

DOCUMENT RESUME

ED 199 049

SE 034 170

AUTHOR Aldrich, Michele L., Comp.: And Others  
 TITLE Programs in Science, Mathematics and Engineering for Women in the United States: 1966-1978.  
 INSTITUTION American Association for the Advancement of Science, Washington, D.C.  
 SPONS AGENCY National Science Foundation, Washington, D.C.  
 REPORT NO AAAS-80-11  
 PUB DATE Nov 80  
 GRANT NSF-SPI77-27279  
 NOTE 294p.; Contains occasional light and broken type.  
 AVAILABLE FROM American Association for the Advancement of Science, 1776 Massachusetts Ave., N.W., Washington, DC 20036 (no price quoted).

EDRS PRICE MF01/PC12 Plus Postage.  
 DESCRIPTORS \*Career Choice; Career Planning; \*Directories; \*Educational Opportunities; Engineering; Engineering Education; Equal Education; \*Females; \*Improvement Programs; Mathematics; Mathematics Education; Science Education; Sciences; Sex Fairness; \*Special Programs

ABSTRACT

Presented is a description of over 300 projects designed to increase the numbers and status of women in science, engineering, and mathematics training and careers. Each project description begins with a heading which conveys standardized data about the program in a condensed form. The headings are explained on the inside front cover of this text. A narrative paragraph details the recruitment strategies, goals, methods, and insights of the project. Each paragraph closes with citations of any publications, films, or tapes created during the program, followed by the name, address, and telephone number of someone knowledgeable about the project. The projects are arranged by grade level, and alphabetically by program title within levels. When a project crosses more than one level, it is listed with the earliest applicable grade. The title page of each section cross-references relevant projects in other sections. Indices in the back of the document list the states in which the projects took place, the disciplines they covered, sponsoring institutions, and their funding agencies. (MP)

\*\*\*\*\*  
 \* Reproductions supplied by EDRS are the best that can be made \*  
 \* from the original document. \*  
 \*\*\*\*\*



ED 177 047

# Programs in Science, Mathematics and Engineering for Women in the United States: 1966 - 1978

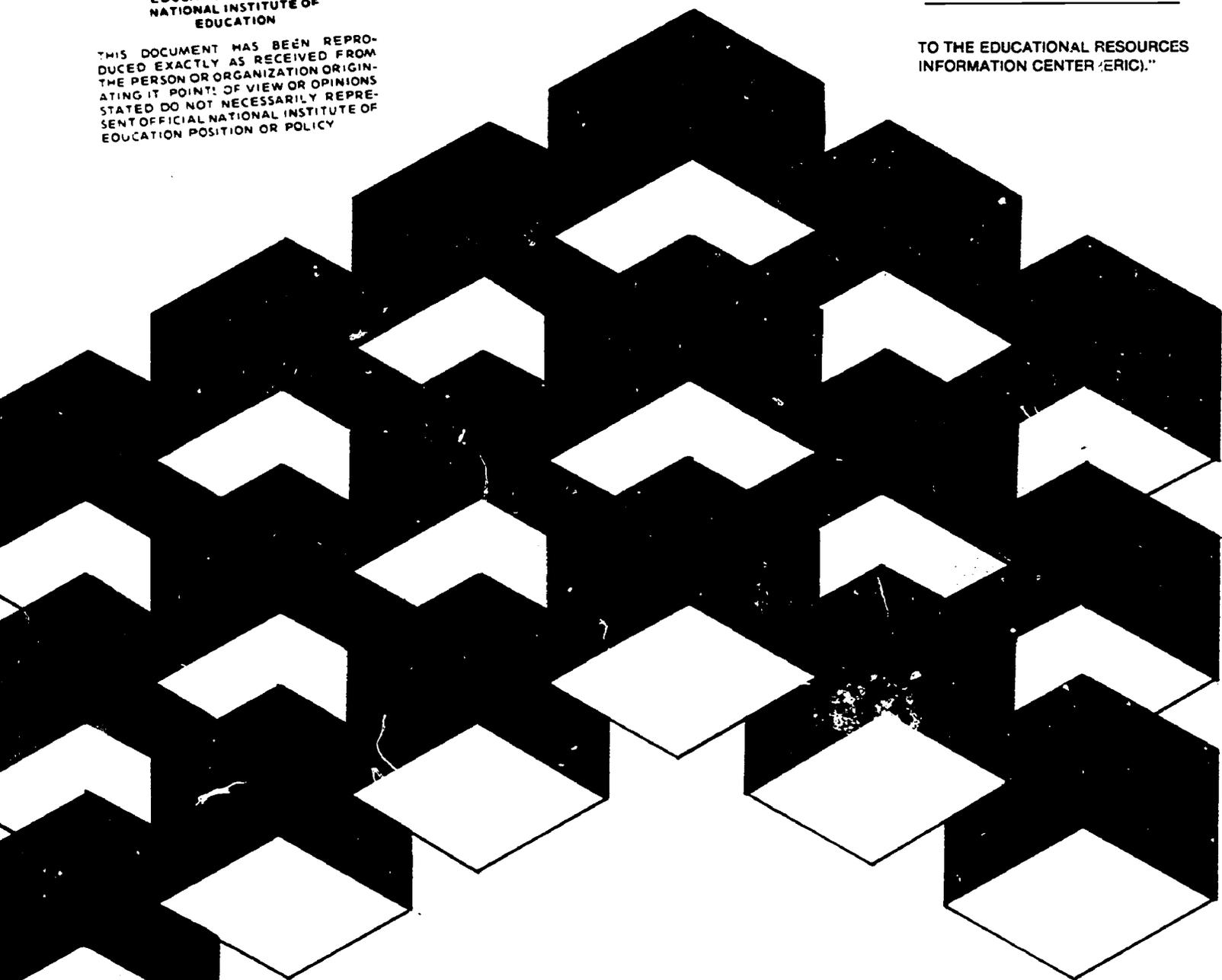
"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Grayce A. Finger

U S DEPARTMENT OF HEALTH,  
EDUCATION & WELFARE  
NATIONAL INSTITUTE OF  
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."



034170

Compiled by  
Michele L. Aldrich  
Paula Quick Hall

## EXPLANATION OF PROJECT HEADINGS

Inventory Number. TITLE OF PROJECT (abbreviation, if any), Sponsoring Institution (abbreviation, if any), City State Zipcode; Other Sponsoring Institution, if any / Funding agency or source of money / annual cost or total cost (Funding agency's percent of cost; Institution's percent of cost) / Time period of project or grant / Disciplines included in project—Math(ematics), Ast(ronomy), Phy(sics), Chem(istry), Bio(logy), Med(icine), Engr-engineering, Agr(iculture), Soc(ial sciences), Geol(ogy--includes marine sciences), Psy(chology), all others spelled out in full / Educational level: numbers 1 through 16, i.e., 1st grade through senior in college (and K for kindergarten); faculty or employee development; continuing/adult education; graduate; reentry women / Number of participants F(emale); M(ale) / Special populations. Special **recruitment** strategies used for these populations\*; Percentages of these populations **involved**\*; Special **efforts** for these populations\*; **Role models** from these populations\* / V means an evaluation was done or is planned.

- \*N = Native American (Indian) / Alaskan Native
- B = Black/Afro-American
- A = Asian-American
- H = Hispanic/Chicana/Puerto Rican/Mexican-American
- E = Economically disadvantaged
- Min = Minority
- D = Disabled/Handicapped

The name, address, and telephone of someone knowledgeable about the project is provided at the end of the narrative paragraph.

Not all the headings bear all the information noted above. Some projects did not provide data on certain items such as cost or minority participation.

PROGRAMS  
IN  
SCIENCE, MATHEMATICS AND ENGINEERING  
FOR WOMEN IN THE UNITED STATES:  
1966 - 1978

COMPILED BY

MICHELE L. ALDRICH  
PAULA QUICK HALL

with the assistance of

Karen L. Ehrlich  
Roger Long  
Rachel Warner

Office of Opportunities in Science  
American Association for the Advancement of Science  
1776 Massachusetts Avenue, N.W.  
Washington, D.C.

November, 1980

AAAS Publication 80-11

The project "An Inventory of Programs in Science and Mathematics for Women" and this publication were supported by the National Science Foundation, Grant No. SPI77-27279. Any opinions, conclusions, or recommendations expressed herein are those of the authors and do not necessarily reflect the views of the National Science Foundation.

Copyright 1980 by American Association for the Advancement of Science

Library of Congress Catalog No. 80-70491

ISBN No. 87168-251-6

Printed in the United States of America

Cover design by Marlene Povich

## TABLE OF CONTENTS

PREFACE.....	v
ACKNOWLEDGMENTS.....	vi
INTRODUCTION.....	vii
INVENTORY OF PROGRAMS	
I. ELEMENTARY SCHOOL.....	1
II. MIDDLE SCHOOL AND JUNIOR HIGH.....	15
III. HIGH SCHOOL.....	43
IV. HIGH SCHOOL AND COLLEGE.....	83
V. COLLEGE: CAREER WORKSHOPS, NSF FUNDED...	111
VI. COLLEGE.....	141
VII. GRADUATE SCHOOL AND REENTRY WOMEN.....	183
VIII. FACULTY-EMPLOYEE DEVELOPMENT.....	209
BIBLIOGRAPHY ON WOMEN IN SCIENCE, ENGINEERING, AND MATHEMATICS.....	223
ASSOCIATIONS OF WOMEN SCIENTISTS, ENGINEERS, AND MATHEMATICIANS: COMMITTEES ON OR FOR WOMEN IN SCIENTIFIC, ENGINEERING, AND MATHEMATICAL ASSOCIATIONS.....	275
INDICES	
STATE INDEX.....	283
DISCIPLINES.....	285
FUNDING SOURCES.....	286
SPONSORS.....	288

## PREFACE

In 1973, the Committee and Office of Opportunities in Science were established by the AAAS to address the problems of the under-representation of minorities and women in science, engineering and technical careers. Early in its history, the Committee identified as a priority the documentation of the myriad special programs that had been developed to encourage the movement of American Indian, Black, Mexican American and Puerto Rican students into careers in science, engineering and biomedicine. This project was supported by the National Science Foundation and resulted in the publication in 1976 of Programs in Science for Minority Students 1960-1975. The idea of an inventory of programs for women was inspired by the success of that publication.

Much has happened since the early 1970's to focus attention on the problems of women in science, and funding initiatives have provided modest support for implementation of intervention projects. The NSF Women in Science Program has been a source of support for much of the activity; but so have the general women's programs such as the Women's Educational Equity Act Program, recognizing the need to move women into non-traditional careers. Certainly science, engineering and mathematics are non-traditional careers for women.

As intervention programs proliferate, as the search for solutions goes on, this book will stand as an attempt to share the experiences of the women and men who have tried and failed, tried and succeeded. Its potential value extends yond this to one of perhaps serving as a source of future contacts and future networks for those already involved in activities as well as for those not yet involved.

Let it also stand as a challenge for what needs yet to be done, for this project unfortunately documents exclusion which is probably unintentional but exclusion nonetheless. Minority and disabled women must be included specifically in programming for women - as participants, as role models, and as directors and subject of serious research on barriers to their entry into science.

We believe that careful documentation and wide dissemination of information on projects already undertaken to increase participation of women in science can do much to shape future programming. It is in this spirit that this inventory of programs has been developed.

S. Maria Hardy  
Chairperson  
Committee on Opportunities  
in Science

## ACKNOWLEDGMENTS

This inventory benefited from the advice of three sequential Heads of the Office of Opportunities in Science at AAAS who were with us during its creation. Janet Welsh Brown, now Executive Director of the Environmental Defense Fund, guided us on publicizing the inventory, canvassing our "public" to find project directors, and designing the questionnaire. Rayna Diane Green, currently Director of the Native American Science Resource Center at Dartmouth College, assisted in the search for projects, especially those relevant for minority women, and saw the questionnaire through its final revisions. Shirley Mahaley Malcom, current Head of OOS, helped in planning the editing of the entries, arranging the book, and assembling the indices and prefatory matter. To say that Roger Long "assisted" in the production is to underestimate greatly his contribution. He typed and dispatched the mailings, kept track of what materials were where, typed (and edited in so doing) the draft entries, and answered numerous telephone calls and letters from scientists and educators. Karen Ehrlich edited many of the college level entries and took charge of the production of the book. Rachel Warner's contribution to the bibliography is mentioned on page 223; in addition, she typed the final draft of the entire book.

During the search process and in the formulation of the questionnaire, we were guided by a resourceful and supportive advisory committee consisting of Mark Durst and Vera Kistiakowsky (both at Massachusetts Institute of Technology), Diana Ida Martinez (Michigan State University), Esther A. Hopkins (Polaroid Corporation), Alma E. Lantz (Eclectic Systems Research of Denver), and Mary Ellen Verheyden-Hilliard (Verheyden Associates of Washington D.C.). Several researchers and administrators in the women and science area gave us extensive help in searching for projects, notably Joan Burstyn (Douglass College of Rutgers University), Edith Ruina (Massachusetts Institute of Technology), Iris Weiss (Research Triangle Institute), Joanne Koltnow (Tymshare of Cupertino, California), and Beatrice Bain (University of California at Berkeley).

We also thank William D. Carey, Executive Officer of the AAAS, for sending several letters on our behalf to his colleagues at other scientific societies and for continued support of this project. Finally, the inventory owes an enormous debt to M. Joan Callanan, our program officer at the National Science Foundation, whose knowledge of women in science we drew upon repeatedly in this book. Her assistant, Mildred Levin, cheerfully and frequently sleuthed elusive pieces of information about NSF funded projects. To all those named here, and to the scientists and educators who sent in information for the inventory, we express our deepest appreciation for their contribution to the book.

Michele L. Aldrich  
Paula Quick Hall

## INTRODUCTION

This book describes over three hundred projects designed to increase the numbers and status of women in science, engineering, and mathematics training and careers. Each project description begins with a heading which conveys standardized data about the program in a condensed form. The headings are explained on the inside front cover of this book. A narrative paragraph details the recruitment strategies, goals, methods, and insights of the project. This paragraph closes with citations of any publications, films, or tapes created during the program, followed by the name, address, and telephone number of someone knowledgeable about the project. The projects are arranged by grade level, and within levels, alphabetically by project title. When a project crosses more than one level, it is listed with the earliest grade to which it applies. The title page of each section cross-references relevant projects in other sections. Indices in the back of the book list the states in which projects took place, the disciplines which they covered, their sponsoring institutions, and their funding agencies. The numbers used in the cross-references and indices refer to the inventory entry numbers, not to the page numbers in the book.

Programs in the inventory started in 1966 or thereafter; some were of finite duration, but others are still underway. Data for the entries came from a four page questionnaire completed by the contact person listed in the entry or by someone else who knew the project well. Each draft entry was sent to the contact person for verification, and changes were made following their suggestions unless revisions conflicted with the format of the inventory. While the inventory staff tried to gather the same information about every project, we did not succeed in some cases in obtaining all items for each project, such as details of its costs--often because these data were not collected at the time the project was conducted.

The book documents a wide variety of ingenious approaches to the problem of increasing the interest and involvement of women in science, mathematics, and engineering in the United States. Among the kinds of projects included are provision of career information, improvement of mathematics or science counseling, innovations in science and mathematics curricula, new methods of teaching science and mathematics, recruitment of women into science education programs, assistance to women with degrees to reenter the workforce, and major institutional changes involving some combination of all these approaches. Readers will find projects which achieved these ends using museum exhibits, formal classes, workshops, inservice training seminars, and many other strategies tailored to suit various audiences and budgets. Two kinds of "projects" are handled separately

## INTRODUCTION

in this book because a different design from our questionnaire method was required. Research efforts are detailed in a bibliography of several hundred citations; the method by which this list was compiled is outlined on page 223. Similarly, committees and associations concerned with women in science-related fields did not fit the questionnaire straitjacket; these organizations are listed on pages 275-282 of the book.

Certain projects are purposefully excluded from the inventory, most notably those related to health sciences and medical sciences and scholarship programs which are not tied to a recruitment or retention strategy. Several projects were reported from women's colleges in which the fact that women took part was incidental to the goal of the program; we have omitted these unless there was something deliberately "woman specific" about them. We also discovered a gratifyingly large number of programs for minority students with very high enrollments of females. Those which did something specific for the women--such as special recruitment strategies, curricular features, or deliberate use of women role models--are in this book. Similarly, science projects targeted for the general population which happened to enroll women appear only if they did something "woman specific" which might be useful for others to adopt. We have described over sixty projects in these categories but outside the scope of the inventory in a separate document available upon request from the Office of Opportunities in Science of the AAAS.

The project staff used several rounds of mailings to find programs which should be described in the inventory. First, press releases on the inventory were sent to science journals, educational publications, women's magazines, and specialized newsletters. Second, staff canvassed many different groups for information about projects--National Science Teachers Association state chapters, officers of women's science associations and committees on women in science, contact persons in minority science organizations and in the AAAS inventory of programs for minority students, the presidents of women's colleges, science and engineering departments of universities, science and technology centers (including major museums), secondary school principals associations, members of the Council of State Science Supervisors, foundations which had supported women's projects, women's centers and women studies programs, 4-H executive officers, Title IX regional coordinators, and many other science or education or women's associations. Project staff wrote to participants in conferences on women in science, such as leaders of the San Francisco Bay Area Math/Science Network workshops, and AAAS symposium speakers. In each mailing, names and addresses of persons who might

## INTRODUCTION

have run eligible projects were requested. The staff then wrote to all those identified as possibly knowledgeable about programs, asking if they had indeed conducted them and if they know of others who had. Questionnaires to describe programs went to all we could find who thought their efforts qualified for inclusion. In addition, these forms went directly to leaders of women in science projects funded by the National Science Foundation, Women's Educational Equity Act, or other funding sources for which we had lists.

Patterns worth noting appear when the inventory projects are studied collectively, as well as by grade level. The distribution of projects by states correlates with population distribution, with a few exceptions. If the states are rank-ordered by number of projects, and that order compared to rank-order by size of population (as of the 1970 Census), only a few states appear more than ten rank places out of line. Colorado, Arizona, New Mexico, Vermont, and the District of Columbia have a rank eleven places or high on the inventory list than on the population list. North Carolina, Florida, Louisiana, Alabama, and Kentucky all have proportionally fewer projects in the inventory than their population size would lead one to expect.

A glance at the disciplines index also suggests some interesting trends. Omitting the "other fields" category from the calculation, and counting the projects which emphasized a given science, yields the following results. "General science" (projects which covered six or more fields) describes 39% of the projects, followed by engineering (28%), and mathematics (17%). The more specialized science fields trail thereafter: chemistry (7%), biological and medical sciences (4%), physical sciences (astronomy, geology, marine sciences, physics) (3%), and social and behavioral sciences (2%). These findings are not unexpected. Engineering is a very wide term and thus cannot be compared to a narrower science specialty such as chemistry. Mathematics is needed for all the fields of science and engineering; accordingly, mathematics has been the focus of much attention in the inventory projects. Also, research findings cited in the bibliography of the inventory demonstrate that poor mathematics preparation is a significant barrier for women considering science-related careers.

The projects have been funded by a remarkable variety of sources. Many won support from several groups, so there is double-counting in the index. Industries and corporations are listed as providing money for 29% of the projects, followed by the National Science Foundation (26%), other

## INTRODUCTION

federal sources (13%, mostly from the Department of Education), foundations (11%), associations and societies (7%), tuition and fees (6%), state and local government (3%), and other agencies (4%). The industrial support often came from firms located near where the project took place, and reflects the businesses' interest in seeing that well-trained personnel are available for future employment. Corporate support came from many different firms, with IBM supporting seven projects and Ford Motor Company six, but most firms underwriting one or two projects. Industrial support tended to be for modest amounts of money, often to supplement a grant obtained from a governmental source. The private sector was often mentioned as donating the time of their women scientists to take part in inventory projects.

A word of caution about the cost figures in the report--one cannot divide the number of women listed as benefiting into the dollar amount expended and come up with a ratio of cost effectiveness of a particular program. Many projects were run with enormous amounts of contributed labor from dedicated volunteers. Also, many sponsoring agencies provided supplies, space, and services at no charge. Some projects gave the numbers of women reached in pilot tests, rather than guessing at the thousands who might ultimately benefit. Finally, it is incorrect to compare the outcome of the one-day career day workshop to the intensive training of a reentry program which absorbs a year or more.

As one might expect, universities and colleges proved far and away the most common sponsors of projects, having been the home base for 84% of the projects, followed by research and program organizations (including industry) (9%), associations (5%), and schools (3%). Within the academic sector, however, there was again sponsorship of a few projects by many schools, rather than many projects by a few postsecondary institutions. University of California (Berkeley) led with seven projects, followed by Mills College and the University of Wisconsin (Madison) with six each. Women's colleges are represented throughout the list, and coeducational schools both large and small have been project bases. It is advisable to be skeptical about the meaning of this list, as some institutions aggregated several activities into one "project" while other institutions divided them into separate entries.

One problem common to many of the inventory programs is the underrepresentation of physically disabled women and of women from racial and ethnic minority groups. Many projects failed to recognize that these women were in their target population; a program might indicate that girls in all tenth grade classes in a region would be addressed, to

## INTRODUCTION

take a hypothetical example, and then say that there were no minority or handicapped women in this group, which seems highly implausible. Several projects did try to recruit underrepresented groups but reported that few such women enrolled. Several explanations might account for their difficulties. First, some of the sponsoring institutions had little prior contact with minority or disabled students, and the women's project may have been the first good-faith effort extended by the sponsor. We believe that these "firsts" may be the start of better relations, but can understand that many women might hesitate to accept an offer to join a project at an institution which had not contacted them regarding previous activities. Second, projects with a disappointing turnout of minority and handicapped students may not have used women scientists from these groups in their planning stages, as sources of advice on recruitment and on design of the program. Third, there is some confusion over the connection between low income women and the other underrepresented groups. Some projects said they approached CETA or welfare offices in an effort to reach minority and disabled women, when the majority of such women do not participate in public assistance programs. In regard to disabled women, it is worth noting that few project sites were chosen for wheelchair accessibility, and that mention was not made of the availability of interpreters for the deaf and of Braille or tape materials for the blind. Much still needs to be done to attract and to serve minority and handicapped women within science programs targeted for all women.

Only a few science projects are listed for girls in elementary schools. The program described at Morehead Primary School (entry number 009), in which science activities for boys and girls have been designed to eliminate sex-typing, is probably similar to those conducted at many other places. We believe that project directors may not have been aware that such efforts qualified for inclusion in the inventory. Because they were funded from general school budgets rather than by special outside grants, directors may not have seen them as "projects" but as part of a general curriculum. It is noteworthy that many elementary school level projects directed their messages to boys as well as to girls, to accustom both sexes to thinking of science as an activity suitable for everyone. Several efforts directed toward reducing sex-typed behavior in many fields, science included, appear in the inventory in the sections on faculty-employee development and presecondary levels. Elementary and junior high school programs tend to touch on all the science-related disciplines, and are directed at a "captive audience" in the classroom rather than at a population which has been specially recruited or screened.

## INTRODUCTION

On the high school level, projects relating to engineering blossom at an astonishing rate. The local chapters of Society of Women Engineers often appear as sponsors. Schools of engineering support these efforts as part of their campaign to achieve a critical mass of women enrolled in engineering and to end the stereotype of engineering as a male pursuit. Here they are following the pattern of projects aimed at encouraging minority students to enroll, which is documented in an earlier AAAS publication.\* Indeed, such programs are often targeted now for both minority and female students.

All projects, particularly those for high school students, use role modeling in a deliberate way. By high school, an emphasis appears on informing students about the prerequisites for entering college training in science fields--including the importance of taking as much mathematics at as intensive a pace as the school offers. To get this message across with a sense of immediacy, many programs use college science students in the high school programs, in addition to post-baccalaureate working scientists. We were surprised to see how little "hands on" science activity is scheduled during high school events, and how little follow-up there is, especially after the one- or two-day workshops. Most programs for high school students sought girls who had the potential for succeeding in careers in the fields covered by the project. It is not clear whether project directors wanted to reach girls who had not yet chosen any careers, or to attract into science those who were leaning toward traditionally female occupations. Efforts to counter sex-typed counseling would have targeted the latter group. Criteria for identifying high ability students included enthusiasm for science on the part of the student; teacher or counselor nomination, selection, or recommendation; prerequisite mathematics or science course work; and test scores or grades. Behind these strategies is an assumption that science careers are for the gifted and talented. Two issues need to be raised about this assumption. First, there are many science technician jobs available for which high school science training is critical. Secondly, science literacy is a vital aspect of a basic liberal arts education which should not be seen as "elective" for only those seeking science careers. It is troublesome that few projects tried to convince girls of the relevance of science, and particularly of mathematics, for virtually any pursuit they might choose, be it law, business, the arts or humanities, or homemaking.

\*Shirley Mahaley Malcom, John Cowrie, and Janet Welsh Brown, Programs in Science for Minority Students 1960-1975 (Washington DC: AAAS, 1976).

## INTRODUCTION

College level projects appear most often in two guises--as career day workshops, frequently supported by modest grants from the National Science Foundation, and courses of various kinds and durations. The course work may be a dual degree program for engineering credentials that permit students to pursue a liberal arts degree at the same time. Many math courses crop up, some designed to attract math "avoiders" into acquiring quantitative skills, and others designed to help the math "anxious" overcome their psychological blocks so they can master the skills. The math programs are grounded in research on women, much of which is listed in the bibliography of this report. These are superb examples of intervention strategies that are tied to research findings. College programs, far more than high school programs, use internships in science industries and university or government laboratories, a feature carried into the graduate and reentry projects as well. Postsecondary programs frequently involve the students in research practicums, sometimes even during the brief career workshops. Programs limited to one scientific specialty such as chemistry begin to proliferate, and industry involvement increases, with the expected payoff in employee recruitment. Still, many projects depend on tuition or student fees for financing their work. College project directors are ingenious at splicing their programs into general budgets of women's centers, science departments, schools of engineering, and the like. This "mainstreaming" takes place at institutions committed to the importance of increasing women's participation in science; isolated programs run with "outside" financing are more likely to appear at schools which haven't begun a wholesale effort to end sex-typing throughout the school, but may be the first step in that direction.

Over fifty projects in this inventory are NSF funded college or high school-and-college career workshops. Usually of one or two days duration, these sessions use role modeling, panels, small discussion groups, and keynote speakers to present information about training and careers in the sciences. The students are drawn from a fifty or hundred mile radius around the host institution. Mailings are the core of most recruiting efforts, supplemented by a variety of other approaches. Most workshops involve an application process, but up to some enrollment limit; few reject anyone who responds. These projects are more conscious than most others of the desirability of involving minority women, perhaps because the NSF guidelines encourage that practice, but the projects not targeted specifically for these women rarely succeed in drawing substantial proportions of racial or ethnic minority groups. Few of the career workshops are replicated in later years with

## INTRODUCTION

other funding, although they inspire continuing efforts of other kinds for women in science by the sponsoring school.

The other big block of NSF supported endeavors occurs on the graduate level and is designed for women reentering science. These career facilitation projects may update the knowledge or skills of women out of the science workplace for some years, or may retrain them in another speciality in which job prospects are brighter than in their original field. These projects are expensive on a per-student basis, but as a recent evaluation documents, the payoff to society in creating productive, motivated scientists in a short period of time makes them very attractive.\* The facilitation projects frequently give participants on the job experience in internships, and usually include counseling and tutoring to smooth over difficulties of women who are changing their lifestyle and career lines.

One of the uses of this inventory will be to provide guidance and inspiration to those who wish to start women in science projects. The staff offers the following suggestions in designing new programs.

--Stress the relevance of mathematics training to all careers and life pursuits. Women who go into the law, business, or humanities research will need grounding in quantitative skills just as those who become scientists and engineers.

--Men can be valuable allies. Many of the projects in this book were originated and supported by male scientists and educators. Often, women scientists, especially those starting their careers, must concentrate on their research and can spend less time than they would like working on projects for women in science.

--Involve minority and physically disabled scientists, especially women from these groups, in the planning of your project. They can offer valuable ideas on how to attract participants to your events and on features that would make the project useful to these underserved populations.

--Persons in educational institutions, scientific organizations, and scientists and teachers in states with relatively few women in science projects (North Carolina, Florida, Louisiana, Alabama, and Kentucky) need to be thinking about starting additional projects. The major

\*Alma E. Lantz, Programs for Reentry Women Scientists (New York: Praeger, 1980).

## INTRODUCTION

funding agencies are interested in seeing good geographical balance of money expended for efforts such as these across the United States.

--Foundations and government agencies interested in the health and medical fields should support an inventory of projects in these sciences to complement this book. Such a directory would be valuable for planning by the Department of Health and Human Services as well as useful to potential directors of future projects in these fields. The survey ought to include programs designed to attract men to health careers non-traditional for them, such as nursing.

--Scholars doing research on women in science should publicize their findings in media likely to reach those who might conduct intervention projects. The work on women in mathematics is a model in this regard.

--Project directors should prepare something the participants can take with them from the event, even if only a one page resource list, which encourages them to follow up on what they learned through additional reading and talking to other people. The printed program of your session, for example, should include the mailing address of scientists and educators who helped the group.

--Private philanthropic foundations, and state and local funding agencies, could be more receptive to supporting "women and science" projects. Some highly successful work has been underwritten with modest grants by these groups and more is needed.

--Look for diversity in sponsorship and consider possible motives for various groups to support your efforts. Colleges and universities are now overwhelmingly the home bases for projects. Their projects are typically part of an attempt to diversify and expand recruitment, or efforts by women faculty and students to encourage other females to consider their chosen (male dominated) fields. Scientists, in their capacity as professional society members, are often concerned about national enrollment rates and take a personal interest in promoting their fields of study; they are useful as "role model" participants in intervention projects. Science-based businesses--a source of money for projects, work opportunities for students, and of research tour sites--are usually motivated by a need to develop the future employees and a desire to generate business in the community. State and local governments are especially interested in raising grades and test scores, reducing attrition, and preventing or reducing unemployment. Activities which stimulate students' academic interest tied to an identified problem area may appeal to such sponsors.

# I. ELEMENTARY SCHOOL

GRADES K - 5\*

ENTRY NUMBERS 001 THROUGH 015

*See also FACULTY-EMPLOYEE DEVELOPMENT for teacher education programs for this level (entry numbers 306, 308, 313)*

*\*Projects begin between grades K-5, but may continue into upper levels.*

## ELEMENTARY

001 CAREERS FOR WOMEN (AND MEN) IN MINING, Women in Mining (WIM), Golden CO 80401 / WIM / \$200 (WIM 100%) / Sept 1978-present / Math, Phy, Chem, Bio, Agr, Geol, Psy / 5 through 16 / 300 F, 200 M year / Involved 1% N, 1% B, 1% A, 1% H, 15% E; Efforts E; Role models E.

WIM has developed a slide show depicting the organization of a typical large mining company and the functions of the company's departments. The slides are arranged as if one were touring the company's operations. The slides are shown by WIM members who discuss career possibilities in mining, such as that of geologist or engineer. The slides and discussions are appropriate for elementary through graduate audiences, but WIM is concentrating on grade 5 through high school classes to show students the scientific side of mining and to dispel the myth that the only jobs in the industry are digging underground. WIM members serve as role models to convince males as well as females that women can have a successful career in the mining industry. They are especially interested in convincing young women that many career opportunities will open if they acquire a strong science education. WIM receives invitations to speak at school career days and to classes through contacts with school administrations and teachers. When requested to do so, WIM will arrange follow-up tours of mining sites or visits on-the-job to mining departments with especially interested students. To insure that women from low income families have a chance at mining careers, WIM has also established scholarships based on financial need. Barbara Kitchen, Houston Oil and Minerals, 1325 S. Colorado Blvd., Building B, Denver CO 80202, (303) 692-6200

002 EDUCATIONAL PROGRAM FOR GIRLS AND WOMEN IN SCIENCE AND MATHEMATICS, Sharon L. Menard, Lafayette CO 80026 / Women's Educational Equity Act Program, U.S. Department of Education (U.S. ED) / \$15,000 (U.S. ED 100%) / Sept 1977-Oct 1978 / Math, Ast, Phy, Chem, Bio, Engr, Geol / K through 12 / Recruit N, B, A, H; Involved 29% N; Efforts N, B, A, H; Role models N, B, A, H /V.

This program identified, collected and compiled curriculum and career materials about women scientists for educators to use in encouraging women to study math and science. Biographical information (to be published with audiotaped interviews) presents women scientists as role models. To generate names for the initial survey of women, various organizations were contacted. From respondents to the survey seven women scientists were interviewed. Two participants were Native American. Publication: "How High the Sky? How Far the Moon?" to be disseminated by Educational

## ELEMENTARY

Development Corporation (55 Chapel Street, Newton, MA 02160, (800) 225-3088). Four audiotapes, average ten minutes/side, Oct 31, 1978. Sharon L. Menard, 2348 North 107 Street, Lafayette CO 80026, (303) 665-5240

003 EXHIBIT ON WOMEN IN SCIENCE IN NINETEENTH-CENTURY AMERICA, Smithsonian Institution, Washington DC 20560 / about \$5,000 (Smithsonian 100%) / 1977-1979 / Ast, Phy, Chem, Bio, Med, Soc, Geol, Psy / K-Adults / 200,000 F, 100,000 M (estimated) / Involved about 10% Min, 1% D; Efforts N, D.

The project documented the participation of women in American science during a period when it has been popularly assumed that they did not have a role in the field. The exhibit concentrated on the education of women in science at coeducational and women's colleges, and their contributions to basic and applied research before 1900. The display opened with an introductory panel which presented a pastiche of artifacts related to the topic, followed by separate cases or panels devoted to astronomy, zoology, marine biology, botany, physical sciences, chemistry and geology, scientific illustration, and anthropology and psychology. The exhibit was housed on the first floor of the Museum of History and Technology, which is easily accessible for wheelchair users. The anthropology case included items of special interest to Native Americans. The exhibit required two months of research in libraries, manuscript collections, and museums, especially at women's colleges. Artifacts, books, and photographs from institutions throughout the United States were borrowed for the display. Publication: Deborah Warner, "Women in Science in Nineteenth-Century American", 1978, 14 pages; this text and catalog accompanied the display. Deborah Warner, Curator of the History of Physical Sciences, National Museum of History and Technology, Room 5123, Smithsonian Institution, Washington DC 20560, (202) 357-2482

004 FREE SCIENCE SPEAKERS PROGRAM, The Education Committee, Association for Women in Science (AWIS), Chicago Area Chapter, Brookfield IL 60513 / \$20 (AWIS 100%) / Jan 1979-present / Math, Phy, Chem, Bio, Engr / K through 12 / 100 F, 100 M to date.

The goals of this project are to improve the attitudes of male and female students toward women in science, through reeducation and exposure to women scientists as leaders and role models, and to stimulate interest among young girls in science as a profession. Speakers attend "career days", describe their disciplines and daily activities, answer questions and/or make audiovisual presentations

## ELEMENTARY

related to their work. They use and show literature on women in science collected by the Education Committee as a resource for speakers. AWIS members also participate in "mini-courses" in their areas of expertise at high schools. Advertisements are mailed to school districts in which volunteering scientists reside. Personal communication with teachers and community groups, participation as judges in local science fairs and offering to serve as mentors for students at local colleges are activities which generate participation in this program. The director reported that the program has been very enthusiastically received, resulting in an increasing number of requests. Her observations were that "children appear to regard women in science as a 'natural'", and that "speakers have expressed great pleasure in experiencing children's responses and doing community service." Her conclusion is that benefits have accrued to both the speaker and the audience. Participation as a speaker is completely voluntary. Costs are for postage only and are paid from chapter dues. Dr. Nadine Beales, Department of Microbiology and Immunology, University of Illinois Medical Center, Box 6998, Chicago IL 60680, (312) 996-7987

005 GIFTED SCIENCE PROJECT, Montgomery County Public Schools, Rockville MD 20850 / U.S. Elementary and Secondary Education Act (Title IV-C), through Maryland State Department of Education / \$87,322 year; \$261,965 total (MD Dept of Education 100%) / July 1977-June 1980 / Ast, Phy, Chem, Bio, Med, Engr, Agr, Geol / 3 through 8, faculty-employee development / 500 F, 500 M year / Recruit N, B, A, H, D, E; Involved 1% N, 8% B, 4% A, 4% H; Efforts B; Role models B, A /V.

The project identified print resources and community resources for use by individual gifted science students and their teachers. The materials have been assembled into a microfiche data bank which can be explored within areas of student aptitude and interest. A special effort was made to find women and minority scientists for inclusion in the "community resources" part of the file, using direct mailings to groups such as Black scientists' associations and the American Association of University Women. Nearly a third of the scientists in the file are women, and approximately ten percent are Black (male and female). Also, the project conducted detailed searches and special mailings to discover print and pictorial materials which portray women and minority scientists, or which are especially appealing to female and minority students. Finally, in asking about physical barriers which might influence the participation of handicapped students in given science programs in the region, the project staff were pleased to find that few

## ELEMENTARY

programs did present problems for the disabled, and the staff found several persons who were eager to work with disabled students. Publication: "Gifted Science Project: A Resource File for Students in Grades 3-8", paper presented to the National Science Teachers Association, Anaheim, California, December 1978, 61 pages. Dr. John R. Parrella, Coordinator, Secondary Science, Montgomery County Public School, Rockville MD 20850, (301) 279-3421

006 INCREDIBLE INSIDE-OUT BODY T-SHIRT, P. Platypus Publications, Inc. (PPP), Miami FL 33144 / Sale of products / about \$10,000 initial investment (Platypus 100%) / Oct 1978-present / Bio, Med / K through 6 / 450 F (pilot), 450 M (pilot) / Involved 5% Min (estimated).

Initially the T-shirt was targeted for elementary school children; since its test phase, it has been marketed to all grades and to adults (about 10,000 sold as of mid-1980). The shirt was designed as a non-sexist science education toy, stressing the similarities between the sexes rather than their differences, and encouraging girls as well as boys to learn more about their bodies and fitness. The shirt and its accompanying "Owner's Manual" also encourages girls to think about careers in the traditionally male domains of research science and medicine. The shirt is marketed in museum shops, teachers' stores, and toy stores. Museums and schools use the shirt and the manual for teaching human anatomy and physiology. An unexpected benefit has been the recognition of the shirt in design exhibits at the Lowe Art Museum and the Renwick Gallery of the Smithsonian Institution. PPP is following this shirt with a second one on plants, which is expected to interest more boys in what males often consider a topic fit only for girls. Publication: "Owner's Manual and Activity Book", 1978, 16 pages, \$1.25. Vicki Werner Hoffman, 1404 Obispo Avenue, Coral Gables FL 33134, (305) 443-9644

007 MATH/SCIENCE DESEGREGATION PROJECT, Novato Unified School District, Novato CA 94947 / Title IV, U.S. Dept of Education / \$67,000 total (U.S. ED 90%; Novato 10%) / Nov 1978-June 1980 / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Soc, Geol, Psy / 1 through 12, faculty-employee development / 275 F staff and 5,000 F students, 180 M staff and 5,000 M students total / Recruit N, B, A, H, E; Involved .5% N, 3% B, 2.5% A, 2.5% H, .5% D, 3% E; Efforts Min, E; Role models E /V.

The Novato project is primarily a staff training program which directly and indirectly influences all school children in the district, and could be adopted for use elsewhere.

## ELEMENTARY

It is designed to increase the number of girls in math, science, and related vocational fields; to establish a network of teachers and counselors knowledgeable about resources and trained in math and science desegregation techniques; to start girls' peer group programs in junior and senior highs; and to raise community awareness and involve parents in math/science desegregation efforts. To reach its target populations, the project mails brochures, uses personal contacts and informal networks within the schools, issues newspaper releases, arranges for class announcements, addresses PTA meetings, and appears before the district's curriculum council. The project conducts teacher training workshops which discuss gender differences in math/science learning, offer resources and strategies to deal with the problem, and provide assistance in implementing new approaches. Counselor training workshops explore factors affecting math/science preparation by girls and their relevance for career choice. Community conferences for seventh through twelfth grade girls and their parents feature female career speakers (many of them minority women) and "hands-on" workshops in math/science. Special efforts are made throughout the program to indicate its relevance for girls who are not college bound as well as those who are. The project has discovered that attention should be focused on high achieving girls who drop out in eighth and ninth grade, and that career awareness must address what the world of work is like, not merely outline career options. Publication: a handbook of resources and strategies; and the final report on the project, 11 pages, 1979. Lyn Reese, Novato Unified School District, 1015 Seventh Street, Novato CA 94947, (415) 892-0690

008 MATH/SCIENCE NETWORK, Mills College, Oakland CA 94613 / Carnegie Corporation of New York / \$125,000 total (Carnegie 100%) / April 1978-present / Math, Phy, Chem, Bio, Engr, Geol / K through 16, faculty-employee development, continuing-adult education / about 2,000 year / Involved 15% Min (estimated) / V.

The Math/Science Network is an association of more than 500 scientists, educators, engineers, parents, community leaders, and business and industry people established in the San Francisco Bay area to promote the participation of women in mathematics and science and to encourage their entry into non-traditional occupations. Individually and cooperatively, Network members work to develop and conduct innovative math and science education programs for girls and women. The Math/Science Resource Center, which is the clearinghouse and switchboard of the Network, collects and disseminates information about these and other exemplary programs, printing and distributing fact sheets, brochures, and a newsletter (The Broadcast). Located on the Mills College

## ELEMENTARY

campus, it coordinates Network activities locally and nationally and is headquarters for the EXPANDING YOUR HORIZONS conferences. (See entry 021.) It maintains a database on Network membership to refer people to others or to relevant projects, with special success in facilitating contact among people of similar interests in the same geographical region and in suggesting materials and human resources for those wishing to start programs. Mills College and the Lawrence Hall of Science (at the University of California, Berkeley) are the coordinating institutions for the Math/Science Network. Jan MacDonald, Math/Science Resource Center, Mills College, Oakland CA 94613, (415) 635-5074

009 MOREHEAD SCIENCE LAB, Morehead Primary School, Greensboro NC 27410; Natural Science Center in Greensboro / Greensboro Public School System (GPSS), and Morehead Parent-Teachers Association (PTA) / \$200 year for materials (PTA 100%; GPSS donates salaries and administration costs) / Aug 1976-present / Math, Ast, Phy, Chem, Bio, Agr, Soc, Geol, Psy / K, 1, 2, 3 / about 150 F, 150 M year; about 300 F, 300 M to date / Involved 47% B; Role models B, E / V.

The Science Lab schedules all elementary classes through grade three for discovery-oriented, hands-on experiences with the materials, supplies, books, field expeditions, artifacts, and human resources of the laboratory. Parents and community members are invited to join the children; some of these adults serve on a volunteer committee. Both boys and girls participate, but sextyping and stereotyping behavior is avoided, and the girls are encouraged to work actively in what has been considered the male domain of the sciences. Women teachers and women scientists are recruited as role models. Each month the lab focuses on a special science topic, e.g. dinosaurs, and teachers are given ample opportunity to follow up the lab work with further in-class exercises such as reading on dinosaurs or artwork on dinosaurs. During August 1976-August 1977, the lab was started and taught by a staff member who served as science resource teacher. As a result of evaluation in June 1977, regular classroom teachers began teaching science to their students using the lab. Science is thus integrated into the rest of the elementary curriculum instead of being restricted to lab time. By giving girls an early, entertaining, and instructive immersion in science, the project hopes to strengthen them against pressures later in their lives to restrict their activities to traditional female occupations. The success of the project stems in good part from the cooperation of the Greensboro Public School System, particularly its Director of Science, Mack Baker. A ten minute videotape has been shown on local

## ELEMENTARY

television, and it was written about in the local newspaper. Catharine R. Boyles, Morehead School, 4630 Tower Drive, Greensboro NC 27410, (919) 292-2220

010 OVERCOMING MATH ANXIETY, Washington DC 20036 / Sales of services / about \$50,000 (Overcoming Math Anxiety 100%) / 1978-present / Math, Psy / K-Adult / about 1,000 F, about 200 M year / Involved about 15% Min; Efforts Min.

This partnership conducts a number of activities of particular interest to women and minorities. The staff members offer individual and group training to help persons who have trouble learning mathematics because of socialization which discouraged their pursuit of math. They publish bibliographies, reports, and resource lists to assist schools, colleges and universities, businesses, and individual practitioners who wish to increase math confidence among their students, employees, or clients. Overcoming Math Anxiety will advise and guide institutions wishing to conduct math anxiety reduction workshops, or can be contacted to run such workshops under institutional sponsorship. The emphasis in Overcoming Math Anxiety's work is on eliminating the psychological discomfort which the math anxious have and on achieving a better "math self image" rather than teaching math skills, although Overcoming Math Anxiety strategies do involve participants in math exercises as part of the process. Overcoming Math Anxiety also works to instruct the general public (and educators in particular) of the necessity of having students, especially women and minorities; take the maximum amount of math in order to succeed in virtually any career. Sheila Tobias, Overcoming Math Anxiety, 1302 18th Street NW #203, Washington DC 20036, (202) 223-6274

011 PROBING OUR WONDERFUL ENVIRONMENTAL RESOURCES (P.O.W.E.R.), School District Eleven, Bronx NY 10469 / U.S. Department of Education / \$45,063 (U.S. ED 98%; School District Eleven 2%) / Sept 1978-Aug 1979 / Math, Ast, Phy, Chem, Bio, Med, Engr, Geol / 3, 4, 5 / Recruit Min; Involved 60% B, 25% H, 1% D, 1% E; Efforts Min; Role models Min / V.

This was a program to design and develop nonsexist teaching materials for grades three through five. The program which was developed by teachers, use illustrated adventure short stories about junior high school students with unisex names and nonstereotyped personal characteristics. The stories cover themes ranging from environmental conservation to history and geography in the context of summer travels throughout the United States by the six youths. They are

## ELEMENTARY

meant to be read to the students by the teacher and discussed. The series had in October 1979 been distributed to one hundred teachers throughout District Eleven and is expected to be in wide use this year on an experimental basis. Evaluation of P.O.W.E.R. indicated that it "moves children toward the stated objectives..." of making children feel better about themselves; reducing sex role stereotyping among children and making both boys and girls "less bound by the conventional role definitions which tell us what jobs we can hold and what feelings we can have." Publication: People and Places U.S.A., Non-Sexist Wide-Range Media Activities for the Classroom, Pilot Program, School District 11, Bronx, NY to be distributed by Educational Development Center, Inc., 55 Chapel Street, Newton MA 02160, (800) 225-3088. Miriam "Mikki" Weiss, 1250 Arnow Avenue, Bronx NY 10469 (212) 920-1411

011 PROJECT SEED, Berkeley CA 94703 / U.S. Department of Education, state and local funds / \$47 per hour of instruction or \$8,000 per class year (U.S. state and local funds 100%) / 1963-present / Math / K through 12 / 20,000 F, 20,000 M to date / Involved 90% E; Efforts N, B, A, H, E; Role models R, A, E / V.

Project SEED is a nationwide program which uses mathematicians and scientists from universities and corporations to teach abstract mathematics to classes of educationally disadvantaged elementary school children on a daily basis as a supplement to their regular arithmetic program. Children discover mathematical concepts by answering a sequence of questions posed by the SEED instructor. The mathematical topics are chosen from high school and college algebra to reinforce and improve the students' computational skills and to help equip them for success in college-preparatory mathematics courses in secondary education. In follow-up classes, students engage in further in-depth mathematical studies as well as peer teaching and peer tutoring; some students actually teach algebra to university students. The regular classroom teacher is always present when the SEED mathematician is working with his or her class. Regular teachers learn mathematics and effective teaching methodology, and acquire new expectations for disadvantaged children. Project SEED's long-range goal is to increase the number of minority and educationally disadvantaged youth in mathematics and mathematics-related careers. Several universities, including Yale, have provided released time to their mathematics faculty to teach in Project SEED. Major corporations have contributed money; sponsored demonstrations for Project SEED; and released their mathematically trained staff to teach. Children in Project SEED are able to perform abstract,

## ELEMENTARY

conceptually oriented mathematics, and arithmetic computational skills improve enormously. A recent evaluation found that SEED students achieved more than two months growth in arithmetic for each month they participated in the program. While Project SEED does not target girls especially, it has found that the methods are particularly successful with girls. In several districts, girls make up the majority of junior high school students who come after school to continue their study of algebra with Project SEED. Staff members also found its methods effective in helping adult women, including elementary school teachers, to overcome some of their hesitancy about mathematics. Girls who have enrolled in Project SEED after-school classes on a tuition basis have increased interest and success in their regular school mathematics programs. More than 100 articles about SEED have appeared in newspapers, journals, etc. A partial list of these and additional information are available from the project. Helen Smiler, 2336A McKinley Avenue, Berkeley CA 94705, (415) 642-3070

013 TRAINING IN SPATIAL VISUALIZATION SKILLS, University of New Mexico, Albuquerque NM 87131 / Women's Educational Equity Act Program (WEEA), U.S. Department of Education / \$78,000 total (WEEA 100%) / July 1978-Feb 1980 / Math, Engr, Psy / K through graduate / 250 F, 250 M total / Involved 1% N, 2% B, 1% A, 5% H, 5% D, 10% E / V.

Spatial visualization has been identified by researchers as a useful skill in learning mathematics. This project has developed and field tested training packages to improve spatial abilities in women and girls. The testing took part in New Mexico schools and used male control samples. Teachers and students were enthusiastic about the packages, which will be refined and eventually distributed through the WEEA dissemination contractor. Publication: final report to WEEA, in preparation. Peggy J. Blackwell, Behavioral Research Division, University of New Mexico, Albuquerque NM 87131, (505) 277-4233

014 WOMEN IN SCIENCE-POSTER SERIES, Pennsylvania Department of Education (PDE), Harrisburg PA 17126 / \$800 year (PDE 100%) / 1974-present / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Soc, Geol, Psy / 4 through 12 / 150,000 total / Recruit B; Role models N, B, D, E / V.

In an effort to encourage girls to consider scientific careers, a series of posters featuring contemporary women scientists was developed. Each poster includes a photograph of the scientist at work and a sketch of her achievements and honors in the sciences interspersed with descriptions

## ELEMENTARY

of her extracurricular interests, hobbies and personal attributes. To begin this project, individual women scientists were invited to be included in the series. (One hundred percent of those invited accepted.) The costs reported are only actual printing costs. Professional and specialized services, clerical and mailing costs were either donated or absorbed by the Department of Education. This has been an effective way of offering role models in science for girls. The Visiting Scientists Program which is part of the Pennsylvania Women in Science Program is described in entry #015. John J. McDermott, Pennsylvania Department of Education, P.O. Box 911, Harrisburg PA 17126, (717) 787-7320

015 WOMEN IN SCIENCE PROGRAM-VISITING SCIENTISTS PROGRAM, Pennsylvania Department of Education (PDE), Harrisburg PA 17126 / \$800 year (PDE 100%) / 1974-present / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Soc, Geol, Psy / 4 through 12 / 150,000 F / Recruit B; Role models N, B, D, E / V.

In an effort to encourage girls to consider scientific careers this project for providing role models was developed. Letters were sent to practicing scientists in Pennsylvania explaining the program and asking them to donate one day of their time for a school visit. "The goal was to enlist the help of scientists who could present themselves as warm, friendly people with whom the students could identify." The invitations to scientists emphasized the importance of explaining their work in simple terms which the students could understand. Chief school officers also received a letter explaining the program and giving them the opportunity to participate voluntarily. As responses were received, scientists and schools were matched and both were notified. The principals were asked to contact their respective scientists to arrange a date and time, and to prepare teachers for the visit. Six hundred forty-eight practicing scientists (sixty percent of those invited) were assigned to visit these schools. After the visit, the schools were asked to return a brief evaluation form. The great majority of these evaluations expressed enthusiasm for the program and a desire to continue it in future years. Several returns suggested some administrative changes. Many male scientists were involved in these visits; they responded well to what was expected of them, stressing the involvement of women in the sciences. Several brought female colleagues or graduate students with them for the visit. The director felt that the response rate and enthusiasm were quite high, and observed that women scientists are particularly "evangelical" about their work. The visiting scientists program is now continuing, for the second year without the involvement

## ELEMENTARY

of the Department of Education. Participating scientists donated their time and paid their own expenses. Administrative costs during the first year were covered by the budget of the Pennsylvania Department of Education. Project Report: John J. McDermott, "More Women in Science: The Pennsylvania Plan." (1977) 6 pp. John J. McDermott, Pennsylvania Department of Education, Post Office Box 911, Harrisburg PA 17126, (717) 787-7320

## II. MIDDLE SCHOOL AND JUNIOR HIGH

GRADES 6 - 9\*

ENTRY NUMBERS 016 THROUGH 053

*SEE ALSO ENTRY NUMBERS 001 THROUGH 005, 007,  
008, 010, 012 THROUGH 015*

*See also FACULTY-EMPLOYEE DEVELOPMENT for teacher  
education programs for this level (entry numbers  
306, 308, 313, 314 )*

*\*Projects begin between grades 6-9, but may  
continue into upper levels.*

## MIDDLE SCHOOL AND JUNIOR HIGH

016 CAREER EDUCATION FOR MATHEMATICALLY GIFTED GIRLS, Johns Hopkins University, Baltimore MD 21218 / Robert Sterling Clark Foundation / \$40,000 from Foundation\*; University contributed indirect costs / Jan 1977-July 1978 / Math, Phy, Chem, Bio, Med, Engr, Soc, Psy / between 7 and 8 / 24 F / Involved 17% B, 8% A; Role models B.

The Career Education program was part of the Summer Institute for the Mathematically Gifted, sponsored by the Intellectually Gifted Child Study Group in the Division of Education at Johns Hopkins. The selection process for participants involved a series of tests--part of the mathematics talent search run by the study of Mathematically Precocious Youth at Hopkins, headed by Professor Julian C. Stanley. Participants in the career program attended structured classes, visited or were visited by people engaged in a variety of research projects, learned about careers that use mathematics and learned skills in statistics, computer science and critical reading. The project broadened the career awareness of the girls who participated. The real measure of success, according to Dr. Lynn H. Fox, will be "when four years from now, all these girls are enrolled in calculus and physics." The other parts of the Summer Institute were two accelerated math classes, Algebra II and Geometry, for which the selection process was identical to that used for the Career Awareness Program; and two graduate courses for teachers, "The Gifted Child" and "Teaching the Mathematically Gifted." Only students whose schools do not offer similar accelerated math courses were eligible to attend the institute. Publications: Lynn H. Fox and Dianne Tobin. "Broadening Career Horizons for Gifted Girls." G/C/T 4(1978): pp 18-22, 45. Julia Raskin and Carolyn Males. "Heavy math for nimble young minds." The Sunday Sun. Baltimore MD. August 21, 1977. Dr. Lynn H. Fox, 100 Whitehead Hall, The Johns Hopkins University, Baltimore MD 21218, (301) 338-8276

\*Full project cost included training for fifty teachers and an accelerated math program for thirty other students, mostly boys.

017 COMPUTERS FOR GIRLS, Lawrence Hall of Science, University of California, Berkeley CA 94720 / tuition fees / \$1,200 (tuition fees 100%) / Jan 1979-July 1979 / Math, Engr / 6, 7, 8 / 40 F / Involved 5% B, 12.5% A.

This program encouraged girls to learn about computers, exposed them to computer and computer associated careers, gave the participants an introduction to computers and encouraged them to go into computer related fields. The course included daily lessons in computer programming,

## MIDDLE SCHOOL AND JUNIOR HIGH

discussions of careers in computer science, teaching of the history and vocabulary of computers, and discussion of computer theory and how computers work. Participants were taught by college students majoring in computer related fields. Women speakers from computer fields addressed the group. For recruitment, course descriptions were mailed to all math/computer teachers at the designated grade levels in the San Francisco Bay Area and to students who had attended the "Expanding Your Horizons in Science and Math" conference (see entry #021) for junior and senior high school girls. The class was also advertised in the general course brochures published by Lawrence Hall of Science. The program was offered three times; thereafter, the girls started taking other computer classes offered by Lawrence Hall of Science. Melanie Harvey, 1081 Keith Avenue, Berkeley CA 94708, (415) 525-0512

018 EARLY AWARENESS FOR WOMEN IN ENGINEERING, Worcester Polytechnic Institute (WPI), Worcester MA 01609 / E.I. DuPont & Nemours & Co. (one year; WPI thereafter) / 1978-\$325, 1979-\$450; \$800 total (duPont 50%; WPI 50%) / Feb 1978-May 1979 / Engr / 6, 7, 8, 9 / 4,000 F.

This junior high school visitation program developed and increased awareness among young women of engineering opportunities at a stage early enough for them to continue math and science preparation throughout high school. It also gave participants information about various engineering disciplines. Letters asking permission for WPI students to speak with sixth through ninth grade women in their schools were sent to approximately 200 junior and middle schools throughout the five New England states over the two-year period. Teams of two-to-three WPI students made an informal presentation at each participating school. Topics discussed during the visits included career opportunities, personal experiences including initial interest, education necessary, and engineering in general. During the first year the visiting teams were all female; the second year coed teams were used. Organizers have found increased credibility in using both male and female students. The students saw and spoke with groups ranging in size from 3-400 at eighty-three junior and middle schools. All clerical, staff and student time was donated. Costs reported were for transportation, printing and postage. Nancy Hargrave, Assistant Director of Admissions, Worcester Polytechnic Institute, Worcester MA 01609, (617) 753-1411

019 ENGINEERING OPEN HOUSE FOR WOMEN, Technological Institute, Northwestern University, Evanston IL 60201 / Corporate support (Procter and Gamble, Greeley and Hansen, CPC

## MIDDLE SCHOOL AND JUNIOR HIGH

International, Atlantic Richfield in 1978) / \$1,000 year (Corporate support 30%; Northwestern 70%) / May 1977-present / Engr / 6 through 16, faculty-employee development / 250 F year / Recruit N, B, A, H, E; Involved about 10% - 15% Min; Role models N, B, A, E / V.

The one-day meeting is advertised through letters (followed by posters with reservation cards) sent to science and mathematics teachers in junior high schools, high schools, and junior colleges in Illinois, southeast Wisconsin, and northwest Indiana. Inner city schools are included in the mailings to reach low income and minority students. Radio interviews announce the meeting and promote the idea of women in engineering. The programs consist of speakers, discussion sessions, a panel, tours of the campus, Northwestern exhibits and demonstrations, and (starting in 1978) information booths on careers set up by industries. Parents and teachers attend as well as students. Costs are low because Northwestern donates staff time and meeting space. An unexpected finding is interest in engineering among junior college and reentry women. Publications: mimeographed final reports, about 20 pages each. Carolyn Krulee, Director of Counseling, The Technological Institute, Northwestern University, Evanston IL 60201, (312) 492-7379

020 ENROLLMENT ENHANCEMENT: WOMEN IN ENGINEERING, Iowa State University, Ames IA 50011 / Dow Chemical Company, Celanese Corporation, American Society for Engineering Education / \$12,500 year, \$125,000 total (Iowa State 25%; others 75%) / 1970-1980 / Engr / 7 through 12, faculty-employee development / 1,500 F, 1,400 M year, 12,000 F, 10,000 M total / Role models B, A / V.

The goal of these programs is to increase the number of women studying engineering in accredited schools. The following components contribute to attainment of this goal:

(1) approximately 1000 high school visits; (2) nine annual scholarships for women in Chemical Engineering and in Mechanical Engineering; (3) an Engineering Honors Workshop for 150 High School Juniors, of whom about half are girls; (4) establishment of a student chapter of the Society of Women Engineers at Iowa State; and (5) in Summer, 1968, "Non-Traditional Careers for Women", a workshop for counselors and mathematics and science teachers. Enrollment of women undergraduates at Iowa State has increased from 26 in 1972 to more than 400 today. The programs are continuously evaluated by a committee and modified accordingly. Dr. Paul W. Barcus, 104 Marston Hall, Iowa State University, Ames IA 50011, (515) 294-5935

## MIDDLE SCHOOL AND JUNIOR HIGH

021 EXPANDING YOUR HORIZONS IN SCIENCE AND MATHEMATICS, Math/Science Resource Center, Mills College, Oakland CA 94613; about 15 California colleges and universities / The sponsoring schools, plus California State Department of Education (in 1977) and Women's Educational Equity Act Program, U.S. Department of Education (in 1978) / \$500-\$3,000 per conference / 1976-present / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Soc, Geol, Psy / 7 through 12 / about 2,000-3,000 F year / Involved 5-10% B, 3-20% A, 3-10% H; Role models B, A, H, E / V.

The project consists of conferences conducted at colleges and universities to increase young women's interest in mathematics and science, foster awareness of career opportunities for women in science-related fields, and provide students with a chance to associate with women working in traditionally male fields. The workshops typically offer hands-on experiences in science and mathematics, and also feature career discussions with women in technical fields from a variety of workplaces (academe, government, business, industry); for a typical example, see entry #022. To inform students of the meeting, the sponsoring campus mails fliers and brochures to local schools, and press releases are issued to relevant media. Members of the Bay Area Math/Science Network use their contacts with other educators and their students to advertise the sessions. The Resource Center at Mills (see entry #008) provides a planner's handbook, and coordinates the production and distribution of materials for students to take from the workshop. The conferences are organized by volunteer committees with speakers and session leaders donating their services, and with local committees raising money for any remaining expenses of the meeting. On-site evaluation shows many students decide to complete four years of high school math after attending the session. Indeed, participants are so enthusiastic that many have recommended more meetings which last longer than one day. Publication: Joanne Koltnow, Expanding Your Horizons in Science and Mathematics Conferences...A Handbook for Planners, 1979, 50 pages. (Available from EDC, 55 Chapel Street, Newton, MA 02160, for \$1.80). Jan MacDonald, Math/Science Resource Center, Mills College, Oakland CA 94613, (415) 635-5074

022 EXPAND YOUR HORIZONS CAREER CONFERENCE, University of the Pacific (UP), Stockton CA 95211; Bay Area Math-Science Network / student fees, Network, Standard Oil of California and National Air and Space Administration-Ames / \$1,500 (student fees 40%; UP 50%; others 10%) / March 1979 / Math, Ast, Phy, Chem, Bio, Med, Engr, Soc, Business fields, Law / 7 through 12, parents and educators / 380 F, 6 M / Recruit

## MIDDLE SCHOOL AND JUNIOR HIGH

B, A, H, involved 10% B, 20% A, 10% H, 10% E (estimate);  
Role models A, H, and Indian / V.

The project is an example of the conferences described in general terms in entry #021. Participants were recruited through newspaper and radio publicity, posters in local schools, and direct contact with teachers. Care was taken to include junior high schools with substantial minority enrollments in the recruitment effort. The conference offered students hands-on experience in science (through laboratory demonstrations, computer exercises, physiological measurements, and the like), provided career information on a variety of scientific and technical disciplines, introduced students to women role models in non-traditional fields, and gave parents and teachers a chance to attend workshops specially tailored for them. One unexpected finding was the lack of awareness among the adults who attended regarding the importance of students completing the maximum amount of math in high school. The University has received a state grant for a similar workshop in 1980. Deann Christianson, 2239 Kensington, Stockton CA 95204, (209) 946-2347 or (209) 464-1147

023 JUNIOR HIGH OUTREACH, Society of Women Engineers (SWE), University of California (UCB), Berkeley CA 94720 / SWE with contributions from private industry and UCB College of Engineering / \$150 year (SWE with industry and UCB College of Engineering 100%) / April 1976-present / Engr / 7, 8 / Involved 15% A / V.

During the month of April, this program takes teams of working engineers and engineering students into junior high classes to make presentations and answer questions. Speakers are also available for career days or other special events. The goals of the program are to increase junior high students' interest in math and science, to make students aware of opportunities available to those with scientific and technical backgrounds, to give students the opportunity to meet women in engineering, and to support and encourage girls interested in technical fields. Recruiting methods and tools include brochures, posters, flyers, announcements at various meetings and in newsletters, and personal contact with professional engineering organizations, engineering alumni, students, and engineers. A special benefit is the additional contact college students have with professional engineers ("good for job contacts"). Advice from the coordinator: "Start early!" Publication: "What do Jimmy Carter and Leonardo de Vinci have in common?" 1976, fold-out brochure. An evaluation is planned for 1980. Outreach Coordinator, Society of Women Engineers, 308 McLaughlin

## MIDDLE SCHOOL AND JUNIOR HIGH

Hall, University of California, Berkeley CA 94720, (415)  
642-1369

024 JUNIOR HIGH VISITATION PROGRAM, University of Washington (UW), Seattle WA 98195 / local industry / \$30,000 year (industry 80%; UW 20%) / Nov 1976-present / Math, Engr / 6, 7, 8, 9 / 2,500 F, 2,500 M year; 6,000 F, 6,000 M to date / Involved E; Role models Min / V.

This program, aimed at minority and women students, is designed to increase awareness of the value of math and science and their applications, and to motivate students to study more math and science as they progress through secondary school. Potential career fields in the math-science-engineering areas are also discussed with the students. An engineering student team from the University directs simple hands-on lab experiments and conducts demonstrations in a regular classroom situation. The teams are made up of one female and one male student, one being a minority, if possible. The teams are specially trained to present specifically developed subject matter at each junior high grade level and to present themselves as role models. Schools chosen for this effort are those in Seattle with a high enrollment of ethnic minorities. The presentations are made to regular classes with their normal mix of minority and non-minority students, male and female, to emphasize in a natural setting that math-science-engineering areas are available for any interested person. The engineering student teams visited 43 teachers, 190 math classes and approximately 4,900 students at six junior high and middle schools in 1978. The programs consist of experiments and demonstrations in the area of materials and structures (seventh grade), electricity (eighth grade) and energy (ninth grade). In addition to the in-class activities, a curricular program of twenty follow-up activities is made available to each math and science teacher in each school visited. An unexpected benefit has been that teachers have a day to observe their classes in action. P. MacGowan, University of Washington, 216 Roberts FB-10, Seattle WA 98195, (206) 543-2649

025 MASTERY OF MATHEMATICS AS THE KEY TO EQUAL OPPORTUNITY, Mills College, Oakland CA 94613 / National Science Foundation (NSF) / \$21,000 (NSF 100%) / July 1979-July 1980 / Math / 7 through 16, teacher-counselor education / 1,000's F, 100's M / Recruit N, B, A, H, D, E; Involved 30% Min; Efforts N, B, A, H, E / V.

Research findings on women and girls in mathematics show that taking math is crucial to having a wide choice of career

## MIDDLE SCHOOL AND JUNIOR HIGH

options and to maximizing achievement even in fields where women are commonly found, such as the social sciences. However, additional research shows that girls are often steered away from math the minute that such courses become elective. This project is designed to disseminate these research findings to the groups which are in a position to change attitudes and increase female enrollments in math. Speeches, publications, films, and meetings are used to reach parents, teachers, counselors, policy makers, and the female students themselves. Over 2,600 persons attended conferences as part of this project. Emphasis is on solutions, not fault finding which led to past underenrollment of women in mathematics. Minority persons are reached through their advocacy groups, and the research findings which report racial variables or different economic class patterns are reviewed for all audiences. Publications: Lucy W. Sells, "Mathematics: The Invisible Filter," Engineering Education vol. 70 (Jan. 1980), 340-341; Sells, "Improving Educational Opportunity in Essential Mathematics Skills," School Administrator Vol. 36 (Dec. 1979), 22-23; and several near-print summaries of research data. Lucy W. Sells, 1181 Euclid Avenue, Berkeley CA 94708, (415) 524-0397

026 MATHCO: A PROGRAM TO ENHANCE YOUNG WOMEN'S UNDERSTANDING OF INTERDISCIPLINARY USES OF MATH IN CAREER CHOICES, University of Oklahoma (OU), Norman OK 73037; Southwest Center for Human Relations Studies / U.S. Department of Education, Women's Educational Equity Act (WEEA) Program / \$70,000 year, \$140,000 total (WEEA 68%; OU 32%) / Oct 1977-Sept 1979 / Math, Soc / 6, 7, 8, 9 / 800 F, 800 M total; 400 F, 400 M year / Recruit N, B, A, H, E; Involved 5% N, 40% B, 1% A, 6% H, 30% E; Efforts N, B, A, H; Role models N, B, A, H, E / V.

The goals of this project were to develop a middle school math course which would enhance the young women's understanding and appreciation of the interdisciplinary uses of math in career choices, and to show them "that if they elected to not take math in high school, their career options would be severely limited." With a National Review Board and a team of curriculum developers, audio-visual specialists and special consultants, the course was developed and validated in eleven school systems chosen nationwide for their racial and economic diversity. The program consists of five modules which include problem solving activities focusing on the relationship of mathematics and social sciences, practical arts, fine arts and language arts, science and careers and a pre-post questionnaire. The course includes several audio-visual entities and will be disseminated by the Educational

## MIDDLE SCHOOL AND JUNIOR HIGH

Development Corporation, 55 Chapel, Newton, MA 02160.  
Carole Hall Hardeman, Ph.D., Barbara T. Laquer, M.A.,  
Kristen Carl, B.S., University of Oklahoma, 555 Constitution  
Avenue, Norman OK 73037, (405) 325-1711

027 MATHEMATICS EDUCATION FOR GIFTED SECONDARY SCHOOL  
STUDENTS (PROJECT MEGSSS), Project MEGSSS, Inc, St. Louis  
MO 63122 / National Institute of Education, U.S. Department  
of Education / \$150,000 year, \$2,000,000 total / Aug 1966-  
present / Math / 7 through 12 / 175 F, 200 M year; 1,000 F,  
1,500 M to date / Involved 0.1% N, 5% B, 0.1% H, 0.1% D,  
0.1% E.

The program provides a challenging mathematics curriculum for gifted secondary school students and an opportunity to earn up to 32 semester hours of undergraduate college credit while in secondary school. Sixth grade students are nominated by schools in the St. Louis metropolitan area. Parents attend an orientation and students are given a battery of tests. (About 1/2 of those tested this year were enrolled - 57 girls and 52 boys.) Students attend math classes at the MEGSSS Center two or three times a week instead of taking math in their schools. The classes are taught by project staff, some of whom are authors of the special series of text books developed for the curriculum. These books are free of sex bias and stereotyping. Students, in general, have achieved very well with extremely difficult material; the number of nominees has more than tripled and interest in the community has grown substantially. It was observed that "the girls are usually slightly better than the boys at the beginning...but that after a year or so the two groups are more or less equal in achievement." Most girls who drop out of the program do so between 8th and 9th grade because of increasing social pressures. Attrition among girls who remain in the program through 9th grade is negligible. Attrition among boys is more likely during or at the end of the 7th grade (the first year in the program) primarily due to poor achievement or a decision that the work is too hard for them. Burt Kaufman, 11287 Manchester Rd., St. Louis MO 63122, (314) 821-9047

028 MIDWEST PROGRAM FOR MINORITIES IN ENGINEERING, Illinois Institute of Technology (IIT), Chicago IL 60616; Northwestern University and Committee on Institutional Cooperation / Sloan Foundation / \$848,000 to date (Sloan 67%; Northwestern 33%) / Sept 1975-present / Math, Phy, Chem, Bio, Engr / 7 through 12 and teacher, counselor, and parent education / 3,150 F, 3,850 M to date / Recruit B, H; Involved 1% N, 79% B, 1% A, 17% H, 57% E; Efforts N, B, H, E; Role models N, B, A, H, E / V.

## MIDDLE SCHOOL AND JUNIOR HIGH

The project wants to raise participation by minority and female populations in management and scientific decisions which affect the nation, by increasing the numbers of these groups qualified for and interested in engineering careers. They conduct out-of-school classes and projects designed to teach mathematics and science up to a level which insures adequate college preparation. The program cooperates closely with local high schools in seven midwestern states, tailoring the recruitment and training approach for each locale. Support (including scholarship money) is sought from industry as the sector most likely to benefit in the long run from the project. The director reports that he has discovered far more bright women and minority students than he had guessed would be available; he has been especially successful in working with science fair participants. He recommends that similar projects initiated elsewhere be led by a specialist who does not try to run the program as auxiliary to research interests or a teaching job. Nathaniel Thomas, Illinois Institute of Technology, 10 West 32 St., #111, Chicago IL 60616, (312) 567-5111

029 MULTIPLYING OPTIONS AND SUBTRACTING BIAS, University of Wisconsin, Madison WI 53706 / Women's Educational Equity Act (WEEA) Program, U.S. Dept of Education / about \$120,000 total (WEEA 100%) / Oct 1 1977-Oct 1 1979 / Math / 6 through 12 / 1,101 F, 1,029 M total / Recruit N, B, A, H, D, E; Involved 1.3% N, 2.5% B, 0.7% A, 0.7% H, 0.3% other Min / V.

High schools where minority/disadvantaged students were enrolled, as well as schools which had a discrepant female/male enrollment in mathematics, were invited to participate in this program. The goal was to increase high school girls' participation in mathematics. A series of four thirty-minute videotapes was produced and validated. The videotapes were tailored to specific audiences--one each for female students and their male peers, mathematics teachers, school counselors, and parents. Though the series is designed to function effectively with no reinforcement via additional activities, a facilitator's guide was also developed. Included in the guide are sections on background information about sex-related differences and the study of mathematics, workshop instructions for each videotape, workshop evaluation suggestions and an extensive bibliography. The series was developed in three rural, urban and suburban schools in Wisconsin and validated in a different group of rural, urban and suburban schools. The videotape series (Multiplied Options and Subtracting Bias) is available from the Educational Development Corporation, 55 Chapel Street, Newton, MA 02160, (800) 225-3088. Dr.

## MIDDLE SCHOOL AND JUNIOR HIGH

Elizabeth Fennema, University of Wisconsin, 225 North Mills Street, Madison WI 53706, (608) 263-5141

030 PRIME, INC., F.I.R.L., Room 107, 20th & Race Streets, Philadelphia PA 19103 / Sloan Foundation, thirty-one local companies, and local foundations / \$250,000 year (Sloan 40%; others 60%) / Nov 1973-present / Math, Phy, Chem, Bio, Engr, Communication skills / 7 through 12 / 950 F (1978-79), 900 M (1978-79) / Recruit N, B, H; Involved 85% B, 2% A, 9% H, 40% E; Efforts N, B, H; Role models B, A, H, E.

The goal of this project is to produce a ten-fold increase in the number of minority students entering and graduating from schools of engineering. Participants are selected on the basis of teacher recommendations, reading ability and achievement test scores with consideration to their potential to succeed in engineering. There are four-week summer academic programs at five college campuses. The curriculum is specially developed for this program and focuses on engineering. Each college is linked with a corporation for additional resources. The corporations provide such things as field trips, audio-visual materials, demonstrations, tutoring and help with special projects. Minority women are deliberately visible as human role models and in audio-visual materials and literature with the hope of conveying the idea that minority women can be engineers. Some financial aid is provided. A slide show presented to parent groups, teachers and companies which shows girls in the PRIME program is a primary tool for publicizing the effort. A major benefit of this program has been the cooperation of business, secondary and higher education, government and community groups in working toward a common goal. In 1977, 64 of the 81 high school graduates who completed the PRIME program enrolled in engineering schools; in 1978, 99 of 130 did so. Audio-visual: "Engineering: Meeting the Challenge", slides, 12 minutes. W. Barry McLaughlin, 20th and Race Streets, Room 107, F.I.R.L., Philadelphia PA 19103, (215) 567-0535

031 PROGRAM FOR ROCHESTER TO INTEREST STUDENTS IN SCIENCE AND MATH (PRISM), Industrial Management Council, Rochester NY 14604 / Rochester Industries / \$150,000 year (industries 100%) / 1978-present / Math, Phy, Chem, Bio, Med, Engr, Psy, Computer Technology, Communication / 6 through 12 and teacher education / 1,600 (M and F) / Recruit B, H, E; Involved 70% B, 30% H, 100% E; Efforts E; Role models B / V.

## MIDDLE SCHOOL AND JUNIOR HIGH

The goal of PRIS<sup>2</sup>M is to increase the number of students qualified by proficiency in science, mathematics and communication skills to prepare for and enter into technology-related careers. The program operates by (1) introducing into selected classrooms teaching materials especially designed to motivate students to consider careers in technical fields, particularly engineering; (2) enlisting the help of technically trained people in industry to serve in and out of the classroom as role models; (3) organizing student visits to laboratories, industries and other high-interest sites; and (4) developing extra-curricular summer activities for PRIS<sup>2</sup>M students. The summer programs include, for students between eleventh and twelfth grades, a one-week orientation to engineering at the University of Rochester, followed by an eight-week paid work experience in an industrial environment. Students who complete this program may, the following year, enroll (at no cost) in a two-semester, pre-college course concentrated on those areas with which students have greatest difficulty as college freshmen at Monroe Community College. PRIS<sup>2</sup>M provides inservice training for teachers who volunteered to use the curriculum supplements or complete curricula. In grades six through nine PRIS<sup>2</sup>M works with most students in twenty elementary schools and two junior high schools and has developed extensive curriculum materials for these grade levels. In grades ten through twelve, at participating schools, students in the New York State Regents program\* whose academic performance is grade level or above experience contact with PRIS<sup>2</sup>M concepts and materials. In addition to funding and recruitment of 350 role models, Rochester industries have provided internships for selected students, conducted training meetings with parents and students on college application and financial aid, and provided recognition and awards for PRIS<sup>2</sup>M achievers. Members of Graduate Women in Science, Psi Chapter were among those who volunteered to serve as role models. Publications: "William H. Corwin, "PRIS<sup>2</sup>M 'Inputs' to Quality Education," about...time, May 1980, pp. 14-16; Annual report. Doug Seager, PRISM, 12 Mortimer Street, Rochester NY 14804, (716) 325-5139

\*The Regents program is the "track" requiring the maximum number of courses in science and math.

052 PROMOTING THE EXPLORATION OF PERSONALLY RELEVANT CAREER OPTIONS IN SCIENCE AND TECHNOLOGY, American College Testing Program, Iowa City IA 52240 / National Science Foundation (NSF) / \$50,000 (NSF 100%) / Aug 1975-July 1976 / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Soc, Geol, Psy / 7 through 12 / 1,390 F total / Role models Min / V.

## MIDDLE SCHOOL AND JUNIOR HIGH

This project determined the impact of certain low-cost replicable procedures for increasing exploration of and preference for careers in science and technology on the part of large numbers of high school girls with potential for such careers. Three hundred ninety ninth grade girls with above average academic ability were selected from three schools - one urban, one suburban and one rural-consolidated - and assigned to a control group or an intervention group. Interventions included an interest inventory free of sex bias, supplemented with group discussions of career planning in general and science/technology careers in particular. Although there were a few trends favoring the intervention group, statistical analyses of outcome data did not indicate that the interventions were effective in stimulating exploration of, preference for and planning toward science/technology careers in those girls whose abilities and interests were compatible with such careers. The project did find that a brief report of vocational interest results can stimulate career exploration in general, and increase congruence between measured interests and occupational preferences on the part of able ninth grade girls. The twelfth grade phase of the project determined whether a low-cost, direct mailing of personally relevant materials about careers in science and technology would stimulate exploration of preference for, and planning toward, science/technology careers on the part of college-bound women possessing abilities and interests compatible with such careers. The intervention included a letter (not sent to the control group) calling attention to the recipients' high potential for careers in science and technology, a list of examples of science and technology programs at colleges of each student's choice and a copy of a booklet developed specifically by the project to provide women with new perspectives on careers in science and technology. A second mailing sent to the intervention group contained a reminder of the first mailing, a list of resource books and materials on career planning, and a postcard for requesting additional information on specific occupations. Statistical analyses of the outcome data indicated that the interventions were not effective in accomplishing project objectives.

Publications: Gail T. McLure, Women in Science and Technology: Careers for Today and Tomorrow (Iowa City: American College Testing Program 1976), 16 pp; Gail T. McLure and Ellen Piel, "College-Bound Girls and Science Careers: Perceptions of Barriers and Facilitating Factors," Journal of Vocational Behavior 12 (1978): 172-188. Dale J. Prediger and Richard J. Noeth, "Effectiveness of a Brief Counseling Intervention in Stimulating Vocational Exploration," Journal of Vocational Behavior 14 (1979): 352-368. Dale Prediger, The American College Testing Program, Box 168, Iowa City IA 52240, (319) 337-1000

## MIDDLE SCHOOL AND JUNIOR HIGH

033 REALIZING MATHEMATICS POTENTIAL, Spring Lake Park High School (SLPHS), Minneapolis MN 55432; Minnesota Council on Quality Education (MCQE) / MCQE / \$29,000 year, \$87,000 to date (MCQU 95%; SLPHS 5%) / July 1978-present / Math, Soc / 7, 8, 9 and teacher education / 350 F, 350 M year; 1050 F, 1050 M to date / Involved 5% E.

This program provided teacher in-service training in mathematics anxiety and sex discrimination in math. Curriculum materials were developed for science (as well as for art, home economics and social studies) for students in grades seven through nine. Glen Martin, 8000 Highway 65 NE, Minneapolis MN 55432, (612) 786-5570

034 RECEPTION FOR FEMALE WINNERS-GREATER SAN DIEGO SCIENCE FAIR, Sigma Delta Epsilon-Graduate Women in Science (ΣΔΕ-GWIS), San Diego CA / \$50 total (ΣΔΕ-GWIS 100%) / April 12, 1975 / Math, Phy, Chem/ Bio, Med, Geol, Nutrition / 7 through 12 / 25 F total / Role models M

This was an effort to inspire and encourage young women interested in science to pursue careers in any one of the scientific disciplines. Members of Sigma Delta Epsilon (women with advanced training in science) held a reception for female winners in the San Diego science fair. The reception offered the opportunity for one-to-one conversation with established women scientists and advice on how to pursue careers in science. Projects and publications or members in various scientific endeavors were displayed, and materials on careers in science were available. The young women were very receptive and interested. The project raised awareness among the women scientists of the need to inspire and encourage young women toward scientific careers at an early age. Arrangers suggested that the collection of names and addresses for follow-up contacts would have been useful. Marydale B. Dessel, 6443 Lance Ct., San Diego CA 92120, (714) 286-0975

035 SCIENCE AND ENGINEERING, A WOMAN'S PERSPECTIVE, New Mexico Institute of Mining and Technology (NM Tech), Socorro NM 87801 / National Science Foundation (NSF) / \$8,000 seed money (NSF 80%; NM Tech 20%), \$3,000 to date maintenance costs (NM Tech 100%) / Sept 1976-present / Math, Ast, Phy, Chem, Bio, Engr, Med, Geol / 6 through 12 / 60 F year, 310 F to date / Involved 10% N, 10% B, 20% H, 5% E; Role models N, B, H, E / V.

The goals of this program are to help make young high school women aware of the non-traditional science and engineering fields available to them; to recruit and enroll

## MIDDLE SCHOOL AND JUNIOR HIGH

young women in these fields; and to make young women aware of federal, institutional and private sources of financial aid for educational expenses. Applications are sent to counselors, math and science teachers, and others likely to be interested at all New Mexico high schools. At these 1½ day conferences, role models actively working in non-traditional fields make 45-minute presentations; workshops on financial aid and summer co-op programs are held; and women college students enrolled in science and engineering share their experiences. There are concurrent "learning modules" in science and engineering disciplines which cover "day to day activities", "academic preparation required", "problems of women", "career opportunities" and "special skills required" for the specific fields. A "career fair" is held throughout the conference at which participants (sixteen in 1976) from industry, government and colleges set up displays, distribute materials and discuss opportunities in their respective areas with students. New Mexico Tech has experienced an increase in female enrollment, and an increase in science and engineering majors among women students since this program began. The directors believe that the program has helped decrease attrition of women students as well. The program is continuing with greater focus on young women with aptitude and interest in science or engineering fields. Participant evaluations and project reports are produced annually. Louise E. Chamberlain, Campus Station, Socorro NM 87801, (505) 835-5424

036 SCIENCE AND TECHNOLOGY IN THE BUSINESS WORLD, Massachusetts Institute of Technology, Cambridge MA 02139; Radcliffe College and Wellesley College / Ford Motor Company, registration fees, and the colleges / \$4,000 (Ford 34%; fees 33%; colleges 33%) / Nov 1979 / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr / 7 through 16 / 275 F, 5 M / Involved about 5% Min; Role models A / V.

Students learned of the conference through mailings to women at local high schools and colleges, or through news media. The conference encouraged women to combine careers in science and management, and provided them with information about the options and educational requirements for doing so. The conference opened with a keynote address by a woman who owns a science-related business. Students then rotated among four workshops on technology and industry, energy and the environment, health and nutrition, and communications. Careers were highlighted such as science writing, environmental engineering, computer science, and health administration. The workshop leaders outlined career choices and preparation as well as portraying the nature of jobs in the field. Interaction

## MIDDLE SCHOOL AND JUNIOR HIGH

between students and the women scientists was encouraged. Among the unexpected benefits were increased networking among women scientists who took part in the session, and increased visibility of the three sponsoring colleges as good places to learn about science. Audiotapes: About two hours, the keynote speech plus one session of each of the four workshops. Dr. Joyce Toomre, Office of General Education, 58 Kirkland, Harvard University, Cambridge MA 02138, (617) 495-2563

037 SECONDARY SCHOOLS SCIENCE PROJECT, California Institute of Technology (Caltech), Pasadena CA 91125 / private funds and Caltech / \$25,000 year (private funds 50%; Caltech 50%) / Oct 1970-present / Math, Ast, Phy, Chem, Bio, Med, Engr, Geol, Photography / 7 through 12 / 200 F, 200 M year; 1,800 F, 1,800 M to date / Recruit N, B, A, H, D, E; Involved 0.2% N, 12% B, 14% A, 12% H; Efforts B, H, E; Role models N, B, A, H, E / V.

This program includes a series of lectures held monthly (Wednesday afternoons) in conjunction with an essay writing contest. 1978-79 lectures were conducted by scientists in various fields and included topics such as "Quasars and Quakes," "Wind Energy," "A Study of Politics in African Countries," and "Using Xrays to See Protein Molecules." A second component of the program is the Saturday Visitation Program which invites five to ten high school science teachers and their students (three to ten each) to the campus on selected Saturdays for a campus tour, several science demonstrations and lunch. A third part of the program is the summer enrichment classes conducted Monday-Thursday 9:00 am to 3:00 pm for six weeks concentrating in the subjects of biology, chemistry, physics and physics/calculus. These non-credit courses are taught by Caltech upperclass undergraduates and graduate students with occasional professorial lectures. There is no cost for the courses; tutoring in mathematics is offered for a fee. On-campus housing is available. Finally, there is a Saturday School for Secondary Students, taught by Caltech undergraduates and graduate students in various fields of math and science. There is substantial parental involvement in the project. Staff made special efforts to recruit minority girls via presentations to selected professional organizations, minority sororities and other groups which have good programs for young women. Minority women were sought and used as role models in various parts of the program. Publication: Lee F. Browne, Developing Skills for Coping (For Minority Students at Predominantly White Institutions; but Maybe for all Students), 1978, \$4.50, 28 pp (available from the author).

## MIDDLE SCHOOL AND JUNIOR HIGH

Lee F. Browne, 210-40, California Institute of Technology,  
Pasadena CA 91125, (213) 795-6811, x2207

038 SUMMER INSTITUTE IN SCIENCE AND TECHNOLOGY, Goddard Space Flight Center, Greenbelt MD 20771; University of Maryland College of Engineering (in 1978 and 1979) and Bowie State College (in 1980) / Goddard and individual scientists / about \$1,000 year / June 19-30, 1978, July 16-24, 1979, and July 14-25, 1980 / Math, Ast, Phy, Engr / 8 / about 25-30 F year / Involved 20% B; Role models B / V.

This program gives eighth grade girls a chance to work in two different fields of their choice with women scientists, engineers, and mathematicians on projects in these specialties. The scientists serve as mentors to these gifted and talented girls. Participants and their parents are eager and appreciative of this opportunity to explore non-traditional career fields for women. Recruitment is done by sending program announcements and application forms to Washington D.C. area and Maryland school officials. Recruitment efforts are conducted by a college or university under contract with Goddard's Federal Women's Program. The project is an activity of the Goddard Subcommittee on Role Modeling for Young People. Mrs. Angelita Kelly, Code 562, Goddard Space Flight Center, Greenbelt MD 20771, (301) 344-5470

039 SYMPOSIUM ON WOMEN IN ENGINEERING, University of Virginia, Charlottesville VA 22903; Society of Women Engineers and School of Engineering and Applied Sciences / Dean's Office of School of Engineering / \$2,500 (Dean's Office 100%) / Jan 17, 1979 / Engr / 7 through 12 / 550 F, 25 M / Involved 10% B / V.

The goal of this program was to introduce young women who might be considering a science career to the field of engineering. Letters of invitation were sent to all junior and senior high schools in Virginia requesting a mail or phone reply. The schedule included speeches by four women engineers - one retired, one about to begin her career and two each with less than ten years experience in the field. After lunch, there were guided tours of the engineering school. The response was reportedly enthusiastic. The program co-chair reported that in retrospect, a small registration fee might have discouraged the few who attended just to get out of school. Assistant Dean David Morris, School of Engineering, Thornton Hall, Charlottesville VA 22903, (804) 924-3164

## MIDDLE SCHOOL AND JUNIOR HIGH

040 THE DAY ON THE BAY PROGRAM, Texas A&M University, College Station TX 77843 / National Sea Grant Program / \$30,000 (Sea Grant 60%; TX A&M 40%) / Sept 1977-Aug 1978 / Geol / 8 through 16, continuing-adult education / 150 F, 200 M / V.

The sea cruise was organized and conducted by a woman scientist, in part to serve as a role model for the women and girls who took part in it, in part to suggest to the men and boys on the expedition that women could indeed be interested in and successful at science. The main purpose of the project was to give an experience in what oceanography is like to persons who might not otherwise be exposed to the discipline. Flyers and telephone calls informed science teachers of the project, and they were asked to pass the word on to students and the community. During the cruise itself, the instructor found time to talk to female participants about careers in science, and insured that the female students had a chance to actually make oceanographic observations, using shipboard science equipment. An unexpected benefit accrued to the women science teachers who came on the cruise and thus learned about ocean science, which they then incorporated into their courses. The project leader reports that the female students were as eager as the males to learn how to conduct oceanographic studies and were as able to use the heavy equipment. Publication: Sarah J. Meyland, It's Only a Little Planet (Texas A&M Sea Grant College Program, September 1978), 74 pages. Sarah Meyland, 8 I. U. Willets Road, Roslyn NY 11576, (516) 672-5305

041 THE PROJECT OPEN DOOR, Verheyden & Associates, Washington DC 20015; DC Commission for Women / U.S. Department of Education (US ED) / \$17,300 (US ED 100%) / Sept 1977-Sept 1978 / Math, Chem / 7, 8, 9, faculty or employee development / Recruit Min, D, E; Efforts Min, D; Role models Min / V.

This project developed a module consisting of a slide-tape presentation "Hey, What Are Your Plans for the Next 60 Years?" and Leader's Guide. The module assists educators working with junior high students to encourage girls to consider career options which are presently non-traditional for their sex and to begin to understand why such considerations are important. The slide-tape also addresses the changing social roles of women and men and the "allrightness" of girls' aspiring to be in charge of their lives in whatever career interests them and for which they have ability. Through the Leader's Guide, the module provides information to assist the presenter to do a

## MIDDLE SCHOOL AND JUNIOR HIGH

better job in answering value laden questions and leading a discussion on the slide show. Planners have found that the module is also being used as a training film for parents and other educators as a way to open discussion with adults on girls' career choice and the questions surrounding changing social roles. The slide show includes pictures of racial/ethnic minority women and girls and handicapped girls, taken in classes with the cooperation of DC Public School System. Module: Slide-tape: "Hey, What Are Your Plans for the Next 60 Years?" 18 minutes, and publication: M.E. Verheyden-Hilliard, The Leader's Guide, Fall 1978. Mary Ellen Verheyden-Hilliard, 3747 Huntington Street NW, Washington DC 20015, (202) 966-6997

042 WOMEN AND WORK, Wentworth Institute of Technology, Boston MA 02115 / Wentworth and Polaroid Foundation / \$1,500 / Oct 1978 / Engineering Technology / 7 through 12 / 250 F / Role models B, H, E / V.

This program was intended to familiarize guidance counselors, mathematics and science teachers, and junior high school students (female) with engineering technology and non-traditional careers. This goal was achieved through a program of panels, workshops and a keynote speaker. Participants were recruited by direct mail and advertising. Several audiotapes were produced for use in the project. Dr. Diane T. Rudnick, Wentworth Institute, 550 Huntington Avenue, Boston MA 02115, (617) 442-9010

043 WOMEN IN ENGINEERING, Pacific Telephone Company, San Francisco CA 94107 / \$3,500 year, \$10,500 total (Pacific Telephone 100%) / 1976-present / Engr / 7 through 12 / 6,378 F and M to date.

This program arranges for women employed in the engineering profession and trained in science, mathematics or engineering to speak to junior and senior high school women about opportunities available in engineering. School career guidance counselors work with Pacific Telephone Company staff to utilize these women who are paid by their employer for participation in speaking engagements. To date, 267 talks have been conducted for male and female audiences of about twenty-five students. This is an effective means of increasing the student's awareness of opportunities in engineering. Mr. Keith Burton, Pacific Telephone Company, 370 Third Street, San Francisco CA 94107, (415) 542-3019

044 WOMEN IN ENGINEERING, University of Illinois (UI), Urbana IL 61801 / industrial contributions / \$20,000 total

## MIDDLE SCHOOL AND JUNIOR HIGH

(industry 10%; UI 90%) / 1973, 1975, 1977 / Phy, Chem, Engr / 7 through Masters, faculty-employee development / 300 F, 5 M year (average) / Involved 1% N, 2% B, 5% A, 1% H, 3% E; Role models B, A, F

The goals of this program were to increase the number of women selecting engineering as a career, and to provide counseling for women already studying engineering. The program conducted three biennial conferences for women students wishing to pursue careers in engineering. The first conference, held in 1973, made an extensive publicity and publication effort as well as providing information to female students. The second and third conferences, held in 1975 and 1977, were designed more to meet the needs of the attendees rather than efforts aimed at large-scale media coverage. Letters were sent to women students in engineering curricula on the campus and to female high school students in the surrounding area encouraging their participation. The University of Illinois at Urbana considered their program successful as evidenced by the increase of women in the College of Engineering from less than one percent to fifteen percent in an eight-year period. Publication: "Womengineer" (booklet). H.L. Wakeland, University of Illinois, 207 Engineering Hall, Urbana IL 61801, (217) 333-2280

045 WOMEN IN ENGINEERING AND MANAGEMENT CONFERENCE, University of New Hampshire (UNH), Durham NH 03824 / UNH and industry (Raytheon, Sanders), N.H. Public Service / \$2,000 / October 1977 / Engr, Soc / 8 through 14, counselors / 150 F, 25 M / Involved 2% E.

The goal of this project was to inform young women of career possibilities in engineering and/or management. Women with background in these fields served as speakers and workshop participants. High school guidance counselors were specifically invited in order to provide a continuity in high school information about engineering and management careers. In the year following the conference the number of women enrolled in engineering at UNH increased. Conference participants were recruited through brochures sent to high schools and colleges in Massachusetts and New Hampshire. The project director felt that more advance notice and publicity and the offering of C. E. U.'s for teachers would have improved the program. Stan Fish, Admissions Office U.N.H. Durham NH 03824, (603) 862-1234

046 WOMEN IN ENGINEERING PROGRAMS, Purdue University, West Lafayette IN 47907 / Corporations and Purdue / \$80,000 year

## MIDDLE SCHOOL AND JUNIOR HIGH

(in 1979) (Corporations 74%; Purdue 26%) / Sept 1968-present / Engr / 7 through 16 / 2,295 F in 1979, about 25 M / Recruit Min; Involved up to 5% B, up to 5% A, up to 5% H; Role models B, A, H / V.

The program was started in 1968 to increase the number of women enrolling in engineering at Purdue, and to increase their retention once enrolled. In 1974, it specifically decided to try to enroll one thousand women by 1978 and to achieve retention rates of women equal to those of men; both goals have been reached. The program cooperates with the Department's minority project to insure recruitment of minority women. The program uses several activities to attain its goals--merit awards for beginning and continuing students, a career day for high school women, publishing and distributing recruitment materials, producing and showing a slide series ("The Feminine Angle," ten minutes, updated annually), mailings to high school and junior high counselors, a Target Cities program for high school juniors, and student counseling by the project staff. Courses devised by a related project (see entry #199) have been continued in the Department by the Women's Program, with slight modifications. The program also works closely with the Purdue chapter of the Society of Women Engineers (see entry #241). Publications: progress reports, about 8 pages each; Feminengineer, a newsletter; recruitment pamphlets such as "Chemical Engineering--For a Nice Girl Like You" and "Thinking About Engineering: Purdue Women Speak Out"; and C.D. Smith and J.M. Takehara, "Cooperative Engineering Programs: Do They Work for Women?" Engineering Education 68 (May 1978), 803-806. Jane Daniels, Department of Freshman Engineering, ENAD Building, Purdue University, West Lafayette IN 47907, (317) 749-2716

047 WOMEN INQUIRE INTO SCIENCE AND ENGINEERING (WISE), Columbia High School, Richland WA 99352; Richland School District / Women's Educational Equity Act Program, U.S. Department of Education / \$10,000 / Aug 1977-June 1978 / Math, Phy, Chem, Bio, Engr, Soc / 6 through 12 / 13 F, 36 M / Role models Min, D / V.

This project was designed to increase the number of female high school students interested and participating in the on-going Inquiry Into Science and Engineering Program. The Inquiry Program provided classroom instruction and hands-on experience working with scientists and engineers, but the enrollment of female students in this class (which has prerequisite mathematics and science) was relatively low. The WISE program had several components. The first was an identification of factors affecting female representation

## MIDDLE SCHOOL AND JUNIOR HIGH

in science and engineering and an attempt to stimulate in a positive way the identified factors at the time of critical choices or heightened susceptibility. The second component was a mentor program--a one-to-one relationship between a student and a professional working in the student's field of interest. A slide/cassette presentation of five-minute talks by four women gave information on the importance of math, science, drafting and shop courses, and self-profiles discussing attributes of scientists, personal motivation, training required, difficulties and rewards. (An interesting feature of the slides was that students could recognize local places and people associated with science and math.) A four-page paper "Why Take More Math?" was distributed after the film (see entry #055 for details). Visits by role models to classroom, assemblies, and evening career awareness programs to which parents and students were invited was another component of the program. A resource list of literature dealing with the participation of women in science and engineering was developed as part of a manual for other districts seeking to implement similar projects. Pictures and services for producing the slide/cassette tape were largely donated. Publication: "Women Inquire Into Science and Engineering" 35 mm color slide/cassette tape, 22 minutes. Deayne Beard, The Richland School District, 615 Snow Avenue, Richland WA 99352, (509) 946-6106, x213

048 WOMEN IN SCIENCE, Radcliffe Forum, Radcliffe College, Cambridge MA 02138 / Ford Motor Company / \$40,000 total (Ford 66%; Radcliffe 34%) / April 1978-April 1980 / Math, Ast, Phy, Chem, Bio, Engr, Geol / 7 through 16, and the public / 650-700 F, 75 M year / Involved about 5% Min / V.

The women in science program included two conferences (described separately as numbers 036 and 116 in this inventory), as well as public lectures by two distinguished woman scientists, a summer intern program in which eight Radcliffe students worked in the science research division at Ford Motor Company, informal lunches in which Radcliffe science majors met women scientists visiting Harvard or Radcliffe, and visits by women scientists and science students to local high schools to encourage girls to consider science careers and to take the maximum amount of science and mathematics. Connected with the effort was a research project on career decisions made by those in the program, conducted by the Harvard/Radcliffe Office of Institutional Policy Research on Women's Education. During the women in science project, an ad hoc committee of interested scientists, faculty, students, and administrators from the Boston area met regularly to discuss

## MIDDLE SCHOOL AND JUNIOR HIGH

issues related to women in science and technology. Audio-tape: of one public lecture, about one hour, 1979. Dr. Joyce Toomre, Office of General Education, 38 Kirkland, Harvard University, Cambridge MA 02138, (617) 495-2563

049 WOMEN IN SCIENCE AND ENGINEERING (WISE), ADVISORY BOARD, University of Arizona (UA), Tucson AZ 85721 / UA / UA 100%) / Jan 1979-present / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Geol / 7 through 16, MA, PhD / 6,000 F yearly / Recruit N, H, E / Efforts H, N / Role models H, E, B.

This project is designed to attract and retain more women in science and engineering majors at the University. The program includes outreach to junior and senior high schools in the state via slide-tape presentations, distribution of pamphlets, and career workshops; currently a pilot effort of this type is underway as a cooperative venture with a state-funded project on career guidance in Pima County. WISE also works with students already at the University, offering career and academic counseling, a library of career planning materials, and a pamphlet designed for freshmen describing curricula and jobs in science and engineering. These women are reached through the school newspaper, flyers on campus, and contacts with upperclass and graduate students in science departments. WISE also conducts workshops described as entries number 139, 158, and 168 in this inventory. Publications and audiotapes: in preparation. Dr. L.L. Wilkening, Department of Planetary Sciences, Building 92, Space Sciences, University of Arizona, Tucson AZ 85721, (602) 626-3741

050 WOMEN IN SCIENCE - A ROLE MODEL PROJECT, Radcliffe College and Polaroid Corporation, Cambridge MA 02139 / Radcliffe College and Polaroid / Radcliffe donated time of 4 students and 1 staff; Polaroid donated time of 10 staff / Sept 1978-Dec 1978 / Math, Phy, Chem, Engr / 7 through 12 / 300 F, 100 M total / Role models H / V.

This project was intended to (1) provide role models in industry--women doing jobs that utilized a technical education--for junior and senior high students; (2) encourage young women to take courses appropriate to technical education while in secondary schools; and (3) to develop an ongoing collaborative relationship between Radcliffe College and the Polaroid Corporation. Existing relationships between Radcliffe College and area schools and teachers were used to develop interest and involvement. Polaroid engineers and scientists jointly with Radcliffe

## MIDDLE SCHOOL AND JUNIOR HIGH

students developed goals and methods for discussing technical education and careers within the secondary school classes. Student/Professional teams were matched with specific schools. The schools were self-selected and included a mix of urban and suburban. Preparation time was arranged between the teams and the teachers. Follow-up meetings were held to evaluate the program and make suggestions for future programs. An unexpected benefit of the project has been the establishment of a support network for the professional women at Polaroid. "Sally Osborn, Mechanical Engineer," completed April 1979, 16mm film, 10 minutes. Joline Godfrey, Polaroid Corp., 750 Main Street - 1C, Cambridge MA 02139, (617) 577-2000, x5244.

#51 WOMEN IN SCIENCE CAREER DAY, George Mason University, Fairfax VA 22030 / George Mason University / \$1,000 (George Mason 100%) / Dec 2, 1978 / Math, Ast, Phy, Engr / 7 through 12 / 200 F.

This career day was designed to acquaint young women with career opportunities and role models in the physical sciences, mathematics and engineering. The program of seminars with "role model" speakers was publicized through the local high schools. Arrangers found that "there is a large untapped audience of highly motivated women who wish to know about non-traditional science careers." The program was effective in increasing student awareness of science career options. Professor Eugenie V. Mielczarek, Physics Department, George Mason University, Fairfax VA 22030, (703) 323-2305

052 WOMEN IN SCIENCE PROGRAMS (WIS), Mills College, Oakland CA 94613 / San Francisco Foundation (seed money), National Science Foundation, Educational Foundation of America, Women's Educational Equity Act Program of U.S. Office of Education (WEEA), and several corporations (IBM, Xerox, Western Electric, etc.) / \$25,000-\$100,000/year depending on projects (agencies about 50%; Mills about 50%) / 1974-present / Math, Ast, Phy, Chem, Bio, Med, Engr, Soc, Geol, Psy / 7 through 16, faculty-employee development, continuing-adult education / 1,000's F / Involved about 55% Min; Role models B, A, H / V (certain projects).

The activities of this program are usually cooperative ventures among the Mills Career Center, Department of Mathematics and Computer Science, and Mills' science departments; for related Mills programs, see entries #008, 021, and 025. To prepare students for science-related careers and majors, no matter what their math background,

## MIDDLE SCHOOL AND JUNIOR HIGH

the program developed a precalculus/calculus course sequence. The precalculus course stresses developing conceptual and visual skills (in particular the graphing of functions) and is accompanied by small workshops headed by peer teachers (under faculty supervision) who help students acquire the algebraic tools needed to succeed in calculus. Second, the WIS program developed student internships in industry, done during the summer or school year, usually with industrial scientists (e.g. at IBM and Western Electric) or at government research facilities (for example, NASA) but with faculty advisers assigned from Mills. Third, WIS offers weekly seminars open to all students, which present information on women in science, careers and current topics in science, and involve occasional field trips to worksites. Fourth, the program initiated a 3-2 program with the engineering schools at Berkeley, Stanford, and Boston University in which students can earn a BA from Mills and a Bachelor's in Engineering from the University. Finally, as part of an outreach effort and with WEEA support, the program helped support four "Expanding Your Horizons" conferences for junior and high school girls (see entry #021), and produced a handbook (see entry #021), two films and a videotape relating to women in math and science. One film, "The Math-Science Connection" (18 minutes) is designed for educators and community leaders wishing to start special programs to increase women's enrollment in and enjoyment of these fields; it is also suitable for some junior and senior high school audiences. "Sandra, Zelia, Dee and Claire: Four Women in Science" is directed toward junior and senior high school women and entering college students; the 19 minute film shows a physicist, engineer, veterinarian, and astronomer at work, with narration describing their careers and lives. The videotape, "Count Me In" (30 minutes), documents the Mills College programs, in particular the precalculus/calculus sequence, the seminars and the internship program. The handbook, films and videotapes are available from Educational Development Center, 55 Chapel Street, Newton MA 02160. Publication: L. Blum and S. Givant, "Increasing the Participation of Women in Fields That Use Mathematics," Mathematics Association of America Monthl (Autumn 1980). Dr. Lenore Blum, Department of Mathematics and Computer Science, Mills College, Oakland CA 94613. (415) 632-2700

053 WHY TAKE MORE MATH?, University of Washington (UW), Seattle WA 98195 / UWS / \$3,000 total (UW 100%) / 1976-present / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Soc, Geol, Psy / 7 through 12 / about 8,000 F total / Involved about 5% Min; Efforts N, B, A, D.

The project began with research into the participation rates of women and minority students in high school mathematics

## MIDDLE SCHOOL AND JUNIOR HIGH

and science courses. An examination of secondary course-taking patterns of over 500 freshmen entering the University of Washington in 1976 suggested that remedial action was needed to keep female and minority students in elective high school classes for a wide choice of college majors. Accordingly, the project published an article on their findings and prepared a brochure for distribution in Washington State junior and senior high schools. Reprints of the journal article are distributed to teachers, counselors, and administrators; the brochure is targeted for students, and outlines the reasons why they should take as many mathematics courses as possible before applying to college. The project hopes also to prepare a special brochure for community college students.

Publications: Helen Remick and Kathy Miller, "Participation Rates in High School Mathematics and Science Courses," Physics Teacher (May 1978), 280-283; and "Why Take More Math?", 4 pages. Helen Remick, Office for Affirmative Action, 101 Lewis Hall, DW-08, University of Washington, Seattle WA 98185, (206) 543-1830

### III. HIGH SCHOOL

GRADES 10 - 12\*

ENTRY NUMBERS 054 THROUGH 113

SEE ALSO ENTRY NUMBERS 01 THROUGH 004, 007, 008,  
010, 012 THROUGH 015, 019 THROUGH 022, 025,  
027 THROUGH 032, 034 THROUGH 037, 039, 040, 042, 043,  
044, 045, 046 THROUGH 053  
AND HIGH SCHOOL AND COLLEGE ENTRIES

See also FACULTY-EMPLOYEE DEVELOPMENT for teacher  
education programs for this level (entry numbers  
302, 306, 310, 313, 314, 315)

\*Projects begin between grades 10-12, but may  
continue into upper levels.

## HIGH SCHOOL

054 ANNUAL HIGH SCHOOL DAY, University of Wisconsin, Madison WI 53706 / Beta Chapter of Sigma Delta Epsilon-Graduate Women in Science, Inc. (GWIS); U. Wisc since 1974 / up to \$500 year (GWIS 50%; other sources 50%) / April 1959-present / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Geol, Horticulture, Nutrition / 10, 11, 12 / 50-100 F year (in 1970s) / Involved 5% B, 1% D; Role models Min.

This program has worked over twenty years to introduce young women to opportunities in as many science careers as possible. Letters, posters and general information announce High School Day to science departments of area high schools. (The project has grown from reaching only three Madison schools to include approximately fifty--all Dane County.) In response to individual indications of interest, letters and brochures giving laboratory tours afford the participants an opportunity to encounter individual successful women scientists and witness a variety of work sites. The women scientists present seminars and the students are given a chance to engage in work in a research laboratory. The work experience was originally one Saturday, and until the late 1960's, often led to summer employment. (Changes in University administrative policy led to discontinuation of the summer employment phase.) Organizers advise others planning projects of this kind to work through teachers and try to get as many students as possible to attend. Another program conducted by Beta Chapter of Sigma Delta Epsilon is described in entry number 276. Costs for the project are kept low because all work is done by volunteers. Bette Barnes, 134 SMI, Department of Physiology, University of Wisconsin, Madison WI 53706, (608) 262-8298

055 APPRENTICESHIP DAYS IN ENGINEERING, University of Santa Clara, Santa Clara CA 95053 / Ford Motor Co., Zellerbach Family Fund, IBM / \$5,000 year (foundations & corporations 55%--all but overhead: Santa Clara 45%--overhead schedule) / Sept 1978-June 1980 / Engr / 10, 11, 12 / 300 F total / Recruit B, A, H, E; Involved 3% B, 30% A, 10% H; Efforts B, A, E; Role models B, A, D / V.

This project was designed to expose young women with math and science capabilities to engineering as a career option. Students were selected by their high school counselor or math or science teacher (depending on who was most responsive to the request). Often individuals were chosen because they heard about the program and asked to participate. Of twenty participating schools twelve had more than twenty percent minority population. The schedule included a morning workshop in engineering with "hands-on" activity to inspire confidence in the students' ability to do engineering. During lunch with women engineers at a local industrial site,

## HIGH SCHOOL

students listened to personal stories and asked questions. After lunch participants had a tour of the industrial facility with a woman engineer on a one-to-one basis. Opportunities were provided at the companies for students to "play" engineer. At least fifty percent of participants chose engineering as a career option at the end of the day. All of them learned what engineers do. Both the companies and the schools appreciated the visibility. Surprisingly, eighty percent of the participants had an immediate family relative who was an engineer but still did not know what engineers do prior to attending the Apprenticeship Day. (The project is in the Silicon Valley where many engineers live.) Organizers advise that a supportive counselor or teacher is important to the success of a program such as this. Publications: Hirschfield and Hornberger. An Interview of Hornberger in American Society of Mechanical Engineers Magazine. Lee E. Hornberger, "Engineering Apprenticeship Days of Young Women." Feb 1980, Vol. 102, No. 2. Society of Women Engineers Bay Area Section Newsletter. Lee Hornberger, Mechanical Engineering Department, University of Santa Clara, Santa Clara CA 95053, (415) 984-4327

056 CAREER EXPLORATION PROJECT FOR HIGH SCHOOL SENIOR WOMEN, University of Kansas, Lawrence KS 66045 / National Science Foundation (NSF) / \$10,000 (NSF 100%) / Sept 1974-Aug 1975 / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Soc, Geol, Psy / 12 / 80 F / V.

The goals of this project were to increase the proportion of talented women who choose to pursue math/science careers in college majors, and to develop materials that could be used with comparable groups nationwide. Five workshops were held with twelve to twenty participants each. Parents also attended and were involved in activities similar to those of students. Students clarified life goals, assessed talents, and talked with women scientist role models. All high school senior women in Kansas and Kansas City, Missouri who had taken at least two years of high school science and three years of high school math, and had math and science ACT scores of or above twenty-seven, were invited to participate. Publications: Science Career Exploration for Women, Washington, DC: National Science Teachers Association, 1742 Connecticut Ave, NW, Washington, DC 20009, 1978, 80 pp; "Science Education in the Affective Domain: The Effect of a Self-Awareness Treatment on Career Choice of Talented High School Women." ERIC Document ED128168. Walter S. Smith, 205 Bailey Hall, University of Kansas, Lawrence KS 66045, (913) 864-4435

## HIGH SCHOOL

057 CAREER PLANNING DAY FOR WOMEN, University of Massachusetts, (U Mass), School of Engineering, Amherst MA 01003; Society of Women Engineers-Student Chapter at U Mass / participant registration fees and U Mass / >\$1,500 year, >\$3,000 total / April 1978 and April 1979 / Engr / 11, 12 / 300 F year, 600 F total.

The purpose of the Career Day was to discuss some aspects of engineering careers with high school women who are interested in the possibility of scientific or technological careers, and their guidance counselors and faculty. A speaker, a panel discussion, and large and small group discussions with practicing engineers and engineering students, gave participants a view of engineering as a career choice. The program included information on the different types of engineering, family life, and discussions of work as an engineer. Concurrently with the small group sessions for students, counselor and faculty met with representatives from the Society of Women Engineers, and the Dean's Office of the School of Engineering. The effectiveness of the program is indicated in part by increased enrollment of women in the School of Engineering and eager inquiries about plans for future programs each year. Joseph S. Marcus, School of Engineering, University of Massachusetts, Amherst, Amherst MA 01003, (413) 545-0300

058 CAREERS FOR WOMEN IN ENGINEERING AND SCIENCE, College of Engineering, Clemson University, Clemson SC 29631 / South Carolina Appalachian Council of Governments / \$17,400 (SC Appalachian Council 72%; Clemson 28%) / Jan 1979-Dec 1979 / Engr / 10 / 25 F / Recruit B; involved 12% B.

This two-week residential program acquainted high school women with the opportunities available in engineering. Twenty-five students were chosen from a six-county pool of tenth grade applicants. The women lived in the college dormitory and attended classes and laboratory sessions in computer science, calculus and circuit theory. The laboratory sessions covered instrumentation and techniques and included a project. Visits by women engineers from industry, and tours of industrial sites were arranged. Women engineering students served as chaperones and became an additional contact with the field of engineering. To obtain applicants, a brochure was mailed to the guidance counselors, principals and math and science department heads of all schools in the area, and publicity articles were sent to area newspapers. Arrangers report that the participants were enthusiastic; many changed their career goals. Most increased their confidence in their abilities to succeed in nontraditional fields. The projects and field trips were reportedly the most interesting parts of the program.

## HIGH SCHOOL

Ms. Sylvia Gilbert Cathey, Department of Electrical and Computer Engineering, Clemson University, Clemson SC 29631, (803) 656-3376

059 CAREERS IN SCIENCE FOR WOMEN WORKSHOP, Goucher College, Towson MD 21204; Maryland Academy of Sciences / \$1,000 in donated services and staff time / March 11, 1977 / Math, Ast, Phy, Chem, Bio, Med, Engr, Soc, Geol, Psy, Scientific journalism, Science museum work / 11, 12 / 220 F total / Involved 15% B; Role models B, A, H, E.

This symposium was designed to acquaint bright, motivated and/or gifted science students with career opportunities in scientific fields. Coordinators of science in the twenty-four public school districts of Maryland, and science department heads in private and parochial schools were invited to nominate eleventh and twelfth grade girls who excelled in science and/or mathematics. Selected participants heard a keynote speaker, and panels of three to four women in science discussed career opportunities. Four panels covered topics including "sea, earth and sky," "museums, schools and media," "genes, cells and viruses," and "computers, slide rules and blueprints." Since the symposium, the Maryland Academy of Science has been used as a resource by students, school administrators and industry. The director suggested that the program, which was very rewarding, might have been even more exciting and valuable if the girls' mothers had been invited. One unexpected benefit was that Maryland high school girls became familiar with Goucher College. Mary B. Hyman, Maryland Science Center, 601 Light Street, Baltimore MD 21250, (301) 685-2370

060 CONFERENCE ON ENGINEERING CAREERS FOR WOMEN (CECW), North Carolina State University, Raleigh NC 27650 / N.C. State University Engineering Foundation / \$29,500 year (N.C. State Univ 50%; Engineering Foundation 50% / June 1974-present / Engr / 9, 10, 11, 12 / 270 F to date / Recruit N, B, E; Involved 1% N, 24% B, 20% E; Role models N, B, E / V.

The participants in this program develop an understanding of some basic engineering concepts and see for themselves the relevancy of engineering education. Under the guidance of women engineering students, these young women attend lectures and meet and visit with female faculty members. Also, engineering demonstration projects are developed and presented by the women engineering students. These demonstrations help CECW students learn that engineering offers creative opportunities for young women. The current women engineering students help their visitors to realize that the

## HIGH SCHOOL

young men on campus do not judge today's women by tradition and prejudice. The CECW summer program brings in about 90 sophomores/juniors, and houses them in a regular dormitory, according to some rather strict dorm rules. The CECW fall program brings in about 150 juniors/seniors during a regular semester weekend. These young women live in the rooms of current women engineering students, and have considerably more latitude to experience campus life, since they are governed by regular dorm rules. Stereotyped images of women are examined through encounter groups as well as panel discussions. Problems peculiar to professional careers for women are discussed openly, with female role models giving specific examples of how they dealt with typical problems. Attention is focused on the great flexibility offered to women by an engineering career. Admissions, financial aid and items of like interest are stressed. Some counselors and teachers attend. CECW programs are held concurrently with the Minority Introduction to Engineering (MITE) programs so as to concentrate the activity for faculty, many of whom volunteer part of their vacation to these programs. The only costs to students are for transportation. Interest in the program is generated through several activities including visits to schools for educational presentations. All women are recommended by their high school counselors, and the juniors and seniors are screened so that those with the appropriate mathematics courses are invited. In 1970-72, an average of ten women enrolled as freshmen in engineering each year, which was less than 2% of the entering freshman class. Preliminary enrollment figures for Fall, 1979 indicate that 249 young women enrolled as freshmen, and this is approximately 13.7% of the entering freshman class. Byard Houck, 119 Riddick, North Carolina State University, Raleigh NC 27650, (919) 757-2341

061 CONFERENCE ON WOMEN IN ENGINEERING, Texas A&M University (TAMU), College Station TX 77843; Society of Women Engineers (SWE) TAMU Section / Various companies through SWE / \$3,000 year (SWE 100%) / April 1976-present / Engr / 9, 10, 11, 12, and parents / 200 F 1979, 300-350 F 1980, 500-550 F to date / V.

This annual conference informs young women of the opportunities available to them in engineering and of the preparation that they should receive while in high school. Recruitment is done through mailings to the counselors of all public and private high schools in the state. The two-day conference consists of (1) a social and design contest; (2) tours of the engineering departments of the university; (3) panel discussions with engineering students and professional women engineers; and (4) exhibits by profession-

## HIGH SCHOOL

als representing various industries. The program has been successful and planners expect to improve it each year. A high school visitation project is being started as another means of talking to girls about engineering as a career. Planners report that most high school women do not know what engineers do and they recommend earlier education in this area. Stephanie Stehling, 5623 Meadow Creek, Houston TX 77017, (713) 946-9025

062 CONFERENCE ON WOMEN IN ENGINEERING, Worcester Polytechnic Institute (WPI), Worcester MA 01609 / EI duPont & Nemours, Procter and Gamble, Union Carbide / \$2,300 total (duPont 60%; Procter & Gamble, Union Carbide 40%) / Dec 1977 & Nov 1979 / Engr / 10, 11, 12, continuing-adult education / 400 F total.

The program increased awareness among young women of careers available in the engineering profession and presented the unique curricular approach of the WPI Plan for educating engineers and/or scientists. Letters were sent to 150 high schools within a 100 mile radius of WPI through the Guidance Director inviting a "traveling unit" consisting of a math or science teacher, a guidance counselor and three to four students to attend this day-long conference. Participants included representatives from industry, female engineers, current WPI students and WPI faculty and staff including the Dear of Academic Advising, Department Heads from Civil, Mechanical, Chemical and Electrical Engineering and the Dean of Undergraduate Studies. The format provided morning plenary sessions, lunch, and afternoon small group sessions. Content included WPI student project presentations, engineering in conjunction with MD, LLB and MBA studies, and guidelines for high school preparation. Time for coordination and clerical work, speakers and panelists was donated, as were facilities. Mileage reimbursement for participants, food, printing and postage were covered by corporate contributions. The Director reports that personal response from participants has been superb, and that there has been a significant increase in WPI applications from women who specifically mention interest spurred by the conference. The "traveling unit" has proven very efficient. Nancy Hargrave, Assistant Director of Admissions, Worcester Polytechnic Institute, Worcester MA 01609, (617) 753-1411

063 ENCOUNTER OF A NEW KIND: YOUNG WOMEN MEET MATH AND SCIENCE, Kean College of New Jersey, Union NJ 07083 / Kean College and participant registration fees / Fall 1977 - April 1978 / Math, Ast, Phy, Chem, Bio, Med, Engr, Soc, Geol, Psy / 9, 10, 11, continuing-adult education / 400 F / Role models B / V.

## HIGH SCHOOL

The one-day workshop encouraged high school girls to continue studies in math and science in order to keep career options open, and raised awareness for those parents, guidance counselors, teachers and community leaders who attended. The program included a keynote speaker (a Black woman scientist, college dean) and respondents (role models including a physician, a physicist, project engineer and a computer programmer); group discussions on self-reliance, career planning, women and math; a walking tour of the campus with demonstrations and a mini-workshop in various science and math departments; and a "working" lunch with resource people. While students were on tour of the campus, adult attendees had a choice of three of four group discussions led by teams of Kean personnel and guest scientists or program administrators. Publicity efforts (mailings to all high schools in New Jersey, to all members of the Association of Mathematics Teachers of New Jersey and the mailing list of the New Jersey Division on Women, announcements on local radio programs and in the Kean College newspaper) brought more applications than the workshop could accommodate. Planners report an enthusiastic response from participants. Several schools are, as a result of the workshop, planning field trips to sites where students will see women at work in science and math related jobs. Costs for the project were absorbed by Kean, including the time of co-planners. Speakers donated their time. The New Jersey Division of Women contributed \$100 for speakers' lunches. Dr. Susan G. Marchand, Math/Computer Science, Kean College of New Jersey, Union NJ 07083, (201) 527-2104

064 ENGINEERING: CAREERS FOR WOMEN, Western Michigan University (WMU), College of Applied Sciences, Kalamazoo MI 49008 / Ford Motor Company, WMU / \$1,200 year (WMU 20%; Ford 80%) / 1978-present / Engr / 10, 11, 12 / 17-20 F year, 37 F to date / Involved 8% B ; Role models B / V.

This annual one day program is intended to enlighten high school women about career opportunities in engineering and the scope of engineering studies, particularly at Western Michigan University. It is further designed to eliminate some of the myths surrounding engineering which might deter potential women engineers. Highlights of the program include participation in demonstrations and experiments in all the engineering departments. Female engineering students and alumnae participate as speakers, aides, and guides. Recruiting efforts include: (1) letters and brochures sent to counselors, math departments, and science departments in all high schools in a twelve county region (187 schools); (2) press releases to area newspapers, radio and television stations; (3) appearances on local public affairs programs on both radio and television; (4) public

## HIGH SCHOOL

service announcements on radio; and (5) expanded feature articles in local newspapers. Participants complete a written evaluation of the program, consistently giving it high marks. The program attracts a small but enthusiastic percentage of its audience. This percentage has been slowly, but steadily, increasing over the years. Ms. Martha M. Cole, College of Applied Sciences, Western Michigan University, Kalamazoo MI 49008, (616) 383-6040

065 ENGINEERING INSTITUTES FOR HIGH SCHOOL GIRLS (1971-1975), ENGINEERING INSTITUTE FOR HIGH SCHOOL STUDENTS (1976-1980), University of North Dakota (UND), Grand Forks ND 58202 / \$150/person (1980), \$10,000-\$15,000 total (UND 100%) / 1971-1980 / Engr, Computer science / 11, 12 / 140 F, 109 M / V.

This one-week residential program is designed to acquaint high school students with the engineering profession and the engineering undergraduate program. Through a series of lecture-laboratory sessions, covering the engineering disciplines, computer science, technology, graphics and design and engineering management, students began to understand the problem-solving role of engineers. Tours, a career planning session and social functions are part of the schedule. Initially, the institute was held for female students only; since 1976 males have been included. The Girls High School Institute was initiated "to build confidence within the female students, but now there are enough women enrolled in the school that they have role models. It is also a good experience for the male students to learn that women will be part of the engineering profession." Participants are recruited through letters and brochures sent to math and science departments and counselors at all high schools in North Dakota and part of Minnesota. Letters are also sent to students with certain ACT scores and those who express interest. Project faculty and former students discuss the program in visits to high schools. Joyce L. Medalen, Director, Engineering Institute for High School Students, Box 80201, University of North Dakota, Grand Forks ND 58282, (701) 777-2571

066 ENGINEERING ORIENTATION PROGRAM FOR HIGH SCHOOL GIRLS, University of Texas, El Paso TX 79968 / industry / \$5,000-\$6,000 year (industry 100%; Univ of TX--overhead and space) / 1975-present / Math, Engr / between 11 and 12 / 20 F year, 100 F to date / Involved 2% N, 50% H, 40% E; Role models H / V.

This six-week Monday-through-Thursday summer program was conducted to attract more women to engineering careers.

## HIGH SCHOOL

Announcements sent to high school counselors in the area invited applications from eleventh grade girls. Selection was based on the number of science and math courses completed by the student, the student's grade point average and scores on a national aptitude test. The intent was to choose students whose mathematical skills were sufficient to participate actively in the program, whose selection of high school math and science courses could still be influenced, and who would have a good chance of completing the degree if the program were successful in attracting them to engineering. The program included (1) an intensive engineering orientation which gave an overview of the profession and detailed treatment of most of the major disciplines within engineering; (2) instruction in mathematics and its relationship to engineering; (3) instruction in Fortran and Basic computer programming; and (4) industrial field trips. Film and slide presentations, informal question and answer periods, course work, laboratory experiments, tours of university facilities, and visits by women engineers in each area (for talks about their work and impressions of women in engineering) were part of the program. Each week the focus was on a different engineering discipline and the field trip, guest speaker and tour were chosen accordingly. At present, forty-four percent of the girls who attended the first three years of the program are enrolled in engineering. A questionnaire given participants at the end of each program revealed thirty-one percent reported that they were seriously considering engineering as a career before they attended the program. Publication: project description--Jack A. Dowdy and John M. Levosky, An Engineering Program for High School Girls, 1979, 9 pp. Jack A. Dowdy, Mechanical and Industrial Engineering, University of Texas, El Paso TX 79968, (915) 747-5450

067 ENGINEERING TECHNOLOGY RESOURCES FOR YOUNG FEMALE STUDENTS (ENTRYS), Greenville Technical College, Greenville SC 29606 / South Carolina Department of Vocational Education / \$8,827 (SC Dept VocEd 100%) / Sept 1978-June 1979 / Chem, Engr / 9, 10, 11, 12 / 30 F / Recruit N, B: Role Models B / V.

A total of 600 young women at four Greenville high schools saw a presentation which included a talk about opportunities in engineering, statistics on women, working women and salaries of women. A slide/tape program on women engineers and engineering students--their lifestyles, jobs, work environments, school environments and goals--was shown. At the end of this presentation interested students were invited to apply to attend the ENTRYS workshop. Thirty women were chosen to attend two days of hands-on workshops exploring

## HIGH SCHOOL

various phases of engineering technology. Both days included luncheons with appropriate speakers. The first day emphasized goal-setting; the second featured women engineers who described their jobs, educational backgrounds and lifestyles and answered questions. During the workshop, participants made radios, dealt with color theory, and did some drafting exercises and chemistry experiments. The second phase of ENTRYS involved taking students to four local industries where they were introduced to women engineers and engineering technicians on the job and given a chance to discuss their backgrounds, lifestyles and career goals. All participants initially showed an interest in math and science. Though only twenty-five percent had planned to become engineers and fifty percent were considering it or a related field at the outset, at the conclusion of the program all participants reported they were at least considering a career in engineering. Many participants increased their awareness of the utility of math and science and vowed to take as many courses as possible in high school. Publication: "Engineering Technology Resource Manual," Engineering Technology Department, Greenville Technical College, forthcoming. Delores B. Lamb, Greenville Technical College, Box 5616 Station B, Greenville SC 29606, (803) 242-3170, x278

068 HIGH SCHOOL INTERACTION PROGRAM, Rutgers University, New Brunswick NJ 08903 / Society of Women Engineers / 1979-present / Math, Phy, Chem, Engr / 9, 10, 11, 12 / 100 F year / Involved 5% B.

The Society of Women Engineers at Rutgers conducts this one-day seminar to inform high school girls about engineering careers and to interest them in applying to the Rutgers College of Engineering. Letters on the program go to high schools in the New Brunswick area, followed by telephone calls. The seminar starts with a panel discussion by several women engineers from different specialties. During the lunch (cost of which is borne by the project, not the students), the girls talk among themselves and with the engineers about education and careers. In the afternoon, the students tour the engineering building to see classes, workrooms, and laboratories. Project leaders have learned that women engineers often got the idea of entering the field from a relative (usually their father) rather than from high school counselors. They also report surprise among the students that women can and do enter engineering. Many students had thought of engineering as a "man's field" before attending the seminar. Susan Gietter, 55 Jeffery Road, Colonia NJ 07067, (201) 381-3474

## HIGH SCHOOL

069 HIGH SCHOOL SCIENCE CAREER GUIDANCE WORKSHOP,  
California State University (CSUN), Northridge CA 91330 /  
Society of Women Engineers (SWE)-CSUN Student Section /  
\$150 (SWE 90%; CSUN 10%) / March 17, 1979 / Math, Ast,  
Phy, Chem, Bio, Engr, Geol, Computer Science / 10, 11, 12 /  
88 F / Recruit E; Involved 5% B, 10% A, 10% D; Efforts E.

The goal of this program was to encourage high school girls to consider engineering and science careers. Letters were sent to high school math and science teachers and hand delivered to counselors at sixty schools. The letter asked the teacher to give a flyer to any girl who might be interested in science-oriented careers. The flyers explained the workshop and had tear-off registration slips to mail in. Teachers were asked to inform staff of any girls who could not afford the \$1.50 fee, which would be waived if necessary (no such replies were received). The fee was kept low to encourage a large attendance. The program began with women in biology, computer science, chemistry, mathematics, and engineering speaking about what they do at work and the opportunities available in their fields. Lunch was served by student members of SWE. During lunch brochures from various professional scientific societies, from schools and from the California Department of Education were distributed. Pamphlets on types of financial aid and application procedures were given to participants. Information about opportunities for all races of women and for minorities was provided. After lunch small rap sessions were led by members of SWE on "Everything you wanted to know about college and didn't know who to ask!" The students talked in groups of eight to twelve about career opportunities and what it's like to go to college. Planners observed that unfortunately, some counselors are still not encouraging girls to consider science-oriented careers. Sharon Cascadden, 6430 Whitaker Avenue, Van Nuys CA 91406, (213) 782-6395

070 INTRODUCTION TO ENGINEERING, University of Maine at Orono, Orono ME 04473 / Univ of Maine Pulp and Paper Foundation / \$17,000 year, \$170,000 to date (Univ of Maine Pulp and Paper Foundation 100%) / 1969-present / Math, Phy, Chem, Engr / between 11 and 12 / about 15-18 F, 22-25 M year; 150 F, 275 M to date / Involved 20% E.

The primary goal of this program is to attract excellent students to the engineering profession. A special effort is made to recruit women by educating high school guidance counselors about opportunities for women in engineering and by direct contact with women who appeared to be qualified candidates. Potential candidates, especially women, are encouraged to try engineering at the beginning level.

## HIGH SCHOOL

Participants are taught an engineering course with an opportunity to select a research project, and taken to industrial sites to meet with engineers and are introduced to engineering students who serve as role models. More than eighty percent of the students who have attended this three-week summer course have later studied engineering and science in college. Stanley N. Marshall, Jr., 217 Jenness Hall, University of Maine at Orono, Orono ME 04473, (205) 581-7559

071 INTRODUCTION TO ENGINEERING FOR HIGH SCHOOL WOMEN, University of Santa Clara, Santa Clara CA 95053 / IBM, Zellerbach Family Fund, Ford Motor Co / \$5,000 year, \$15,000 total (foundations and corporations-wages and materials; Univ of Santa Clara-overhead) / 1977-1979 / Engr / 9, 10, 11, 12 / 27-35 F year, 93 F total / Recruit E; Involved 3% B, 20% A, 10% H, 7% E; Efforts E; Role models A, H / Y.

These three-week workshops were intended to recruit women into engineering by exposing them to the work and to women in the field, and to prepare them for engineering studies. The workshops include "hands-on" projects including shop, soldering, radio, solar energy design, concrete placement, surveying, materials testing, metals casting and engine disassembly. Teachers and speakers are women of various engineering backgrounds and interests who tell the students about engineering careers. Tours of industrial sites are conducted. Recruitment is done by sending flyers to high school counselors, math and science teachers, publishing notices in local newspapers and alumni papers; and by talking to students at "Network" workshops, high schools, and local science fairs. Former participants and faculty colleagues also helped generate interest in the program. Special scholarships are given to students on the basis of financial need. Of the 90 women who have attended the workshops, many are now enrolled in engineering schools or intend to do so. Retention rate for these students seems high, but evaluation is not complete. Planners report that it is difficult to measure change in self-confidence, which appears to be a benefit of the workshops. For the organizers, the project is extremely time-consuming though exciting and has established the director as a contact for young women students. Lee Hornberger, Mechanical Engineering Department, University of Santa Clara, Santa Clara CA 95053, (408) 984-4327

072 INTRODUCTION TO ENGINEERING FOR WOMEN AND MINORITY HIGH SCHOOL STUDENTS, Washington State University (WSU), Pullman WA 99154 / College of Engineering, WSU and industry

## HIGH SCHOOL

contributions / \$21,000 (1979) (WSU 20%; industry 80%) / July 1975-present / Engr, Architecture, Construction management / 11 / 40 F, 20 M year; 170 F, 40 M to date / Recruit N, B, A, H; Involved (1978) 21.7% A, 2.8% H / V.

This annual summer program seeks to increase the representation of women and minorities in the engineering profession by reaching these groups at the high school level and giving them a realistic picture of engineering as a profession. Announcements of the program are sent to science teachers or counselors at all high schools in the state, inviting them to nominate students whom they feel would benefit. (In 1978 the median G.P.A. of students chosen was 3.85. Of the 14 minority students invited, the 8 Asians and 1 Hispanic male attended.) All departments in the College of Engineering participate in the program, which consists of a mixture of lectures (some by guests from industry), laboratory experiments, films, discussions, and tours. Over half of the program has been devoted to laboratory experiments in the various branches of engineering. Aspects common to all fields are presented in an introductory lecture which touches on such topics as salaries, career opportunities, qualifications for engineering and curricula. Guest speakers from industry lead small informal discussion groups. Participants complete an evaluation at the end of the program, and have revealed in these and their informal comments and letters considerable enthusiasm for the program. A final report is prepared annually. Robert Luedeking, Chemical Engineering Department, Washington State University, Pullman WA 99164, (509) 335-5252

073 INTRODUCTION TO ENGINEERING PROGRAM FOR HIGH SCHOOL GIRLS, College of Engineering, University of Wisconsin, Madison WI 53706 / Wisconsin Foundation, Dupont and College of Engineering / \$4,710 (1975) / June 1974-1976 / Engr / 11, 12 / 47-77 F year, 168 F total / V.

This program introduced high school girls to engineering in an environment which would enable them to work to their full potential and to acquire familiarity with some concepts of engineering. For each one-week session, twenty-five girls who had completed two years of mathematics, who had outstanding high school records and who had been nominated by math, chemistry or physics teachers were selected. Participants contributed (\$25 each in 1974) toward the cost of room and board for the week. The students were introduced to the specific fields of engineering in which the college offers undergraduate degrees. Each department provided written descriptive materials, a talk by a department representative, and, generally, a tour of some of the departmental laboratories or demonstrations of on-going

## HIGH SCHOOL

projects. In addition, students were given an introduction to logic circuits and to computer programming. There was an attempt to provide unusual or "do-it-yourself" experiences plus a tour of the campus. The evening program presented an opportunity for the students to meet practicing women engineers and scientists for informal discussion of the problems and rewards of their professions. Evaluations indicate that the program has enhanced the attitudes of students toward possible careers in engineering according to the director. Prof. Lois Greenfield, T-24, College of Engineering, University of Wisconsin, Madison WI 53706, (608) 262-3507

074 IOWA SCIENCE, ENGINEERING, AND HUMANITIES SYMPOSIUM, University of Iowa, Iowa City, IA 52240 / U.S. Army Research Office / \$9,000 year (Army 100%) / 1962-present / Math, Ast, Phy, Bio, Med, Engr, Soc / 10, 11, 12 / 110 F, 110 M / Recruit N, B; Involved about 2% N, about 4% B; Role models N, B / V.

The annual symposium introduces students to the nature of science and informs them about the relation of science to society. It attracts a large number of female students every year. Teachers have noted that their women students appreciate the chance to talk to working scientists. Occasionally, special features make it especially relevant for the topic of women in science. In 1977, for example, Dr. Doris Simonis addressed the symposium on "Science and Poetry," and she talked informally with many of the young women attending about how scientific ideas and projects can improve the quality of human life. She felt that the meeting was an excellent forum for interesting women students of a humanistic inclination in the relevance of science in modern day life. Edward L. Pizzini, 455 P B, University of Iowa, Iowa City IA 52240, (319) 353-4102

075 LAWRENCE LIVERMORE LABORATORY/DUBLIN HIGH MATH PROGRAM, Lawrence Livermore Laboratory (LLL), Livermore CA 94550 / LLL Office of Equal Opportunity / Sept 1979-April 1980 / Math, Ast, Phy, Chem, Bio, Med, Engr, Geol / 9, 10, 11 / 150 F / Involved 1% N, 10% B, 12% A, 8% H, 2% D; Role models B, A, H / V.

This pilot program was conducted to encourage high school girls to enter scientific fields. Although all male and female students in mathematics classes were invited to participate, all lecturers, scientists, engineers and helpers were women from LLL. The activities included panel discussions in the mathematics classrooms by women in different scientific fields, a tour of the LLL for girls

## HIGH SCHOOL

from the high school, movies and demonstrations of projects at LLL, and a computer workshop set up in the high school. For the panel discussions, there were five women scientists in each math class who told how they got into their respective fields (seismology, engineering, mathematics, etc.), and what their jobs entailed. Arrangers report that many of the girls who participated have expressed interest in going into mathematics and particularly computer science. They advise that "it is extremely important to use women and minorities as role models and to present job descriptions of these women in terms the students can understand." Jean Shuley, Lawrence Livermore Laboratory, Post Office Box 5509 L-402, Livermore CA 94550, (415) 422-4234

076 MATH/SCIENCE DAY, Meredith College, Raleigh NC 27611 / Allied Chemical Corporation / \$1,200 (Allied Chemical 80%; Meredith 20%) / April 27, 1979 / Math, Chem, Bio / 10, counselors / about 400 F / V.

All North Carolina high school guidance counselors were invited to each bring three sophomore women students to the Math/Science Day. The purpose of the program was to encourage high school women to continue their studies in mathematics and science. Volunteer participants, including science department chairs, women graduates, and a woman science researcher studying women's career choice in math, science and engineering addressed the group. Information sessions, corporation exhibits, science games, demonstrations and a film completed the day. Evaluations were later sent to the counselors who attended. Project Director stated that student evaluations would have been useful as well. Costs were low because salaries of organizers and participants were not included. Companies volunteered their employees' time and paid travel costs. Marie Capel, Director, Career Services, Meredith College, Raleigh NC 27611, (919) 833-6461

077 MATH-SCIENCE DAY, Westridge School, Pasadena CA 91106 / Women and Mathematics (WAM) / \$1,000 (Westridge 10%; private contributions 90%) / April 1979 / Math, Phy, Chem, Bio, Med, Engr / 9, 10, 11, 12, faculty-employee development, continuing adult education / 300 F/ V.

This one-day program of lectures, seminars and discussions was designed to give an overall picture of careers in mathematics and science for women and to present role models. Parents and faculty members participated. Recruitment was done by letters and through WAM. Project director reports that the program was very successful and will be repeated in

## HIGH SCHOOL

1980-81. Questionnaires evaluating the event were completed by speakers and participants and verbal comments were noted. Two speakers were sponsored by WAM (see entry #097). All costs were donated by individuals. Vendula Vogel, Westridge School, 324 Madeline Drive, Pasadena CA 91105, (215) 799-1153

078 MICHIANA MATHEMATICS CONTEST FOR WOMEN, Saint Mary's College, Notre Dame IN 46556 / Bendix      op / \$500 year (Bendix 20%; St. Mary's 80%) / April 1977-present / Math / 9, 10, 11, 12 / 50-150 F year, 300 F to date / Involved 10% B, 4% A, 2% H, 1% E / V.

The project stimulates interest in mathematics among high school women and identifies high school women who have mathematical talent. Press releases are sent throughout the state and region; announcements are sent to area high school mathematics departments and the contest is listed by the Indiana Association of Junior and Senior High School Principals which sanctions the event. The contest is individual and team oriented. Individuals compete in one of three contest areas: Algebra, Geometry, Advanced Mathematics. A team consists of nine individuals, three in each of the contest areas. Team and individual trophies are presented. All participants receive certificates. Tests are two hours in length. The contest has tripled in size during the three year existence. National notice has been given to the contest. Saint Mary's College, an all-women's college, enlists the aid of its mathematics majors and mathematics students to provide tours of the campus and to discuss college mathematics. Dr. Don S. Balka, Saint Mary's College, Notre Dame IN 46556, (219) 284-4678

079 MINORITY INTRODUCTION TO ENGINEERING (MITE), University of Washington (UW), Seattle WA 98195 / local industry / \$25,000 year, \$65,000 total (local industry 100%; space, computer facilities and faculty time UW) / 1977-1979 / Math, Phy, Chem, Bio, Engr / 11 / 20 F, 20 M year; 50 F, 50 M total / Recruit N, B, A, H, E; Efforts N, B, A, H; Role models Min / V.

Participants were recruited to this program via a series of mailings to area high schools, to principals, counselors, science supervisors, and teachers and personal contacts with selected schools. Teachers and students were addressed in short meetings at fifteen of the schools in Seattle. Applications were based on overall math and science ability, grade point average and counse'or and teacher recommendations with a minimum prerequisite of two years high school math and one year of high school science. This was an eleven-day

## HIGH SCHOOL

residential program designed to recruit minority high school juniors of high academic standing and motivate them to adopt careers in engineering. An intensive program of lectures in math, physics, engineering and computer science, laboratory work, talks on engineering careers and financial aid, field trips to engineering establishments and athletic and cultural events was arranged to accomplish these goals. At the end of the program gift certificates and certificates of excellence were awarded to the ten students who scored highest on a test of material covered during the program. The announcement of this feature at the beginning was intended to offer additional motivation for students to learn the material presented and distributed. The majority of former participants are enrolled in engineering programs at various universities. Project report: Alistair D.C. Holden, "Minority Introduction to Engineering June 18-30, 1978 MITE at UW", 8 pp. Alistair Holden, University of Washington, 216 Roberts FB-10, Seattle WA 98195, (206) 543-2100

080 ONE WEEK SHORT COURSE FOR WOMEN ON CAREERS IN SCIENCE AND TECHNOLOGY, Institute of Technology (IT), University of Minnesota, Minneapolis MN 55455 / General Motors Corp., Ford Motor Co., IBM / \$6,500 in 1979 (General Motors Corp., Ford Motor Co., IBM 100%) / 1977-present / Math, Phy, Chem, Engr, Architecture / 11 / 60 F in 1979 / Involved 3% B in 1979 / V.

Participants are recruited to this program by letters and posters sent to high school teachers and counselors. The project allows young women to explore courses, curricula, jobs and careers available in a number of science and engineering fields and to interact with and learn from other young women having similar interests and abilities. Activities during the week include a general introduction to the University and campus (through films, tours, informal meetings and discussions), an introduction to what study in the field involves and demands placed upon the students (through a question/answer panel comprised of upperclass women students in the Institute of Technology), an overview of employment and careers in various fields (through a question/answer panel comprised of women employed in scientific/engineering positions), and contact with a range of disciplines over a three-day period (through classroom and laboratory presentations by selected departments and disciplines). The participants are asked to complete an evaluation of the week's program, rating each of its components on an excellent-to-poor scale, and providing written comments as desired. The aggregate response from these reviews is very positive. An unexpected benefit has been an increased level of interest by participating faculty toward the program. Project staff offer several suggestions

## HIGH SCHOOL

for planners of similar programs: (1) mix academic and industrial experiences; (2) limit class length to no more than seventy-five minutes each; and (3) maximize the number of "hands-on" type laboratory experiences. John V. Bell, Institute of Technology, University of Minnesota, 106 Lind Hall, Minneapolis MN 55455, (612) 375-2972

081 PRE ENGINEERING SUMMER INSTITUTE, Northrop University, Inglewood CA 90306 / U.S. Department of Energy (DOE) and industry / \$76,000 year, \$350,000 total (DOE and Industry 60%; Northrop 40%) / 1974-1979 / Math, Phy, Chem, Engr / 11, 12 / 47 F, 124 M / Recruit B, A, H; Role models B, A, H / V.

This program provides an opportunity for minority and female students to enroll in pre-engineering algebra, trigonometry, physics and chemistry classes during the summer quarter. Students who have completed any of the above classes with a grade of B or better are enrolled in regular engineering math or science classes. Participants who successfully complete the pre-engineering program have the necessary prerequisites to apply for admission to freshman engineering programs at any college. Minority and women students are recruited by discussions with high school career counselors and students, and by sending announcements to publications of the Society of Hispanic Engineers, Black Professional Engineers and BCPDME<sup>5</sup>. Planners recommend that minority and women students be treated as potential students who may or may not have some educational disadvantages and that divisive programs which treat them as minorities or females be avoided. Robert C. Thornton, Northrop University, Inglewood CA 90306, (213) 641-3470

082 PREFACE PROGRAM, Rensselaer Polytechnic Institute (RPI), Troy NY 12181 / U.S. Department of Energy; Industrial corporations / \$31,500 year (DOE 47%; RPI and corporations 53%) / April 1978-present / Engr / 9, 10, 11, 12 / 16 F, 16 M year; 28F, 28 M to date / Recruit N, B, H; Involved 1.8% N, 50% B, 1.8% A, 21.4% H; Efforts N, B, A, H; Role models B, H.

This program was meant to acquaint minority and women high school students with the opportunities available to them in engineering and to motivate them toward engineering careers. Brochures were sent to high schools, the JETS (Junior Engineering Technical Society) listing, and representative professional societies. Past attendees helped recruit new participants. The project consists of career oriented lectures relating to each of twelve engineering disciplines; computer and unique interactive computer graphic lectures;

## HIGH SCHOOL

and hands-on experiences. Tours and field trips as well as discussions of college admissions, financial aid, co-op programs, placement, career opportunities and communication skills were conducted. Interaction with minorities and women who are professional engineers and/or engineering students was an essential part of the workshop. Each group learned much about the other and developed a genuine understanding of the other. Of the nineteen who have graduated from high school so far, all are in college and eighteen are following curricula in engineering or science. Dr. Paul M. DeRusso, Associate Dean of Engineering, Rensselaer Polytechnic Institute, Troy NY 12181, (518) 270-6620

083 PROJECT ON SEX STEREOTYPING IN EDUCATION, Women Educators, Red Bank NJ 07701; Georgia State University / Women's Educational Equity Art Project (WEEA), U.S. ED / \$80,000 year, \$160,000 total (WEEA 100%) / Sept 1976-Aug 1978 / Math, Phy, Chem, Bio, Soc / 9, 10, 11, 12 and faculty-employee development / 100's F (estimated); about 1 M per 4 Fs / Involved 5% Min (estimated). Role models B, A, H / V.

The project developed and tested thirteen instructional units on sex stereotyping in specific content areas of education, for use by teachers and high school students. The units consist of an audiotape of about a half hour accompanied by handouts, overhead projector transparencies, and a bibliography. The units include lectures, discussion topics, and activities which take one to two hours in all; some activities can be done later by participants. Two of the units are specifically on science and mathematics respectively, but others on curriculum, educational research, and so on may prove of general interest to those working on women in science and mathematics. Tapes: titles and price list available from Education Development Center, 55 Chapel Street, Newton MA 02160. Publication: Patricia B. Campbell, "A Useful Evaluation of Sex Roles Materials: Possibility or Pipe Dream," ERIC Doc. 156699, Nov. 1978. Patricia B. Campbell, 450 Red Hill Road, Middleton NJ 07748, (201) 671-1334

084 RESEARCH INTRODUCTION TO A SCIENTIFIC EDUCATION (Project Rise), Goucher College, Towson MD 21204 / National Science Foundation (NSF) / \$34,790 year, \$69,581 total (NSF 94.3%; RISE 5.7% + \$19,700 in tuition remission) / April 1974-Nov 1975 / Math, Chem, Bio, Soc, Psy / 10, 11, 12 / 68 F / V.

This course was designed to increase interest in science as a career. Participants were high achieving female high

## HIGH SCHOOL

school juniors who were recruited from three high schools with the cooperation of school counselors. Students received four college credits for participation in the weekly classes, focused on a research project. The courses were taught by professionals in scientific fields. Although the statistical results from the evaluator were disappointing, the comments on the experience were favorable. Prof. Barbara H. Long, Goucher College, Towson MD 21204, (301) 825-3300

085 ROWLAND SCHOLAR PROGRAM, Clark College, Atlanta GA 30314 / Rowland Foundation / \$25,000 year (Rowland Foundation 100% / June-Aug 1976-1978, 1980 / Math, Phy, Chem, Bio, Engr / 12 / 9 F, 11 M (1978); 39 F, 49 M total / Recruit B, H; Involved 50% B; Role models B, A, H / V.

This eight-week summer program is offered for several incoming freshmen who plan to major in a science and/or engineering field. The program strengthens skills in mathematics, science and communications. An introduction to computer science and instrumentation is given. Participants may earn up to eight semester hours of college credit. They are selected from students who have been accepted for admission to Clark, based on SAT or ACT scores, high school academic records, letters of recommendation, and/or an interview by program selection committee. In addition to academic instruction (four days per week) the following activities are conducted on the fifth day: (1) discussion of career opportunities in the fields of science and engineering; (2) industry and laboratory tours; (3) guidance sessions to cover topics such as "how to study," "use of the library", "how to take tests" and "how to get along in college"; and (4) specifically designed instruction and investigative work. Out of town participants live on campus and eat meals as a group. Various social functions were arranged for all participants. The program provides a stipend for each student covering room, board, tuition and other expenses. Year-round scholarships were awarded to successful participants and extensive information about other forms of financial assistance was provided. Women scientists were especially sought as role models and speakers. Clark alumni and women students were among those invited to talk with Rowland students about combining marriage and childbearing with professional work as well as about their jobs. Visiting women scientists addressed male and female participants as part of an effort to make all students aware that women are succeeding in these fields and that in the future most work situations will have both male and female professionals employed. Dr. O.P. Puri, Clark College, Atlanta GA 30314, (404) 523-3538

## HIGH SCHOOL

086 SCIENCE CAREER WORKSHOP, Notre Dame College, Cleveland OH 44121 / National Science Foundation (NSF) / \$10,000 (NSF 100%) / Sept 1979-Oct 1979 Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Soc, Geol, Psy 10, 11, 12 / 185 F / Involved 20% B; Role models Min / V.

This program was publicized by local television, radio and newspapers. Brochures, posters and application forms were sent to area high schools. The one-day conference encouraged high school students to consider the many science career options, provided role models for these students by their interaction with outstanding women scientists and engineers, gave specific information about the preparation essential for various science careers and about current and projected job opportunities in science for women (including equal opportunity laws and affirmative action plans), and discussed with them the different lifestyles available to women scientists. These subjects were presented by women scientists in speeches, a panel discussion, and small group workshops. During the luncheon, students had an opportunity to talk to individual speakers, making personal contact and having specific questions answered. All participants (scientists and students) were asked to evaluate the experience. Planners reported that all "goals were realized, with great success." Sister Jeanmarie DeChant, Notre Dame College, 4545 College Road, Cleveland OH 44121, (216) 381-1680

087 SOCIETY OF WOMEN ENGINEERS (SWE) - HIGH SCHOOL VISITATION PROGRAM, Michigan State University (MSU), East Lansing MI 48824 / MSU-SWE / \$400 (MSU-SWE 100%) / Sept 1978-June 1979 / Engr / 11, 12 / 350 F, 100 M.

This program informed high school students of the career opportunities in the engineering fields and examined engineering as an area of study. High school principals, counselors, and teachers of mathematics, physics and chemistry were contacted to arrange for visits to the schools. Teams including SWE members and a College academic advisor visited participating high schools and (1) gave a 20 minute slide/tape presentation on engineering - what it is and has to offer; (2) conducted a discussion of college life specific to the engineering curriculum with a panel of three women engineering students; (3) answered questions addressed to the academic advisor pertaining to University or College structure as a whole; and (4) distributed literature on engineering as a field for women to consider. As a result of the project, many students, particularly women, have become aware of the option to choose the field of engineering and some former participants have entered engineering disciplines. Ms. Susan L. Wall, College of Engineering, Michigan State

## HIGH SCHOOL

University, East Lansing MI 48824, (517) 355-5078

088 SPECTROSCOPY, Notre Dame College, Cleveland OH 44121 /  
Notre Dame / 1976 / Chem / 11, 12 / 24 F / Involved 15% B.

Five one-day sessions were held to teach eleventh and twelfth grade girls the basic principles of spectroscopy and to give them related laboratory experience. Lectures and laboratory work with spectroscopic equipment were conducted. Participants were recruited via posters and letters sent to area high school science teachers asking that they encourage girls who were juniors or seniors to attend the Spectroscopy Workshop. Funding was part of the general science budget at the College. Sister Jeanmarie DeChant, Notre Dame College, 4545 College Road, Cleveland OH 44121, (216) 381-1680

089 STEVENS WOMEN IN ENGINEERING SUMMER PROGRAM, Stevens Institute of Technology (SIT), Hoboken NJ 07030 / EXXON Corp., Pfizer Foundation, Inc., Mobil Foundation Inc., General Motors Corp. and program fees / \$60,000 year (Industry and Foundations and fees 60%; SIT 25%; program fees 15%) / Summer 1978-present / Engr / 10, 11 / 40 F (1978), 160 F (1979) / Involved 2% B, 4% A, 2% II, 5% E; Efforts E; Role models Min / V.

This residential career awareness program provides an introduction to major aspects of engineering, increases awareness about the engineering profession, and helps students realize their potential related to an engineering education and an engineering career. Through classroom presentations, laboratory experiences in various engineering disciplines, seminars and colloquia, students interact with practicing women engineers, women engineering students, and Stevens faculty members and administrators and learn about the role of women in engineering. They are taught computer programming and allowed to generate and execute several programs, demonstrating the use of the computer as a research tool for the engineer. Seventy-five percent of the 1978 group will begin engineering studies in September 1980 at fourteen different schools. Before attending the summer program, only three of the forty participants indicated definite plans to pursue an engineering education. Recruitment was by mailings to students identified through ETS student search and to high school guidance counselors and teachers of math and science, and by brochures distributed at College Fairs and Career Days. Full scholarships were available to students of limited means. Susan C. Swartz, Stevens Institute of Technology, Hoboken NJ 07030, (201) 420-5182 or 5245

## HIGH SCHOOL

090 STUDENT SCIENCE TRAINING (SST), University of Dayton, Dayton OH 45469 / National Science Foundation (NSF), industry, Wright-Patterson Air Force Base (WPAFB), Aeronautical Systems Division / \$15,000-\$25,000 year, \$30,000-\$50,000 total (NSF, industry, WPAFB 80%; University of Dayton 20%) / June 1978-Aug 1979 / Phy, Chem, Bio. Engr / 10, 11 / 13 F, 17 M year / Recruit B, H; Involved 24% B, 6.6% H; Efforts B; Role models B / V.

The project encouraged high school sophomores and juniors who exhibited potential to pursue scientific and engineering careers. The project gave minority and economically disadvantaged students an opportunity to work with established researchers in both academic and industrial/governmental environments. The six to eight week program provided one week of intensive academic work followed by a four to six week industry internship. The students were involved in classroom instruction and one-on-one tutorial with material at a post-secondary academic level, hands-on problem oriented projects, motivational career orientation and guidance sessions, and role modeling through the use of minority scientists and engineers as lecturers and advisors. There was a panel discussion by distinguished women scientists and engineers and two women were guest speakers. To recruit students, staff mailed brochures to and visited all area high schools; they asked counselors and science and math teachers to recommend eligible students, and specifically to include minority girls. Stipends were made available to all SST students so they would not have to forego income from summer employment in order to participate in the program. In the selection process a special effort was made to include minority women. A telephone survey of the students who attended the 1978 SST Program was conducted. Twenty-one of the twenty-six high school juniors were contacted. All of these students had entered college and 90.4 percent were in science or engineering. Jennie Sethna, Director, Student Oriented Programs, or Carol M. Shaw, Assistant Dean of Engineering, University of Dayton, Dayton OH 45469, (513) 229-2736

091 STUDENT SCIENCE TRAINING PROGRAM, Texas Woman's University (TWU), Denton TX 76204 / National Science Foundation (NSF) / Annual cost \$14,000 (NSF 95%; TWU 5%) / June-July 1979 / Math, Chem / 11 / 7 F, 1 M / Involved 12.5% B, 12.5% A, 37.5% H.

This six-week summer program in chemistry gave students practice in analysis and evaluation of complex topics. It demonstrated the universal applicability of several fundamental concepts, accelerated the students' scholarly development, developed self-reliance and motivated the

## HIGH SCHOOL

students to prepare for a well-defined role in science. The schedule included daily lectures, laboratory sessions, small group projects and independent study projects. There were tours of the campus, particularly the library and science departments, and field trips related to the class work, as well as social/recreational activities. Student assistants (junior or senior chemistry students) assisted in instruction and lived in the dormitories with participants and served as counselors. This program was designed for high-ability secondary school students. Announcements were sent to principals, science teachers and counselors in Texas and nearby states, inviting nomination of one student from each school. Selection was based on grade point average (B), class rank, I.Q. if available, recommendation from the high school and the student's essay on how the program would "enable him to reach his goals in a science career." A similar project was conducted with NSF support in 1959, 1961 and 1963-69. Dr. Walter S. Hamilton, Box 232973, TWU Station, Denton TX 76204, (817) 387-7518

092 STUDENT SCIENCE TRAINING (SST) PROGRAM IN COORDINATION CHEMISTRY FOR HIGH-ABILITY SECONDARY SCHOOL STUDENTS, Notre Dame College, Cleveland OH 44121 / National Science Foundation (NSF) / \$17,000 year, \$150,000 total (NSF 100%) / Sept 1971-present / Chem / 11, 12 / 20 F, 20 M year; 180 F, 180 M total / Recruit E; Involved 40% B, 2% A, 50% E; Efforts E; Role models B / V.

The project gives talented students a unique experience in coordination chemistry, teaches them the principles and theories inherent in coordination chemistry, allows them to use sophisticated instrumentation, helps them develop research techniques in the laboratory, and provides an opportunity for them to get to know other talented students with similar interests and drive. During the program, groups of forty or more students meet every Saturday, all day. They have a three-hour lecture in the morning and three-four laboratory sessions in the afternoon. Each student delivers a research paper before faculty of the program, peers, and their high school teachers. Students are given a tour of the college's research facilities and engage in fun activities together. The academic program is approximately third year college level. Prior to the opening of the program a special two-week workshop is held to help the economically and educationally disadvantaged students (predominantly Black students) review or develop basic skills needed. (Approximately two-thirds of this group were female.) Special efforts are made to recruit women, minority students and economically disadvantaged students, especially in urban schools. Recruitment activities include letters and forms sent to teachers of

## HIGH SCHOOL

chemistry at high schools, a dinner meeting for teachers and interested students, a mini-SST Day for teachers and students, recruiting by present participants for qualified students in their own schools, newspaper articles, and national brochures announcing the program. Sister Jeanmarie DeChant, Notre Dame College, 4545 College Road, Cleveland OH 44121, (216) 581-1680

093 SUMMER COLLEGE ORIENTATION PROGRAM IN ENGINEERING AND SCIENCE (SCOPES), Clarkson College, Potsdam NY 13676 / various industries and organizations / \$25,000 year (Industries and organizations 88%; Clarkson 12%) / 1954-present / Math, Phy, Chem, Bio, Med, Engr, Geol, Soc, Industrial management, Accounting, Architecture, Technical Communication, Criminal Justice, Finance, Industrial distribution, Marketing / 10, 11, 12 / about 45 F, 50 M year; 500 F, 600 M to date / Recruit N, B, H, E; Involved 20% N, 5% B, 2% H, 15% E; Efforts N, B, H, E; Role models N, B, H, E / V.

This annual, two-week summer program provides career information and gives participants an exposure to the college environment and life away from home. The schedule includes lectures, demonstrations, academic exercises and special projects. Role models, including some minority women and women from economically disadvantaged background, were utilized. Participants were recruited through high school guidance counselors, various minority groups (including ME<sup>3</sup>), and a number of American Indian agencies. An interest in the participation of women is reflected in a slide-audio production and a brochure highlighting opportunities for women in engineering. Scholarship aid was available for minority and economically disadvantaged students. Planners credit the program with having resulted in increased enrollment of American Indians at Clarkson and a subsequent improvement in recruiting. They advise that care be exercised in "not assuming that the needs, social background, family life, etc. of American Indians is similar to that of other minority groups." SCOPES, 10 minutes, slide-audio; What about Engineering for You? slide-audio, 10 minutes; Women in Science and Engineering and Clarkson College, slide-audio, 10 minutes. Clark J. Bailey, Clarkson College, Potsdam NY 13676, (715) 268-6578

094 SUMMER SCIENCE PROGRAM, University of Washington (UW), Seattle WA 98195; Office of Minority Affairs / private community funds / \$27,275 year (private community funds 85%; UW 15%) / 1958-present / Math, Phy, Chem, Bio, Med, Engr, Geol / 10, 11, 12 / 10 F, 10 M year, Recruit N, B, A, H;

## HIGH SCHOOL

Involved (1979) 10% N, 20% B, 15% A; Role models B, A / V.

The Summer Science Program is an eight-week project designed to give low-income minority and women high school students a thorough introduction to the sciences and to motivate them to pursue scientific careers. The twenty students chosen for the 1979 program participated in laboratory research for thirty hours a week and spent ten hours weekly in tours, seminars and lectures. They had four intensive twelve-hour classes--in marine science, engineering and computer science, medicine and applied mathematics. The program included a career and life planning class and workshops and on-campus work experience in science fields. Students were paid the federal minimum wage. Participants were recruited at high schools in areas of the city with substantial minority populations via in-class presentations of the program. Publication: Roberta Banks and Rick Rael, Summer Science Program Report 1978 University of Washington, 65 pp.; "Science Program for high schools assist in realization of career dreams," The University Report, Summer 1979, p. 2. Roberta Banks, 300 HUB, FK-10, University of Washington, Seattle, WA 98195, (206) 543-8576

095 TECHNICALLY SPEAKING--SHOULD YOU?, Institute of Technology (IT), University of Minnesota, Minneapolis MN 55455 / Institute of Technology / \$1,700 year, \$6,800 total (IT 100%) / April 1975-April 1979 / Math, Ast, Phy, Chem, Engr, Geol, Architecture, Landscape architecture / 10, 11, 12 / 100-200 F year, 700 F total / Involved 1% N, 1% B, 2% A; Role models B, A, H, E / V.

Individual invitations for girls to attend this seminar were sent to counselors and chairpersons of mathematics departments at all high schools in the Twin Cities Metro Area. Participants in the seminar were given a view of alternative careers via a woman engineer who addressed the group, a film on women in engineering, and small group discussions at lunch with a woman engineer and one or more women students from IT. Indicators of the effectiveness of this program are the increasing enrollment at IT and the annual growth in the number of girls wishing to attend the seminars. Planners have found that it is absolutely necessary to allow ample time for discussion and questions from the high school students. Ben Sharpe, 106 Lind Hall, 207 Church St. SE, Minneapolis MN 55112, (612) 373-7536

096 VISITING WOMEN SCIENTISTS PROGRAM, Research Triangle Institute, Research Triangle Park NC 27709 / National Science Foundation (NSF) / \$130,000 year, \$395,000 total (NSF 100%) / Aug 1977-Oct 1979 / Math, Ast, Phy, Chem, Bio, Engr, Soc,

## HIGH SCHOOL

Geol, Psy / 9, 10, 11, 12 / 38,000 F, 2,000 M total /  
Recruit N, B, A, H, E; Involved 1% N, 22% B, 2% A, 10% H;  
Role models D, E, Min / V.

This program provided high school females with an opportunity to interact with women scientists as role models; gain information about science careers currently available and those that are presently emerging; see evidence of women combining career and personal lives successfully; and learn about the preparation needed for a science career, the importance of keeping options open and sources of financial aid. Other objectives included encouraging teachers to provide support for females considering science careers, promoting the attitude that science careers are appropriate for females and males, and encouraging females to seek additional information about science career opportunities. The Visiting Women Scientists Program consisted of visits by 91 women scientists from diverse employment and ethnic backgrounds to 250 junior high and senior high schools across the United States. Resource Packets of Science Career Information were distributed to the schools before the visits. The day long visits to the schools included a slide presentation of women in a variety of science careers, demonstrations of various job-related activities, discussion of women combining a career and family and question and answer sessions. Staff meetings were also conducted in a majority of schools to provide school staff with information about the program. Learning activities and career information were made available to all who participated. The director reported that the Visiting Women Scientists Program was rated highly by participants and was successful in encouraging students to seek additional information about science careers. The aspect of the program most highly rated by students was that the presentation showed the students the importance of taking mathematics and science courses in high school. Publications: Carol Place, Larry E. Conaway, Iris R. Weiss, and Mary Ellen Taylor. "The Visiting Women Scientists Program, Final Report." Research Triangle Park, NC: Research Triangle Institute, August 1979; Iris R. Weiss and Larry E. Conaway. "Manual on Program Operations for the Visiting Women Scientists Program." Research Triangle Park, NC: Research Triangle Institute, August 1979; A final report of the Pilot Program, Highlights Reports of both programs and a "Women Scientists Roster" (published by the National Science Teachers Association) were also produced. The roster identifies by location, training, discipline and race or ethnic background approximately 1300 women scientists throughout the U.S.A. who have indicated interest in encouraging females to consider science careers. Iris Weiss, Research Triangle Institute, P.O. Box 12194, Research Triangle Park NC 27709, (919) 541-6327

## HIGH SCHOOL.

097 WAM: WOMEN AND MATHEMATICS, Mathematical Association of America, Washington DC 20036 / IBM and other corporate sources / \$4,500 per year per region (1979--8 regions) / Sept 1975-present / Math / 9, 10, faculty-employee development / 100 F, 20,000 M to date / Recruit Min (as speakers); 100 models Min, D, E / V.

WAM is a secondary school lecture program which interests young women in studying mathematics and makes adults who influence their course and career selection aware of the need for a strong mathematics background in many traditional and newlyemerging careers. Lectures by women of all racial and economic backgrounds are geared to meet the needs of the individual groups and schools and address the concerns of both college-bound and non-college bound students. Speakers are recruited through corporate and professional groups, academic networks and personal contacts. Schools and other organizations are encouraged to host WAM visits by mailings to schools, talks at conferences of teachers, counselors, professional societies and others associated with education, newspaper and journal articles and personal contact. The cost of the program is significantly reduced by volunteer efforts. In addition to talking with students WAM holds special conferences for counselors, and prepares, acquires, and disseminates research reports on issues relevant to the program, bibliographies on related issues, and career literature in all fields. This program has resulted in increased awareness of issues by speakers, students and all others involved. All participating schools and organizations are asked to evaluate WAM visits.

Publications: E.L. Poiani. "Close Encounters of the Mathematical Kind," Pi Mu Epsilon Journal, Fall 1979, 5 pp; M. Denby, S.J. Devlin, and E.L. Poiani. "The Women and Mathematics Program: A Preliminary Statistical Evaluation," Proceedings, Social Statistics Section, American Statistical Association, 1977, 5 pp. Dr. Eileen L. Poiani, Saint Peter's College, Jersey City NJ 07306, (201) 333-4400, x588

098 WHY NOT ENGINEERING?, College of Engineering, University of Wisconsin (UW Madison), Madison WI 53706 / General Motors (GM) / \$680 per person per day, \$77,680 total / Nov 1977-April 1978 / Engr / 11, 12, teachers, counselors / 116 F / V.

The program acquainted female high school students, teachers and counselors with the career opportunities available in engineering and about the work performed by engineers, and provided counselors and teachers with information about students who succeed in engineering. The forerunner of this project was a one-week summer program conducted for three consecutive summers, which brought female high school students to campus for engineering career awareness activities

## HIGH SCHOOL

(see entry #073). To extend the long range effectiveness of these programs past when the students graduated from high school, the "Why Not Engineering" program, involving counselors and teachers, as well as students, was initiated. This program was a series of four one-day conferences which included a film "A World for Women In Engineering" (AT&T Company), a panel of engineering students discussing with high school students the experience of studying engineering, a session for teachers and counselors on "What Kinds of Students Should Consider a Career in Engineering?", a luncheon with a woman engineer as speaker, demonstrations and questions about various fields of engineering, the Madison campus, financial aid, housing, etc. As a result of the project, many of the students have enrolled at the host school, and counselors and teachers know people they can contact in the College. Prof. Lois Greenfield, T-24, College of Engineering, University of Wisconsin, Madison WI 53706, (608) 262-3507

099 WOMEN AND SCIENCE EDUCATION, Sangamon State University, Springfield IL 62704 / National Science Foundation (NSF) / \$10,000 (NSF 100%) / Jan 1980-Oct 1980 / 10 / 4 00 F / Involved 20% B, 5% A, 5% H; Role models Min, E / V.

This program delivered information about job opportunities in science to students at eight large high schools. Large and small group discussions were held with women scientists as role models. W.W. Stevens, Sangamon State University, Springfield IL 62708, (217) 786-6688

100 WOMEN IN ENGINEERING, Tri-State University (TSU), Angola IN 46704 / Industry / \$3-4,000 year, \$9-15,000 total (Industry 95%; TSU registration fees 5%) / June 1974-June 1978 / Engr / 11, 12 / 25-30 F year, 150-180 F total / Involved 5% B / V.

This one-week residential summer program increased the awareness among high school girls of careers in engineering. Any female junior or senior could apply. A recommendation from a teacher or counselor, permission of the parents and a \$30 fee were required. The schedule of activities included lectures and laboratory experience in science, mathematics and engineering, seminars and discussions with women engineers, demonstrations and tours of corporate facilities in the area, films, homework assignments and social gatherings. Some of the women engineers stayed overnight in the dormitory with the students, allowing further opportunity for discussion. Participants received certificates at the end of the session. These programs have been well received by the high school women participating.

## HIGH SCHOOL

and they have led many to pursue engineering who would not have otherwise. The increased enrollment of women in engineering at TSU has exceeded expectations of project staff. The cooperation of area industry in providing various forms of support has been the mainstay of this program. Publications: Women in Engineering (annual program reports). Gerald R. Seeley, Dean of Engineering, Tri-State University, Angola IN 46703, (219) 665-3141, x269

101 WOMEN IN ENGINEERING AT CASE INSTITUTE OF TECHNOLOGY, Case Western Reserve University, Cleveland OH 44106 / Standard Oil of Ohio (SOHIO) / \$4,000 year (SOHIO 90%; Case Western 10%) / April 1977-present / Math, Phy, Chem, Bio, Med, Engr / 9, 10, 11, 12 / 150 F year, 450 F to date / Recruit N, B, A, H; Involved 85% B, 15% H, 2% A, 2% D; Efforts N, B, A, H; Role models N, B / V.

This program informs young women about engineering and provides them with a hands-on laboratory experience. Participants are recruited via letters to school counselors and teachers of science and mathematics. Students attending this one-day annual program hear a speech by a prominent role model, and a panel discussion on women in engineering with Case students and alumnae. Women students of the engineering school participate in the program as guides and laboratory assistants. Each participant (and some parents) attends a laboratory session in one of the fields of engineering. Comments from participants reflect a strong desire for laboratory work in and information about more than one engineering specialty and a broader range of science fields. The director reports that enrollment of women at Case has increased as has the number of inquiries about women in engineering from students, parents, counselors and teachers. Margaret E. Boulding, Director of Student Programs, Case Western Reserve University, Crawford Hall, Room 215, 10900 Euclid Avenue, Cleveland OH 44106, (216) 368-2904

102 WOMEN IN ENGINEERING (WIE), University of Idaho, Moscow ID 83843 / Industry-gifts and grants / \$8,000 year (industry 70%; Univ of Idaho 30%) / July 1974-July 1979 / Chemical engineering / between 11 and 12 / 98 F total.

In conjunction with the JETS (Junior Engineering Technical Society) Summer Short Course on Computer Programming this program was developed to make women high school seniors aware of the potential of careers in engineering. Following the JETS two-week accelerated class, the women take a six-hour per day, two-week course emphasizing applications of

## HIGH SCHOOL

the computer in engineering problem solving. A stipend of \$80 per week is paid each participant for the duration of the four-week program. Participants pay their own expenses for room and meals. Partly due to the availability of the WIE program, women applicants for the 1974 JETS program increased substantially and accounted for fifty percent of those actually selected to participate in JETS. To apply for WIE, women had to check a box on the JETS application. Planners observed that the role of women in engineering education has increased. The stereotype of the engineer being male has been diminished and the enrollment of women in engineering programs increased. They advise that the programs be flexible, challenging and fun for the students. "They should be given responsibility in assignments to plan, execute and analyze experimental problems." Article published: W.R. Hager, and W.J. Thomson. "Recruiting Women Engineering Students: Participation is Convincing." Engineering Education, April 1976, pp. 756-758. Dr. Kermit L. Holman, Dept. of Chemical Engineering, University of Idaho, Moscow ID 83843, (208) 885-6795

103 WOMEN IN ENGINEERING CONFERENCE, Humboldt State University, Arcata CA 95521 / Humboldt State University / \$1,000 (Humboldt 100%) / May 16, 1975 / Engr / 9, 10, 11, 12 / 50 F / Role model. A.

This program introduced women to the world of engineering. Students were recruited through contact with high schools, science teachers, principals and parents. Role models were brought to this conference from San Francisco, Sacramento and Washington, DC, as there were and are no female engineers in the local area. As a result of this conference, several women entered engineering schools and lasting friendships were developed. Dr. F. G. Alden Burrows, Dept. of Engineering, Humboldt State University, Arcata CA 95521, (707) 826-3618

104 WOMEN IN ENGINEERING SEMINAR, Texas Tech University, Lubbock TX 79406; Society of Women Engineers (SWE), Texas Tech Chapter / \$600 total (SWE 100%) / Jan 1979-March 1979 / Math, Phy, Chem, Engr / 11, 12 / 37 F / Involved 8% B, 2% A, 16% H, 1% E / V.

To introduce engineering as a viable career choice to high school girls, a two-day on-campus seminar was held. The program included tours of engineering departments and a panel discussion with members of SWE from industry and academia and from the Texas Tech student chapter. Over thirty percent of the seminar participants are currently enrolled in engineering at Texas Tech. SWE, Box 4200,

## HIGH SCHOOL

Lubbock, TX 79409, (806) 742-3456

105 WOMEN IN ENGINEERING SEMINAR/INSTITUTE, University of Dayton, Dayton OH 45469 / Industry / \$15,000-\$15,000 year, \$65,000-\$75,000 to date (Industry 75%; University of Dayton 25%) / 1974-present / Engr, Engineering technology / 10, 11, counselors / 60-80 F year, 700 F to date/Recruit B, E; Involved 10% B, 15% E; Efforts B; Role models B / V.

This one-week summer program offers an educational program that brings the possibilities and opportunities for a career in engineering to the attention of young women. It breaks psychological barriers and generates interest in the field of engineering among women of high school age. Brochures describing the program are sent to 3,000 high school counselors and teachers, including schools with a large minority population and inner city schools. The program begins with a Parents' Banquet attended by students, counselors and parents at which a nationally known woman engineer speaks and serves as a role model. The second component is an Engineering Design Project led by faculty or industry representatives for students and counselors in small groups. This activity illustrates the engineering approach to problem solving. Next, local role models, members of the South Ohio Section of the Society of Women Engineers, participate in a panel discussion for students and counselors. These women represent various fields and stages of engineering careers and have successfully combined careers and family life. Technical presentations involving the students in "hands-on" demonstrations and experiments in engineering, engineering technology and research are a fourth component. The Day With Industry permits participants to interact with practicing engineers, observe engineering design, processes and production, and be involved in "hands-on" experiments designed to illustrate what engineers do. For example, girls visiting Inland Division of General Motors made and tested their own brake cable. An Industry Roundtable allows each company to discuss the role of engineering at the particular facility with the aid of a display or exhibit (many of which are product or process oriented) for participating students and counselors. The project director reports that "the role of industry and government in the Seminar/Institute is imperative to provide a complete overview of the engineering profession, one which includes engineers in practice. The Industry Roundtable and The Day With Industry have proved enjoyable and educational experiences for the attendees as well as unique opportunities to view, in a practical sense, the industrial and/or government applications of engineering principles. An equally important aspect of this participation is the ability to identify clearly for the attendees the sincere interest on the part of the industrial sector to

## HIGH SCHOOL

help educate and ultimately employ women who graduate with degrees in engineering and engineering technology." The results of a recent survey of participants of the previous seminar/institutes indicates that industry's participation, The Day With Industry, and the Industry Roundtable are highlights of the program. Carol M. Shaw, Assistant Dean of Engineering, University of Dayton, 300 College Park, Dayton OH 45469, (513) 229-2736

106 WOMEN IN SCIENCE Tri-State University (TSU), Angola IN 46705 / area business and industry / \$5,164 year, \$13,475 total (area business and industry 100%) / June 1976-June 1979 / Phy, Chem, Bio, Med, Geol / 10, 11, 12 / 178 F, 1 M total / V.

These one-week summer sessions gave high school girls interested in pursuing a career an opportunity to hear several successful women scientists discuss their work. Each speaker described her profession, covering such areas as academic preparation, job activities, job opportunities, personal advantages and disadvantages. A discussion period followed each presentation. Representative laboratory experiences were provided for each student. Participant evaluations completed at the end of the sessions were used for planning programs in subsequent years. Many students reported that the range of careers they were considering had broadened as a result of this experience. Recruitment was done by sending program brochures to high schools in Indiana, Michigan and Ohio. All participants were recommended by area high schools. Peter Hippensteel, Biology Department, Tri-State University, Angola IN 46705, (219) 665-3141

107 WOMEN IN SCIENCE-SCIENCE-ORIENTED CAREER DEVELOPMENT WORKSHOP, William Cullen Bryant High School, Long Island City NY 11105; Policy Studies in Education, National Science Foundation (NSF) / NSF / \$2,000 (NSF 17.5%; William Cullen Bryant 82.5%) / Feb 1975-May 1975 Math, Phy, Chem, Bio, Med, Engr, Soc. Psy / 11 / 16 F, 16 M / Involved 10% B, 15% B, 50% E; Role models N, B, A, H / V.

The initial goals of the project were to identify women interested in science in high school and investigate the factors that were influential in their selection of careers related to science and mathematics. Students selected, both male and female, scored above the 50th percentile on the Scientific, Mathematical or Social Science scales on the Kuder General Occupational Survey. Students also had reading scores on the Metropolitan Reading Test at or above grade level. General grade averages were above eighty

## HIGH SCHOOL

percent and each student had studied at least two years of science and mathematics on the high school level. Student logbooks were used to record reactions, ideas, and feelings related to job selection. Case studies, role models, career exploration, self-exploration, value clarifications and opinion surveys were also employed. Most girls had already accepted the reality of work as part of women's lives. Those interested in science were able to broaden their spectrum of jobs. A more positive image of scientists was created. A minimized image of sex role stereotypes was found. For those girls who did not have a high interest level in the field of science, that attitude remained constant even after the role model workshop. Robert E. Nagle, William Cullen Bryant High School, 48-10 31st Avenue, Long Island City NY 11103. (212) 721-5404

108 WOMEN IN MATHEMATICS SEMINARS, Kent Denver Country Day School, Denver CO 80110 / Kent Denver Country Day School / Sept 1977-May 1978 / Math, Bio, Med, Engr / 11, 12 / 25 F/ V.

Monthly father-daughter breakfast seminars were held for girls enrolled in Math Analysis and A.P. Calculus and their fathers (or designated substitutes). The objectives were to encourage able girls to continue to study mathematics through their junior and senior years of high school; to encourage and reinforce the expectation that women can and do practice in the fields of science, mathematics, medicine, business, engineering, etc. by providing role models with whom they can identify; and to utilize the natural alliance of teenage girls and their fathers to explore the above opportunities. Speakers included a biologist, a geologist, a pediatrician, a certified public accountant, and a mathematics professor who were women. One session was a panel of father-participants discussing opportunities for women in their fields. Clerical and postage costs were donated by the School; participants paid for their breakfasts (\$1 per person per meal). Dr. Beryl Brasch, 1417 South Fairfax, Denver CO 80222, (303) 756-4443

109 WOMEN: STUDY-IN-ENGINEERING, University of Maryland, College Park MD 20742 / corporations (8) / \$9,000 year, \$45,000 total corporations 50%; Univ MD 50% / July 1975-present / Engr / 11 / 25 F year, 200 F total / Recruit N, B, A, H; Involved 15% N, 9% B, 30% A, 1.5% H, 1.5% foreign, 1.5% E, 0.5% D; Role models N, B, A, H, E / V.

This program, designed to increase women's participation in engineering, recruits students for a six-week summer experience which includes six credits of college course work in engineering, interaction with successful women scientists

## HIGH SCHOOL

and engineers and field trips to research labs and industrial sites. Applications are received to insure that minority, handicapped and economically disadvantaged girls are represented. Male and female college students serve as guest speakers to share their perceptions of engineering and the curriculum at the University of Maryland. Costs were relatively low because teaching staff were paid from summer school teaching funds. Funds for scholarships and administrative costs were donated by corporations which also provided women engineers for a panel discussion on campus and tours of industrial plants. Marilyn R. Berman, College of Engineering, University of Maryland, College Park MD 20742, (301) 405-2421

110 WOMEN IN ENGINEERING CONFERENCE, Stevens Institute of Technology (SIT), Hoboken NJ 07030 / SIT, New Jersey Bell, AT&T, Bell Laboratories / \$5,000 year (Industries 70%; SIT 30%) / Feb 27, 1980-present / Engr / 10, 11, continuing-adult education / 150 F, 15 M to date / Involved 2% B, 2% A, 2% H; Role models B / V.

This program uses a panel of practicing women engineers in various specialties and a panel of engineering students to encourage participants to study math and science in high school in order to "keep their options open." The panelists increase the participants' awareness of opportunities available in engineering and major aspects of engineering jobs. Student panel members discuss their decisions to study engineering and their experiences in school. The engineers talk more about the personal and professional perspectives of being a woman engineer. High school students and their teachers, parents and guidance counselors are recruited through the counselors. Susan A. Schwartz, Stevens Institute of Technology, Castle Point, Hoboken NJ 07030, (201) 420-5245

111 WOMEN IN ENGINEERING WORKSHOPS, Michigan Technological University (MTU), Houghton MI 49931 / Michigan Tech Fund / \$50,000 year, \$285,000 total (Michigan Tech Fund 75%; MTU 25%) / Aug 1973-present / Engr / 10, 11, 12, and teacher-counselor education / 1,906 F, 18 M to date / Recruit B; Involved 5% Min; Role models B / V.

Announcements of the workshop are mailed to 6,000 high schools (including schools with high minority enrollments) in a twelve-state area. The schools nominate student for the program, and applicants compete on the basis of academic ability. Costs except transportation are covered by the University and industry, making it possible for applicants from economically disadvantaged backgrounds to attend.

## HIGH SCHOOL

Three sessions a summer are conducted, each with about 100 students and several high school teachers and counselors attending. The workshops consist of sessions on cooperative education, admissions, financial aid, job opportunities, and specific fields of engineering and science (chemical, civil, electrical, geological, metallurgical, mechanical, and mining engineering; computer science, wood and paper science; and applied technology). Laboratory projects and field trips are conducted in these fields. Female engineers serve as role models. Over two thirds of the students who participate then enroll in engineering in college. The project directors recommend workshops such as these for other professional fields; they remark that the endeavor does require strong commitment from the university and the industrial sponsors. Jane F. Berner, Director, Women in Engineering Workshops, Michigan Technological University, Houghton MI 49931, (906) 487-2270

112 WORKSHOP ON CAREERS IN SCIENCE AND MATH FOR WOMEN, Alverno College, Milwaukee WI 53215 / \$100 (Alverno College 100%) / Nov 11, 1978 / Math, Phy, Chem, Bio, Med / 1, 2, 3, continuing-adult education, 24 F.

This one-day workshop increased the awareness of career opportunities in math and science, particularly for young women who are still selecting their careers. It included a presentation on steps involved in selection of a career (by the Career Development Coordinator), presentations by alumnae who are professional women in science or math, and a discussion period. Faculty, alumnae and coordinator's time was donated. The arrangers concluded that the need exists for increasing career awareness among women and for providing, for the present, some encouragement in closed situations (women only). Dr. Alice Theine, 5401 S. 59th St., Milwaukee WI 53215, (414) 671-5400

113 YOUR OWN THING, Rochester Institute of Technology (RIT), Rochester NY 14623 / Admissions Office of RIT / \$960 year, \$5,840 total (RIT Admissions Office 100%) / Sept 1976-present / Math, Phy, Chem, Bio, Engr, Soc / 9, 10, 11, faculty-employee development / 5,000 F and M year; 12,000 F and M to date / Recruit B; Involved 50% B, 50% E; Efforts B; Role models N, B.

Rochester Institute of Technology (RIT) conducts a career awareness program to inform junior high school women of opportunities in non-traditional careers. Secondary school was chosen because at that stage there is enough time left for the student to choose science and math courses necessary to prepare for advanced training in technical fields. Female

## HIGH SCHOOL

students of RIT, serving as role models, visit the schools to lecture on career stereotypes, show a film of women in non-traditional careers, discuss their career choices and goals, provide detailed information and answer questions in large and small groups. Three benefits of the program have been the increased enrollment of women at RIT, clarification of goals and career choices by RIT student role models, and an increase in information about technical careers and awareness of opportunities for women by teachers and school counselors. Project staff became aware of how poorly informed some counselors are with regard to many technical fields and the career stereotyping in schools. RIT student role models received letters documenting their participation for their student folders. The total number of participants includes the students, counselors, superintendents, teachers and student role models. Dorothy Lowe, Co-ordinator, Women's Projects, Rochester Institute of Technology, One Lomb Memorial Drive, Rochester NY 14623, (716) 475-6631

#### IV. HIGH SCHOOL AND COLLEGE

GRADES 10 - 16 \*

ENTRY NUMBERS 114 THROUGH 154

*SEE ALSO HIGH SCHOOL, COLLEGE, AND COLLEGE,  
CAREER WORKSHOPS, NSF FUNDED ENTRIES*

*\*Projects begin between grades 10-16, but may  
continue into upper levels.*

8594

## HIGH SCHOOL AND COLLEGE

114 A PROGRAM OF RESEARCH, RECRUITMENT, RETENTION, AND EDUCATION SPECIFICALLY FOR THE ATTRACTION OF WOMEN INTO ENGINEERING CURRICULA, University of Colorado, Boulder CO 80309; College of Engineering and Applied Science, University of Colorado / E.I. du Pont de Nemours & Co. / about \$7,000 total (du Pont 100%) / Sept 1975-Dec 1977 / Engr / 9 through 16.

Several related research, recruitment, retention and educational activities were undertaken for female students at the University of Colorado. The recruitment effort included summer honors institutes for high school junior and seniors. Their purpose was to inform students about engineering as a career. (About thirty percent of the participants have been women.) During the school year, approximately 600 ninth grade students, half of whom are women, visit the campus to learn about engineering. A career pamphlet, "A Woman Engineer," was published in 1976 and distributed to 450 high school counselors, 15 other agencies and organizations in the area and to students who attended "awareness" programs. A presentation on women in engineering was made to high school counselors at a monthly meeting of their professional association. Retention/Education activities have included: revitalization of the student chapter of the Society of Women Engineers (SWE), and sending a representative to the national student SWE conference; a workshop on "how to interview" and one on "how to write a resume"; and production of a forty-minute videotape "How To Interview Effectively," in Spring 1976. Plans are underway to arrange summer employment opportunities in industry for women students. G.J. Maler, Associate Dean, College of Engineering and Applied Science, University of Colorado, Box 422, Boulder CO 80309, (303) 492-7118

115 BROADENING HORIZONS: CAREERS FOR WOMEN IN SCIENCE, Tulane University, New Orleans LA 70118 / National Science Foundation (NSF) / \$7,258 / Nov 30 and Dec 1, 1978 / Math, Phy, Chem, Bio, Med, Engr, Soc, Geol, Psy / 12, 13, 14 / Recruit B; Efforts B; Role models B / V.

The goals of this project were (1) to provide students with current information about career opportunities in the physical and social sciences; (2) to increase awareness of personal and cultural barriers women face in achieving careers in science, as well as specific suggestions for overcoming them; (3) to provide women students with motivation and encouragement for careers in science; and (4) to offer students an opportunity to visit women scientists in their work environments. The goals were met through a two-day workshop which included speakers, panel discussions and field trips. Meals provided an opportunity for informal interaction between women scientists and students. Career packets with general literature and specific information

## HIGH SCHOOL AND COLLEGE

were given out. Evaluations by participants were uniformly positive with regard to all aspects of the program. Schools and counselors became more aware of student needs. Panel members met other women scientists and began to form a network. Program publicity generated much interest within the community and several women called to volunteer their services. Recruitment for the workshop was by posters, brochures, letters to professors, visits by the project director to science classes, ads in campus and local newspapers, and television and radio announcements. The actual cost, including cash equivalent of contributed goods and services was \$15,623.21. Small private donations and Tulane University covered expenses not paid by the NSF grant. Publication: A summary of the program in Journal of College Student Personnel 21 (November 1980): 6.

Dr. Jean Cohen Di Leo, Counseling Center, Tulane University, New Orleans LA 70118, (504) 866-5555

116 CAREERS IN BIOLOGY: ALTERNATIVES TO MEDICINE, Radcliffe College (RC), Cambridge MA 02138; Massachusetts Institute of Technology (MIT) / Ford Motor Company, registration fees, and the colleges / \$3,000 year (Ford 34%; fees 33%; RC and MIT 33%) / Dec 1978 / Chem, Bio, Engr, Soc, Geol / 9 through 16, teachers / about 250 F year / Involved about 5% Min; Role models A.

The conference introduced women to the possibilities of careers in biology besides that of the traditional physician or research scientist. Student participants heard a keynote address by a biologist working as an administrator at the National Science Foundation. They could choose two workshops from among nine on bioengineering, biology and business, science writing and editing, scientific illustration, hospital work, government jobs, industrial research, biology and urban planning, and marine biology. Each workshop leader spoke about her choice of and preparation for her career, the interesting aspects of her work, and the satisfactions and concerns for women who pursue science. Time was allocated for questions and discussion in each workshop. Dr. Joyce Toomre, Office of General Education, 38 Kirkland Street, Harvard University, Cambridge MA 02138, (617) 495-2563

117 CAREERS IN THE GEOSCIENCES CONFERENCE, Association of Women Geoscientists (AWG), Menlo Park CA 94025 / AWG; conference registration fees; industry / \$2,000 year (conference registration fees, industry 33%; AWG 66%) / 1978-present / Geol / 9 through 16, MA, PhD, faculty-employee development, continuing-adult education / 100 F, 10 M year / Involved 2% A, 2% H, 2% E / V.

## HIGH SCHOOL AND COLLEGE

The conferences inform students and professionals of opportunities for training and advancement in the geosciences. Notices of the meetings are mailed to professors in geoscience departments, to relevant companies, to school and community newspapers, and to affiliated professional organizations. The conferences consist of workshops on specific issues, panel discussions, and social functions. Besides benefitting those who attend, the conferences have generated publicity for the Association in the scientific community. Audiotapes: being transcribed and edited for possible publication. Mary Lou Swisher, Association of Women Geoscientists, P.O. Box 1005, Menlo Park CA 94025, (415) 856-7072

118 EDUCATIONAL MATERIALS TO RECRUIT WOMEN INTO SCIENTIFIC CAREERS, Queensborough Community College, Bayside NY 11364 / National Science Foundation (NSF) / \$11,180 (NSF 100%) / 1974-1975 / Ast, Phy, Engr / 9 through 14, continuing-adult education, teacher and counselor education / about 200 sets sold a year / Recruit N, B, A, H, E; Efforts B, A, E; Role models B, A, E / V

This project produced audiovisual materials showing female scientists at work and describing their educational and professional lives during interviews with physicist Dinah Moché. The six audiotapes present career information to young women and also represent a variety of disciplines, personal backgrounds, and work settings. The tapes are accompanied by slides and articles (a biographical sketch and a list of references for each of the scientists). Publication: "Development of Educational Materials to Recruit Women into Scientific Careers," American Journal of Physics 44 (1976): 390-391. The set of six tapes with slides and articles is available for \$30 from Publication Office, National Science Teachers Association, 1746 Connecticut Avenue, Washington DC 20009, (202) 328-5800. Dr. Dinah Moché, Physics Department, Queensborough Community College, Bayside NY 11364, (212) 631-6234

119 FEMALE ACCESS TO CAREERS IN ENGINEERING/INDUSTRIAL TECHNOLOGIES (FACET/FACIT), Trident Technical College (TTC), Charleston SC 29405 / South Carolina Department of Vocational Education (SCDVE--1977-78), U.S. Office of Career Education (OCE--1978-79) / \$60,000 year, \$120,000 total (SCDVE,OCE 100%) / June 1977-Aug 1979 / Math, Engr / 11, 12, 13, 14, continuing-adult education / 286 F total / Recruit B, E; Involved 30-40% B; Role models B/V.

FACET/FACIT approaches the problem of sex-role stereotyping in career selection by providing high school girls and

## HIGH SCHOOL AND COLLEGE

older women access to educational opportunities in engineering technology and industrial crafts. The program hopes to graduate at least thirty-five qualified female engineering technicians each year beginning with the class of 1980. Two courses, one for high school girls and one for women high school graduates, offer (tuition free) orientation to engineering and industrial technology, basic technical skills and reinforcement of math, science and problem-solving skills. Both courses use role models and hands-on laboratory activity. Tours of industrial sites, assertiveness training, interest testing and counseling are part of one or both programs. Finally, women enrolled in non-traditional curricula receive specialized counseling, free tutoring and general support while attending school. Nurture groups of enrolled students meet monthly with interested women from the faculty and industry to handle special interest and provide peer support. Enrollment of women in engineering technology has increased from six percent (38) in Spring 1977 to 17 percent (132) in Spring 1979. In industrial technology enrollment of women has increased from two percent (12) to six percent (43) over the same period. To recruit participants, a program was presented at area high schools; a public awareness media campaign was launched; College faculty were asked to make referrals; community groups, social service agencies, and professional organizations were shown the FACET film and slide/show; and posters and brochures were distributed throughout the community. The project is included in college recruitment activities. The director reported that the success of the FACET/FACIT program has been a source of pride to the institution as the project has received local and national recognition. Nearly every department at TCC has been involved. The project has helped focus on the particular and special needs of women as well as their abilities and strengths. The director advises that "when counseling women about careers, one must be prepared to help clients deal with a wide variety of personal and family concerns before dealing with career concerns." Audiovisual: "Make Something Happen," 16mm film, 12 minutes; "Step by Step," slide/tape show, 10 minutes. An evaluation is underway. Alison Caughman, Trident Technical College, P.O. Box 10367, Charleston SC 29411, (803) 572-6160

120 HIGH SCHOOL CONFERENCE, Clarkson College, Potsdam NY 13676; Society of Women Engineers (SWE) Student Chapter / SWE (with industry contributions) / \$1,000 year, \$5,000 to date (SWE 100%) / 1975-present / Math, Chem, Bio, Engr, Industrial distribution / 11 through 16 / 400 F, 3 M to date / V.

This conference made participants aware of the opportunities

## HIGH SCHOOL AND COLLEGE

available to them in the fields discussed, and encouraged them to pursue their career goals. Invitations for anyone interested in the designated fields were sent to 450 area high schools. The high school students stayed in the dormitories with college students and attended classes with them. Guest speakers addressed various aspects of engineering. A panel comprised of Clarkson students held a discussion, and a filmstrip of Clarkson was shown. The director reported that the high school students were more interested in the speakers' discussions of general aspects of working than of very technical ones, and most inquisitive about what to expect in the immediate future and early stages of career preparation and development. Many of the former participants have applied either to Clarkson or to other technical colleges, and many have pursued their interests in the fields considered at this conference, according to the director. A project review was prepared. Kathy Capizzi, Apt. 201, 1741 S. Country Club Rd., Decatur IL 62521, (217) 423-4698

121 HIGH SCHOOL GIRLS CONFERENCE-FALL 1977, University of Illinois, Urbana-Champaign IL 61801; College of Engineering and Society of Women Engineers (SWE) Student Chapter / SWE 2%; College of Engineering 98% / May 1977-Oct 1977 / Engr/ 10 through 16 / 100 F, 3 M / Recruit B; Involved 1% A, 5% E / V.

This two-day workshop was designed to interest women in engineering careers. Participants heard talks by successful women engineers and panel discussions by recent graduates currently working in engineering jobs, and participated in small group sessions. Students were recruited by brochures sent to high school counselors and heads of high school science and mathematics departments and by telephone. As a result of this workshop there is increased awareness among high school counselors and parents about engineering careers. Enrollment of women in engineering at the host school has increased. The director observed that "peer role models are important." Publication: "Women Engineers" (originally titled "Engineering Add Lib"), 1974, 16 pp, reprinted by American Association of Engineering Societies, 345 East 47th Street, New York NY 10017. Dean Howard Wakeland, 207 Engineering Hall, University of Illinois, Urbana IL 61801, (217) 333-2282

122 MATH ANXIETY REDUCTION CLASS: A SPECIAL SECTION OF MATH 001, A REVIEW OF HIGH SCHOOL ALGEBRA, University of Maryland, College Park MD 20742 / \$2,500 (University of Maryland 100%) / 1978-present / Math / 10 through 16 / 25 F, 10 M total / Involved 15% B / V.

## HIGH SCHOOL AND COLLEGE

The objectives of this program are to assist students in reducing their mathematics anxiety and avoidance behaviors, and to provide them an opportunity to learn and improve their mathematics skills in a non-threatening atmosphere. Students participate in a five-hour per week, one semester course which reviews high school algebra. Counseling techniques based on Gestalt theory are used to help students reduce their math stress. The counseling and mathematics instruction are integrated. Among these students who initially viewed their inability to handle mathematics related situations as a major barrier to their career objectives, a decrease in math avoidance was noted. Tests revealed a significant positive change in mathematics ability, and subsequently some students have enrolled in more difficult mathematics courses. Dr. Lynn Cleary, Department of Mathematics, University of Maryland, College Park MD 20742, (301) 454-2746

123 MATH ANXIETY WORKSHOPS, State University of New York (SUNY-NP), New Paltz NY 12561; Massachusetts Institute of Technology (MIT) / Fund for the Improvement of Postsecondary Education (FIPSE), SUNY-NP / Jan 1978-present / Math / 10 through Masters, reentry women / 25 F, 5 M year / Efforts E / V.

FIPSE funded a project at MIT to develop new ways to teach mathematics based on recent brain research; the New Paltz project, run through the Continuing Education Program, uses these methods. Students are recruited via direct mailings to women who had taken part in special women's programs in the New Paltz region and via announcements in continuing education brochures, college and local newspapers, and radio programs. The fee is kept low (\$25) to encourage low-income women to take part. Mathematics (arithmetic through algebra) is taught in the workshop with an emphasis on word problems. Many workshop graduates have gone on to take other mathematics and science courses, and others have achieved enough confidence to deal with situations in everyday life which involve quantitative skills. The project director feels that "everyone is capable of learning mathematics and so-called 'natural talent' affects only the rate of progress" in learning it. Publication: Marion G. Ben-Jacob, "Alleviating Math Anxiety in Students," forthcoming in Reading Improvement. Staff time is volunteered, and administrative costs are absorbed by the University. Marion G. Ben-Jacob, State University of New York, New Paltz NY 12651, (914) 257-2658

124 MATHEMATICS REVEALED, University of Missouri (UM-KC), Kansas City MO 64110 / UM-KC plus student fees / \$1,420

## HIGH SCHOOL AND COLLEGE

(in Fall 1979 session) (Student fees 80%; UM-KC 20%) / Jan 1979-present / Math / 10 through 16 and continuing-adult education / about 25 F per semester / Efforts B, D, E; Involved 4% B, 4% H / V.

This course, taught by Dr. Elizabeth Berman of UM-KC, is open to anyone but is designed to be especially relevant and attractive to women, minority persons, and the economically disadvantaged who need to master basic mathematical skills. The course emphasizes practical applications and sensory exercises, and uses a book created for it and similar courses which includes examples on such topics as salary differences between the sexes and among races. Large type and extensive open space in the text make it easier to use by those with visual impairments. The course deals with feelings of math anxiety in opening sessions, and uses a variety of techniques to build student confidence regarding math ability. Students are encouraged to consult with each other on homework through the distribution of a mimeographed directory of the enrollees. The teacher has experimented successfully with giving tests to be worked on by small groups in the class. Tapes: two audiocassettes of radio interviews with Dr. Berman of about one hour each, and two videotapes of television interviews of about ten minutes each, done in May and June 1979. Publication: Elizabeth Berman, Mathematics Revealed (New York, Academic Press, 1979), 546 pp., \$10.95, and the instructor's manual for it. Dr. Eloise Behnken, Assistant Dean, College of Arts and Sciences, University of Missouri-Kansas City, Kansas City MO 64110, (816) 276-1137

125 MATHOPHOBIA WORKSHOPS, Wichita State University, Wichita KS 67208, Student fees / about \$500 year (student fees 100%) / Aug 1978-present / Math / 12 through 16, reentry women / 50 F, 14 M year.

The workshops are advertised through television, radio, magazines, and newspaper stories, as well as posters and word-of-mouth. The sessions are devoted to decreasing the fear of mathematics and to increasing self confidence in ability to handle mathematics, especially among women. The workshops employ class discussions, experience with mathematics in a "laboratory" (buttressed by positive reinforcement), and some group psychology techniques. Currently the format is a six week workshop of two hours per week, one in the fall semester and a second offering in the spring. Costs are low because University departments (Mathematics, Women's Studies, Continuing Education, and the Learning Resource Center) work with the project. The short term effects are already apparent as at least one third of the participants enroll in and complete math

## HIGH SCHOOL AND COLLEGE

courses within a year of taking the workshop. The project has found that "the self image of the person as one who can do or cannot do is paramount" and that the workshops must dispel myths about mathematics and how it is learned. Jerry Baker, Math Lab., Box 100, W.S.U., Wichita KS 67208, (316) 689-3705

126 MINORITY ENGINEERING SCHOLARSHIP PROGRAM, Speed Scientific School (SSS), of the University of Louisville, Louisville KY 40208 / variou. industrial firms / \$12,000 year (Industry 50%; SSS 50%) / Sept 1974-present / Engr / 10 through Masters / 150 F, 200 M to date / Recruit B, E; Involved 40% B, 50% E; Efforts B, E; Role models B.

The project is designed to interest women and minority students (high school level and above) in engineering, to increase the number of women and minority applicants to the engineering school at the University, and to provide financial aid for students with excellent academic records whose family income might be regarded as "middle range" but who need money for college. The project director visits public and parochial high schools in the area (often accompanied by female and minority students already in the University program) to talk to counselors, teachers, and students and to leave brochures and other printed materials and information about engineering careers. Project descriptions are also aired on local television stations and on local Black radio stations. For financial aid, the program may use general scholarship funds provided by industry for the program, or an industrial concern may sponsor an individual student. As a result in part of the project's activities, enrollment in engineering at the University since 1974 has risen from fifty women to 281 women (and from twenty-six Black students to sixty-six Black students). Brenda Hart McAnulty, Speed Scientific School, University of Louisville, Louisville KY 40208, (502) 588-6100

127 MINORITY WOMEN IN SCIENCE-SEMINAR SERIES, Morris Brown College, Atlanta GA 30314 / Southern Education Foundation / \$5,000 (Southern Education Foundation 100%) / June 1977-Aug 1978 / Math, Phy, Chem, Bio, Med / 11 through 16 / 100 F, 25 M / Recruit B, E; Involved 100% B, 50% E; Efforts B, E; Role models B, E / V.

This seminar series, which was part of a larger project, involved high school students who were recruited by their counselors. The project's Advisory Board included high school counselors from twelve Atlanta area schools. Atlanta University science advisors helped publicize the program and distribute leaflets. A series of Black scientists presented

## HIGH SCHOOL AND COLLEGE

lectures, seminars, or mini-workshops and conducted discussion groups focused on their major disciplines. The speakers discussed career opportunities and training requirements of their professions and distributed literature on career training and development. This program was intended to provide role models for Black youth considering careers in science and to give career data and employment outlook information on many para-professional and professional science and health-related fields. It broadened the frame of reference of local youth and opened the college campus to them as a source of motivation. Evaluations done by participants reported this series to have strengthened their decision to major in science and given them useful information. Publication: Henrie M. Turner, "Minority Women in Science Project," Final Report, September 1978, 43 pp, mimeographed. Henrie M. Turner, Ph.D., Chairperson, Biology, Morris Brown College, 643 Martin Luther King, Jr. Drive, N.W., Atlanta GA 30314, (404) 525-7831, xi69

128 MINORITY WOMEN IN SCIENCE-SUMMER PROJECT, Morris Brown College, Atlanta GA 30314 / Southern Education Foundation / \$12,000 (Southern Education Foundation 100%) / June 1977-Aug 1978 / Math, Bio, Med, Geol / 11, 12, 13 / 20 F / Recruit B, E; Involved 100% B, 50% E; Efforts B, E; Role models B, E / V.

Twenty high school seniors and college freshmen attended this four-week summer enrichment program. Participants received a stipend and attended classes in biostatistics, mathematics, and biology; took a mini-course in computer science and one in photography; attended seminars and went on field trips to Bell Laboratories, Grady Memorial Hospital and Skidaway Island Marine Biology Institute. The classes included lectures, laboratory and library work. Career information was supplied in a warm, friendly atmosphere conducive to personal growth and development. This program was part of a larger Minority Women in Science Project; the Advisory Board of the Project included twelve high school counselors who recruited participants from their schools. Atlanta University science advisors distributed leaflets and announced the project on all campuses. The goals of the project were to supply role models for Black youth who were considering careers in science; to provide career data and employment outlook information on many para-professional and professional science and health-related fields; to open the college campus to high school students who needed motivational development; and to broaden the general frame of reference for youth in the Morris Brown and Atlanta community. Publication: Henrie M. Turner, "Minority Women in Science." Final Report, Sept. 1978, 43 pp, mimeographed.

## HIGH SCHOOL AND COLLEGE

Henrie M. Turner, Ph.D., Chairperson, Biology Department, Morris Brown College, 643 Martin Luther King, Jr. Drive, N.W., Atlanta GA 30314, (404) 525-7831, xl69

129 MYTHS AND REALITY: WOMEN IN SCIENCE I AND II, Stockton State College (SSC), Pomona NJ 08240 / Division of Natural Science and Mathematics (NAMS)-1977; Center for Environmental Research (CER)-1979 / \$750 year (NAMS, CER 100%) / July 1976-April 1977, Sept 1978-April 1979 / Math, Phy, Chem, Bio, Engr, Soc, Geol, Psy / 11 through 16 / 300 F, 2 M year / Involved 5% B, 1% A, 1% H; Role models B, A / V.

These programs were intended to encourage women to consider careers in science and to take their aspirations seriously. Announcement were made in all science classes and posters displayed. Counselors at local high schools, and community and four-year colleges were contacted. Radio announcements, newspaper ads and contact with women's organizations were part of the recruitment strategy. In addition to a keynote address by a well-known, successful woman scientist, each program included an information panel on different disciplines with women in those fields answering questions and serving as role models. Several "attitudes toward women in science" workshops were held in which women could analyze and discuss their fears, aspirations and basic assumptions. The director reported that the participants left elated by the experience and seemed more committed to careers in science. Dr. Rosalind Herlands, NAMS Division, Stockton State College, Pomona NJ 08240, (609) 652-1776

130 NEW CAREER OPTIONS FOR WOMEN THROUGH MATHEMATICS, A STATEWIDE CAMPAIGN AND SUMMER INSTITUTE, University of Arkansas, Fayetteville AR 72701 / Winthrop Rockefeller Foundation and NL Industries Foundation / \$46,000 (Foundations paid direct costs; Univ of Arkansas paid indirect costs) / Jan 1, 1978-Dec 31, 1978 / Math / Between 12 and 13 / 82 F / Recruit E; Involved 5% B, 1% A, 1% H, 1% Students with Foreign-born parents, 35% E; Role models B, E / V.

One goal of this project was to create awareness of mathematics deficiencies in high school education, and of the special problems of women. Toward this end, five meetings were held for high school staff and parents, discussing employment trends and opportunities, math-related sex-stereotyping and math requirements and recommendations. While this program was quite well received and effective, the director felt that much continued effort would be needed. A second and related objective was to create a model Summer Institute for women interested in math-related

## HIGH SCHOOL AND COLLEGE

careers but lacking two or more years of needed high school mathematics. A brochure describing the Summer Institute with reply card was mailed to 1500 senior women and 1500 teachers in 380 high schools in Arkansas. Newspaper articles were distributed statewide at regular intervals. A six-week summer academic program with emphasis on mathematics was offered. Eighty-two women registered for 6 hours of credit in College Algebra and Math Patterns and devoted themselves full-time to these courses plus the information and awareness activities of the program. Activities related to sex-stereotyping, role models, career information and planning, financial aid and work study programs of the University; anxiety management, personal growth and computer programming were offered. University faculty taught the courses and extensive tutoring was available. Counselors and teachers were encouraged to submit applications from students of all racial/ethnic groups, regardless of financial means. Financial aid was available for attending the Institute. The director reported that "the Institute was an overwhelming success, but expensive". The Institute is being substantially modified to reduce costs. The third goal of the program was to increase the numbers of women engaged in math-related pursuits through replication of this program at other colleges. Fifty participants have indicated that they are pursuing majors requiring at least college algebra (including business, engineering, computer science and math). The environment of full-time commitment to this project for six weeks was very effective in stimulating study habits, group spirit and enjoyment of math. James F. Porter, Department of Mathematics, University of Arkansas, Fayetteville AR 72101

151 NEWS! (NEW EXPERIENCES FOR WOMEN IN SCIENCE): WOMEN IN SCIENCE CAREER WORKSHOP, Cerritos College, Norwalk CA 90650 / National Science Foundation (NSF) / \$27,167 total (NSF 32%; Cerritos 68%) / April 1977-Feb 1979 / Math, Ast, Phy, Chem, Bio, Engr, Soc, Geol, Psy / 11, 12, 13, 14, and reentry women / 440 F total / Recruit H, E; Involved 3% N, 5% B, 4% A, 22% H; Efforts E; Role models H, E / V.

The workshop was advertised by direct mail to women students who had not decided on college majors, by posters in public places, and by ads in local newspapers. The one-day session concentrated on informing women about job opportunities in science related fields, from technician level up to doctoral research scientists. The program opened with a slide/tape show ("Why Not?") on women and men in unconventional roles. The workshop featured Isabella Navar (psychologist), Estelle Ramey (endocrinologist), and Elena Verdugo (actress who portrays women in non-traditional roles) as speakers.

## HIGH SCHOOL AND COLLEGE

Students attended a panel discussion on science jobs in a variety of settings, including government, industry, and academe, and had a chance to talk to scientists in small group discussions. The workshop also offered one hour "seminars" on science specialties (computers, psychology, engineering, earth and environmental sciences, and so on); students could attend two of these, which they chose in preregistration. The project staff remarked that these workshops demand a lot of time from organizers, who may be called upon to cope with last-minute logistical crises and program shifts. They advise that role models used in workshops meet with staff in advance of the sessions to supplement written or telephoned discussions. Videotapes: six thirty-minute tapes on the job presentations, plus two tapes of forty-five minutes each of Drs. Ramey and Navar. Wanda Sterner, Cerritos College, Norwalk CA 90650, (213) 860-2451, x396

152 ON-GOING PARTNERS IN EQUALITY NETWORK (PROJECT OPEN), Tompkins Cortland Community College (TCCC), Dryden NY 13053 / Vocational Education Amendments (VEA) / \$46,000 year, \$110,000 total (VEA 100%) / Oct 1979-Aug 1980 / Math, Engr, Mechanical, construction and electrical technologies / 10 through 14 / 300 F, 25 M year; 750 F, 75 M total / Recruit B; Involved 3% B, 10% E; Efforts B; Role models B / V.

The program encourages women to seek training in non-traditional careers, and conducts workshops for local communities on expanding career options. Each year about thirty women are selected by interview to participate in this program of four-to-five months of career exploration. A minority outreach worker was funded by the Comprehensive Employment and Training Act (CETA) specifically to recruit Black women. The program components are (1) career conversations with women working in non-traditional jobs, two or three hours per week on a one-to-one basis; (2) career training presentations by college faculty who teach in non-traditional fields to inform participants of courses available and show the various shops and laboratories in a nonthreatening way; (3) support groups where five to six women meet weekly with a counselor to engage in assertiveness training, decision making, career testing, conflict resolution, personal exploration, etc.; and (4) on-site job visitations with women employed at local industries. The project has resulted in greater awareness of expanding career options and larger enrollments of women in technology programs. The director advises that "women who enter non-traditional training programs need continuing support and remedial 'tools for technology' type courses to gain familiarity with basic science/engineering terminology and

## HIGH SCHOOL AND COLLEGE

use of tools." Project OPEN functions in conjunction with a Women's Reentry Program at the College. It is expected that the project's functions will be transferred into the recruiting, counseling, job placement and vocational education activities of the College when current funding expires. Audiovisual: "Women in Non-Traditional Careers," videotape, 15 minutes, September 1979. Sandra Rubaili, Director, Project OPEN, Tompkins Cortland Community College, Dryden NY 13053, (607) 844-8211

133 OPTIONS FOR WOMEN IN MATHEMATICS, SCIENCE AND ENGINEERING, California State University (CSUF), Fullerton CA 92634 / private industry and CSUF / about \$5,000 / March 1978 / Math, Ast, Phy, Chem, Bio, Mec, Engr, Agr, Geol / 10 through graduate, faculty-employee development, continuing-adult education / 285 F, 10 M / Involved 10% Min; Efforts Min; Role models B, A, II / V.

This one-day workshop was part of a longer range CSUF goal of increasing the number of women working in scientific fields; it was specifically designed to inform women of opportunities for training and jobs in mathematics, science, and engineering. Brochures describing the meeting were mailed to members by fifteen American Association of University Women chapters in Orange County. The brochures also went to school counselors, career advisors, and teachers in the county's junior and senior high schools and to colleges and universities within one hundred miles of CSUF. News stories appeared in industrial and Chamber of Commerce newsletters. The session included three speakers, discussions in small groups regarding scientific specialties, panels of successful women describing their work, and afternoon workshops on such topics as dual careers, reentering science, resume writing, job searches, math anxiety, and career development for minority women. Partly as a result of this workshop, the enrollment of women in the sciences at CSUF has increased (and even exceeded that of men for the last two years). Private industry was very supportive of the project. An unexpected benefit was receipt of first prize for the best short-term project of 1978 in the Women's Education Division of the National University Extension Association. Slide show and tape: 12 minutes, used to start conferences and subsequently used to recruit for CSUF at high schools. Betty Robertson, Coordinator, Community Programs, Office Extended Education, California State University, Fullerton CA 92634, (714) 773-2611

134 PRE-FRESHMAN SUMMER SCIENCE PROGRAM, Spelman College, Atlanta GA 30314 / Rockefeller Foundation, Josiah Macy, Jr. Foundation, Noyes Foundation / \$50,000 year, \$380,000 total

## HIGH SCHOOL AND COLLEGE

(foundations 76%; Spelman 24%) / Aug 1972-present /  
Math, Chem, Bio / between 12 and 15 / 40 F year; 350 F,  
2 M to date / Recruit B; Involved 100% B, 30% E; Role  
models B, E / V.

The goals of this program are: (1) to provide high ability women students with an adequate background to follow successfully a college major in the sciences; (2) to assist students in developing the study skills and self-discipline necessary to pursue a college sequence in the sciences; and (3) to stimulate scientific interest and motivate students to seek a career in science or in health at the highest possible levels. All students applying to Spelman who indicate an interest in pursuing a program in pre-medicine or science are invited to apply to the program. The program provides instruction in pre-calculus mathematics, biology, chemistry, reading and scientific reading, and computer science. Study skills and the use of the library are taught in the reading course. Instruction is provided at an accelerated pace and at an honors level. Discussion sessions are held in which students are given information on careers and science sequences, and are encouraged to pursue a scientific or health career. The program, along with others, can be credited with more than doubling the number of science, engineering and mathematics majors. Dr. Etta Falconer, Spelman College, Box 28, Atlanta GA 30314, (404) 681-3645

135 RECRUITMENT OF WOMEN INTO ENGINEERING TECHNOLOGIES,  
State University of New York, Alfred NY 14802 / New York  
State Education Department / \$25,525 year, \$48,071 total  
(NY State Education Dept 100%) / Oct 1978-present / Engr /  
9 through 14, faculty-employee development / 40 F year / V.

The project works with high school girls in the western and central parts of New York state, with their parents and teachers and advisors, with women students enrolled or interested in engineering technologies at SUNY Alfred, and with the faculty and admissions of that campus. It raises interest in engineering technology among the high school students and those who might influence their educational choices by videotapes, radio and television programs, newspaper articles, brochures, speeches, and field trips to SUNY Alfred. The project director makes presentations and holds individual discussions with admissions officers, college counselors, and faculty at SUNY Alfred to help them become comfortable with the integration of women students in what was previously an all-male field of endeavor. Support is provided to women who do enroll through weekly sessions and by having women engineers speak to students and serve as role models. Several factors indicate that

## HIGH SCHOOL AND COLLEGE

the project is accomplishing its goals--numbers of women applicants for engineering technology are increasing, retention rates for those who do enroll are rising, and high school counselors are responding positively. A thirteen-minute videotape, "Helping to Shape Our World: A Career in Engineering," was prepared in December 1978; it is accompanied by a sixteen-page brochure with the same title, written by Ann Wood and Carol Reid. Ann E. Wood, School of Engineering Technologies, SUNY, Alfred NY 14802, (607) 871-6147

136 REWARDS OF LEARNING A NEW SKILL: WOMEN IN TECHNOLOGY, Cerritos College, Norwalk CA 90650 / Workshop registration fees / \$50 (fees 100%) / June 1979-Nov 1979 / Math, Engr, Technology / 9 through 14, continuing-adult education / 23 F / Recruit B, H, E; Involved 13% B, 8% H, 45% E.

The one-day workshop was advertised through newsletters, releases to papers in the eight cities near the college, flyers to the city halls and libraries and Chambers of Commerce in the area, coverage in the school newspaper, and announcements by women teachers in their classes. The session introduced women to non-traditional careers in technology where salaries and opportunities are excellent at the present time. The specialties were science or engineering related for the most part, including drafting and numerical control. The workshop consisted of four panels conducted in the classrooms where the specialty was taught to introduce the women to the tools used and the nature of the work. The workshop closed with a panel of women who had graduated in these fields and were now employed. The project director noted that the participants were enthusiastic about the results and were prepared to tell others of their experience. One unexpected benefit was that more instructors now ask for cross-listing of technology courses in the women's program. Vera Eckles, Cerritos College, Center for Today's Women, 11110 East Alondra Boulevard, Norwalk CA 90650, (213) 860-2451, x530

137 SCIENCE CAREER DAY, Morris Brown College, Atlanta GA 30314 / Southern Education Foundation / \$3,000 (Southern Education Foundation 100%) / June 1977-Aug 1978 / Math, Ast, Phy, Chem, Bio, Med, Engr, Soc, Psy / 11 through 16 / 100 F, 75 M / Recruit B, E; Involved 100% B, 50% E; Efforts B, E; Role models B, E / V.

This Science Career Day was part of a larger Minority Women in Science Project. The Advisory Board of the project included high school counselors from twelve Atlanta area high schools. The counselors recruited participants and

## HIGH SCHOOL AND COLLEGE

made sure their schools were represented. Science advisors from the college distributed leaflets and announced the program on Atlanta University campuses. The goals of this project were to provide role models, career data and employment outlook information to Black youth, open the college campus to high school students as a source of motivation, and to broaden the students' general frame of reference. These goals were accomplished by introducing the students to Black professionals who could share personal histories and career information, arranging small group sessions for in-depth discussions, distributing career literature, and exposing the participants to the college campus facilities and atmosphere. Publication: Henrie M. Turner, "Minority Women in Science Project," Final Report, September 1978, 43 pp, mimeographed. Henrie M. Turner, Ph.D., Chairperson, Biology, Morris Brown College, 643 Martin Luther King, Jr. Drive, N.W., Atlanta GA 30314, (404) 525-7031

138 SUMMER RESEARCH PARTICIPATION ON VARIABLE STARS FOR UNDERGRADUATES, Maria Mitchell Observatory (MMO), Nantucket MA 02554 / National Science Foundation (NSF) / \$10,000 year, \$220,000 total (NSF 50%; MMO 50%) / June 1957-present / Ast / 11 through Masters / 108 F, 7 M to date / Involved 1% A, 1% H, 3% D; Efforts A.

The Maria Mitchell Observatory program (originally for female students, now expanded to include males) has been offered every summer since 1957. The program gives undergraduates interested in astronomy an opportunity to participate in research, and to judge whether they want to continue on in this field. Students are offered basic instruction in the use of telescopes, examination of photographic plates and analysis of observations as well as public speaking opportunities. Each student lectures to school-age children and assists visitors to the observatory in the use of the telescopes. Most students publish their first papers as a result of their summer's work. The program director reports that many students have continued on in astronomy, and in later years, have commented that the program provided a learning experience that was both enjoyable and unique. Publications: Annual report of Maria Mitchell Association: Report of the Director of the Observatory. Dr. Emilia P. Belserene, Maria Mitchell Observatory, 3 Vestal Street, Nantucket MA 02554, (617) 228-9273

139 WHAT NEXT? CAREER AND EDUCATION OPPORTUNITIES IN SCIENCE FOR UNDERGRADUATE WOMEN-A WORKSHOP, University of Arizona (UA), Tucson AZ 85721 / UA Foundation; corporate gifts /

## HIGH SCHOOL AND COLLEGE

about \$4,000 (UA Foundation 25%; corporations 25%; UA 50%) / March 3, 1979 / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Soc, Geol, Psy / 12 through 16 / 110 F total / Involved 2% N, 2% B, 10% H, 1% D; Role models N, H, E.

This project was publicized by posters and by display advertisements in campus newspapers. Application forms were mailed to science and engineering majors. This workshop included panel presentations by women scientists and engineers and individual conversations in a walk-around format. It exposed young women to role models and stimulated them to think about job opportunities and careers in the sciences and engineering. The director reported that "students appreciated the opportunity to speak at length to individual women in their fields of interest." Dr. L.L. Wilkening, Department of Planetary Sciences, Building 92, Space Sciences, University of Arizona, Tucson AZ 85721, (602) 626-2806

140 WOMEN IN CHEMISTRY, Oklahoma State University (OSU), Stillwater OK 74074 / Upjohn Company / \$2,000 (Upjohn 60%; OSU 40%) / March 1975 / Chem / 11, 12, 13, 14 / 50 F, 20 M.

Potential participants learned of the meeting through literature and announcements sent to four year colleges throughout Oklahoma. During the day-long session, four women chemists from a variety of workplaces served as role models, first giving technical talks on their research to the college students and then conducting small group discussions with the high school students. College women were welcome to attend the discussions if they wished. All students also had the option of lunching with the women chemists. Project staff recommend that care be taken in selecting an effective moderator for sessions such as these; a good moderator contributes to the program rather than serving in an honorific capacity. Gilbert Mains, Chemistry Department, Oklahoma State University, Stillwater OK 74074, (405) 624-5941

141 WOMEN IN ENGINEERING CONFERENCE, Tennessee Technological University (TTU), Cookeville TN 38501 / \$200 year, \$1,200 total (TTU 100%) / 1974-1979 / Engr / 9 through 14, teachers and counselors / about 25 F year, 150 F total / Involved 5% B.

The goal of this annual conference was to increase the enrollment of women in engineering. Brochures were sent to high school teachers and counselors and to individual students. Complimentary dormitory housing was provided. High school faculty and advisors were especially encouraged to attend. The program began with registration and a

## HIGH SCHOOL AND COLLEGE

social function Friday evening. The Saturday program included small group discussions with women in professional engineering and with engineering students, lunch, tours of engineering facilities and plenary sessions. The director reported that these conferences along with other efforts, have resulted in a dramatic increase in enrollment of women in engineering and that in 1977, ten percent of the 1,400 engineering students at TTU were female (exceeding the national average). Dean Leighton E. Sissom, College of Engineering, Box 5005, Tennessee Technical University (TTU), Cookeville TN 38501, (615) 528-3172

142 WOMEN IN ENGINEERING CONFERENCE, University of Houston (UH), Houston TX 77004 / industrial donations / \$800 (Industry 50%; UH 50%) / Sept 29, 1979 / Engr / 10 through 14 / 100 F, 10 M / Involved 30% B, 5% A, 20% H, 1% D, 25% E; Role models B, E / V.

The goals of this project were to interest high school girls in engineering as a career option, and to provide an opportunity for student sections of Society of Women Engineers (SWE) from throughout Texas to meet and exchange ideas and experiences. The conference included workshops and panel discussions involving women professionals and college students. Workshop topics included "Finances," "Assertiveness," "Establishing Credit," "Stress," "Interviewing," "Corporate Life," "Legal Rights," and "Succeeding and Getting Ahead." Participants were recruited by letters to high school teachers and counselors, letters to student sections of SWE, an article in "Technical Careers Newsletter" and personal contacts in local high schools. The director reported that response from attendees has been favorable, generating several inquiries and applications to UH and requests for repeat of popular workshops. A further benefit has been increased enthusiasm and a sense of accomplishment among local SWE members. Dr. Betty Barr, Department of Electrical Engineering, University of Houston, Houston TX 77004, (713) 749-1532

143 WOMEN IN ENGINEERING CONFERENCE, University of Washington (UW), Seattle WA 98195 / local industry (eleven firms in 1978) / \$10,000 year, \$28,000 total (Industry 80%; UW 20%) / 1973-present / Math, Phy, Chem, Engr / 10 through 16 / 336 F year; 1,500 F, 85 M to date / Recruit N, B, A, H, E; Involved about 5% Min; Efforts N, B, A, H, E; Role models N, B, A / V.

Publicity on the annual one-day workshop is sent to school principals, counselors, and teachers; a special effort is made to reach those likely to be in touch with minority

## HIGH SCHOOL AND COLLEGE

students. The program coordinator follows up the mailings by visits to school classes. The conference informs women students about the high school prerequisites, educational requirements once in college, and career opportunities in engineering. The session starts with a keynote speaker, followed by short talks on various aspects of engineering by women in those specialties. In the afternoon, participants attend discussion sessions and see displays on engineering created by students at the University. One third of the women who enroll in the University engineering program cite the conference as a definite factor in their decision to enter the field. Publications: annual reports. Dr. Thomas G. Stoebe, School Relations FB-10, University of Washington, Seattle WA 98195, (206) 543-7090

144 WOMEN IN ENGINEERING PROGRAM, Georgia Institute of Technology (GIT), Atlanta GA 30322 / GIT 100% / late 1960's-present / Engr / 12 through 16 / increased from about 25 to over 2,000 year F / Recruit B, E; Involved 10-15% Min; Efforts E / V.

The Women in Engineering efforts at Tech began with an active annual recruitment effort, which has since tapered off to some degree. This program is informal, involving subtle, low-key special handling for women. The more important recruiting efforts are those entailing some form of individual contact, primarily via the mail. Special letters to women applicants to Tech, follow-up letters after acceptance and before enrollment and provision of a contact person in the School of Engineering are seen as most effective. Direct national mailings, high school contacts, special women in Engineering brochures, and notification of scholarship opportunities are also done. In the past a number of scholarships for women have been available. These offered small amounts (i.e., on the order of \$250/year) but considerable visibility. The number available is decreasing due to a decline in industrial support for women in engineering efforts. Georgia Tech makes a special effort to recruit women at Black colleges. Costs of the program are part of the general administrative budget of the Dean. Terence Connolly, School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta GA 30332, (404) 894-3933

145 WOMEN IN ENGINEERING PROGRAM, University of North Dakota (UND), Grand Forks ND 58202 / UND 100% / Engr / 10 through 16 / 60-70 F.

This program recruits women into the engineering program

## HIGH SCHOOL AND COLLEGE

and the profession, and provides for their professional growth while in college and after graduation. Visits to high schools and junior colleges provide contact with persons interested in engineering. Correspondence by mail and by telephone maintains the communication with prospective engineering students. Partly through a student chapter of the Society of Women Engineers (SWE), college women provide support for each other and enthusiasm for their mutual goals. Counseling and interaction with role models aid their academic pursuits. The women engineering students host engineering conferences which benefit all engineering students within the school. The Women in Engineering program has increased the percentage of women engineering students at University of North Dakota from zero to ten percent within the past seven years. The Student Section of SWE has developed a slide presentation for use by that group, and publishes the "SWE Connection" which gives general information about the school and the women in engineering and is used for recruiting. Costs are met from a general budget, not specifically designated for this program. Joyce I. Medalen, Director, Women in Engineering, Box 8201, University of North Dakota, Grand Forks ND 48202, (701) 777-2571

146 WOMEN IN ENGINEERING, WHY NOT YOU?, The University of Iowa, Iowa City IA 52242 / industry funds / \$6,500 year (Industry 100%) / 1975-present / Engr / 10 through 16 / 50-150 F, 2-10 M year / Involved 5% B, 5% A; Role models B / V.

The goals of this annual conference are to introduce engineering to those who might not have considered it, to answer questions participants have concerning engineering and their personal lives, and to allow engineering students to interact with role models and assistants. There are morning information sessions covering a wide variety of topics. Some involve discussion panels that allow interaction. Informal time for one-on-one interaction is provided. Campus tours and hands-on workshops have proven successful and offer positive reinforcement. The director reports that "the conferences tend to exceed our goals. The unexpected benefits appear within the student body. The process of 'selling' engineering works to generate new enthusiasm among the women. Often it helps them to set goals, orient themselves and continue on in their studies with more enthusiasm." Recruitment is done through promotional mailings to high school counselors, on-campus publicity, newspaper ads, and television and radio interviews. Mary Beth Watson, 102 Clapp Street, Iowa City IA 52240, (319) 338-2692

## HIGH SCHOOL AND COLLEGE

147 WOMEN IN SCIENCE, Women's Center, Jersey City State College, Jersey City NJ 07305 / Schering-Plough Corp. / \$750 (Schering-Plough 50%; Jersey City State College 50%) / Sept-Nov 1978 / Math, Ast, Phy, Chem, Bio, Med, Geol / 10 through 16 / 185 F, 2 M / Involved 20% B, 5% A, 10% H, 2% D, 25% E; Role models B, H, E / V.

This project acquainted high school students with women in science. Speakers discussed their education and employment experience as women scientists as well as their specific fields and the opportunities for women in them. The one-day program included morning presentations by a chemist, a physicist, an astronomer, an engineer, a medical professional and a college dean/chemist. A slide presentation on Women Scientists in American History was followed by a question-answer period. Lunch provided time for informal conversation among students and scientists. School and corporate displays, tours of the college science facilities, and distribution of literature concluded the program. Recruitment was done by letters to chairs of all New Jersey high school science departments inviting them to bring their students. Newspaper articles and announcements on campus helped publicize the event. The director reported that requests for invitations to future workshops have come from elementary schools; many participants have requested repeat programs or additional tours. An unexpected finding was that "many high school students didn't seem aware of difficulties they may face as related to sexism." The overall conclusion of the director was that programs such as this are valuable, easy and inexpensive to do. Dr. Helen Kotsonis, Women's Center, Jersey City State College, Jersey City NY 07305, (201) 547-3170 or 3189

148 WOMEN IN SCIENCE AND ENGINEERING PROGRAM, California State University, Northridge (CSUN), Northridge CA 91330 / CSUN and industry / \$14,000 year, \$56,000 to date (Industry 36%; CSUN 64%) / Sept 1974-present / Math, Ast, Phy, Chem, Bio, Med, Engr, Geol / 10 through 16, MA, PhD / average 200 F year, 1,000 F to date / Recruit D, E; Involved 10% B, 15% A, 5% H, 1% D; Role models B, A / V.

The project is designed to increase the number of women majoring in non-traditional science areas, especially at CSUN. The program devotes the greatest proportion of time to personal, individual counseling with students, and has succeeded in raising the percentages of women in the targeted majors at all degree levels. Recruitment and retention efforts include presentations to high school, community college, and four year college classes; holding science career workshops; forming student science and engineering organizations; publishing a newsletter; and

## HIGH SCHOOL AND COLLEGE

coordinating information on financial aid. Special recruitment trips are made to educational institutions with high enrollments of economically disadvantaged and minority students. Prof. Bonita J. Campbell, School of Engineering, California State University, Northridge CA 91330, (213) 885-2146

149 WOMEN IN SCIENCE CAREER WORKSHOP, Bergen Community College, Paramus NJ 07652 / National Science Foundation (NSF) / \$9,960 (NSF 100%) / June 1978-Jan 1980 / Math, Chem, Bio, Engr, Soc, Psy / 11, 12, 13, 14 / 210 F total / Recruit E; Role models D / V.

This workshop brought students in contact with role models for a question-and-answer period, conversations over lunch, and a presentation of historical facts about the contributions of women scientists. The purposes were (1) to give emotional support to students interested in these areas; (2) to provide information about the work of scientists, career advancement opportunities, and the skills and courses important in preparation for work in these fields; and (3) to give students a view of the life-styles of women scientists. The president of each participating college appointed a coordinator to act as liaison between the project staff and students, and to attend the conference. Individual invitations were mailed to the students and each received a certificate for participation in the conference. As a result of this project, faculty have become more aware of the special needs of female students. The director suggested that if male faculty are not present, they be made aware of these needs somehow. Students and panelists completed a questionnaire commenting on the workshop. The director concluded that "the more personal contact between students and panelists, the better the results." An audiovisual product is being developed and will be about 30 minutes long. Dr. Estelle K. Meislich, 338 Lacy Drive, New Milford NJ 07646, (201) 261-4335

150 WOMEN IN SCIENCE CAREER WORKSHOP, California State University, Fresno (CSUF), Fresno CA 93740 / National Science Foundation (NSF) / \$12,000 (NSF 83%; CSUF 17%) / April 1977-April 1978 / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Geol, Psy / 12, 13, 14, and college counselors / 200 F, 10 M (as speakers) / Involved 2% N, 1% B, 6% A, 3% H; Role models B, H / V.

This one-day workshop encouraged female students to aspire to careers in science, and provided information about training and jobs in those fields. The workshop was publicized through mailings to deans, department heads, and

## HIGH SCHOOL AND COLLEGE

high school and college counselors, with personal phone calls as a follow-up to science department chairs at community and four year colleges. The project also posted brochures, used television and radio spot announcements, and arranged for a half hour public television program. The workshop provided role models from a variety of scientific fields in the form of guest speakers and panelists. Students received detailed information on occupations from these sessions as well as materials distributed during the workshop, such as a reading list, a list of professional support groups, and a booklet on typical science jobs. One result of the conference was a network of cooperation among women science professionals who attended. The jobs booklet continues to be used by the CSUF careers office. Elizabeth Nelson, Department of Sociology, California State University, Fresno CA 93740, (209) 487-2891

151 WOMEN IN SCIENCE CAREERS WORKSHOP, Mesabi Community College, Virginia MN 55792 / National Science Foundation (NSF) / \$7,180 (NSF 100%) / July 1978-Oct 1979 / Math, Phy, Chem, Bio, Med, Engr, Soc, Geol, Psy / 10 through 14 and reentry women / 161 F / Recruit N, A; Involved 5% N, 1% A, 1% D, 5% E / V.

The project was announced on posters at area schools and businesses, on radio and television, through newspaper articles and ads, and via faculty members and administrators at area colleges and universities. Interested women received brochures and an application. The workshop provided successful and articulate women scientists as role models, offered information on career opportunities and training programs in the sciences, and increased student awareness of attitudinal variables which influence career objectives. Besides panel discussions and keynote speakers, the workshop featured small group discussions during which the women met with the scientists to analyze individual concerns and problems. The speeches and panels were taped. Ms. Marjorie Schmitt, Mesabi Community College, Virginia MN 57792, (218) 741-9200

152 WOMEN IN SCIENCE WORKSHOP, Jackson State University (JSU), Jackson MS 39217 / National Science Foundation (NSF) / \$10,000 (NSF 100%) / June 1978-June 1979 / Math, Ast, Phy, Chem, Bio, Engr, Soc, Geol, Psy / 11 through 16 / 150 F, 50 M / Recruit B, E; Involved 99.5% B, 98% E; Efforts B, E; Role models B, E / V.

This two-day workshop exposed female students to careers in the sciences, career models and career decision-making

## HIGH SCHOOL AND COLLEGE

processes. Over twenty consulting women scientists from industry, government and academia represented the biological, physical, social and behavioral sciences, in addition to mathematics, engineering and psychology. The student participants represented five senior and junior colleges within the State of Mississippi. The workshop included an orientation session for consultants, a general session on career decision-making, small group sessions run by the scientists and a banquet for students, consultants, faculty and the community. The general session was attended by over four hundred students from Jackson State in addition to the workshop participants. The general findings indicate that even though participants found the workshop stimulating and worthwhile, they did not think that the college level was the optimal time for them to have received the information provided. The data suggested that had the participants received science career information sooner, they might have considered such careers appropriate for them. The directors recommended that similar projects be initiated at the junior high and possibly elementary school levels. Recruitment was done by personal contact with faculty members at other institutions and publicity through television, radio and contact with community groups. The role models or their employers donated their time; costs for travel and lodging were paid by the corporations and a foundation with one exception. Dr. Geraldine Brookins, Director, Research Institute for Socio-Technical Problems, Post Office Box 18611, Jackson State University, Jackson MS 39217, (601) 968-2001 or 2009

153 WOMEN IN SCIENCE WORKSHOP, James Madison University, Harrisonburg VA 22807 / National Science Foundation (NSF) / \$10,000 (NSF 85%; Madison 15%) / July 1978-July 1979 / Math, Ast, Phy, Chem, Bio, Med, Engr, Soc, Geol, Psy / 12 through 16, faculty-employee development / 200 F, 25 M / Recruit E; Involved 2% B, 3% D, 15% E, 1% A; Efforts N, B, E; Role models A, H, E / V.

This science career workshop for senior high school girls (early college decision) and undergraduate women students increased awareness of varied vocational opportunity in non-traditional science fields; reviewed problems faced by women in professional, business, government and industrial careers; and provided ongoing support for each participant in her science-oriented career. Student participants were recruited through newspaper and radio announcements, visits to classes by contact faculty in area schools, and printed posters with tear-off application forms. Speakers for the workshop were identified with the assistance of the Association for Women in Science. Material lists and vocational files, as well as publications selected

## HIGH SCHOOL AND COLLEGE

specifically for women of racial/ethnic minority backgrounds, were available as informational resources at the workshop. Workshop components included a keynote address, panel discussions, small group interaction and representatives from all areas to allow for one-to-one discussions. Additionally, the workshop leaders provided the mechanism for a "buddy system" sign-up in which each student participant was paired with a successful woman in a related vocational area. Project staff noted increasing rapport among the scientists who participated and increased awareness of the need in this area by the university community. Slideshow/tape: "Vignettes of Six Women in Science," 30 minutes. Publication: Final report to NSF. Margaret A. Gordon, Department of Biology, James Madison University, Harrisonburg VA 22807, (807) 433-6225

154 WOMEN IN SCIENCE CAREER WORKSHOP, Gustavus Adolphus College, St. Peter MN 56082 / National Science Foundation (NSF) / \$11,924 (NSF 100%; Gustavus Adolphus absorbed indirect costs) / June 1, 1979-July 31, 1980 / Math, Phy, Chem, Bio, Med, Engr, Soc, Psy / 12, 13, 14 / 148 F / Recruit N, B, A, D; Involved 2.3% N / V.

In October 1979 this one-day conference was conducted for freshmen and sophomore college students (from Gustavus Adolphus College and others within a one hundred mile radius of St. Peter) and "high-potential" area high school seniors. Seven visiting women career scientists presented forty-minute information sessions for different groups of twenty-five students at four times during the day. Topics covered included career options for women in science, practical information about selection of undergraduate courses, and summer employment or internships. Women scientists and counselors from the area who could answer student questions, were invited to have lunch with the students; a woman scientist made a formal speech at the luncheon. The workshop included distribution of relevant printed materials and a panel of all resource people for a final synthesis of information. A staff member has been added to the College academic advising effort to meet weekly with individual women and monthly with groups of women science students, to continue the benefits of the workshop. Barbara Simpson, PhD, Counseling Center, Gustavus Adolphus College, St. Peter MN 56082, (507) 931-4300, x2161

V. COLLEGE: CAREER WORKSHOPS, NSF FUNDED

GRADES 13 - 16\*

ENTRY NUMBERS 155 THROUGH 196

SEE ALSO COLLEGE ENTRIES  
FOR OTHER NSF FUNDED CAREER WORKSHOPS, SEE ENTRY  
NUMBERS 086, 107, 131, 149, 150, 151,  
152, 153, 154, 265, 282, 295, 297

*\*Projects begin between grades 13-16, but may  
continue into upper levels.*

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

155 CAREERS FOR WOMEN IN SCIENCE, Sangamon State University, Springfield IL 62708 / National Science Foundation (NSF) / \$10,000 (NSF 90%; Sangamon 10%) / Jan 1979-July 1979 / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Soc, Geol, Psy / 14 / 75 F / Involved 12% B, 3% A, 2% H, 2% D; Role models B, A, H, D, E / V.

The goal of this program was to stimulate thought among sophomore college women about the possibility of going into science as a career. Participants were recruited through mailings, contact with advisory staff at other institutions, radio and newspaper announcements, and posters. The program included a large group presentation and small seminars by role model scientists. W.W. Stevens, Sangamon State University, Springfield IL 62708, (217) 786-6688

156 HAWAII SCIENCE CENTER WORKSHOP FOR WOMEN, University of Hawaii, Honolulu HI 96822 / National Science Foundation (NSF) / \$10,000 (NSF 73.7%; Univ Hawaii 26.3%) / June 1976-April 1977 / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Geol / 13, 14 / 292 F / Involved 5% B, 70% A, 5% D, 20% E; Efforts A; Role models A / V.

To alert potential participants about the workshop, the project started with a mass mailing to all 13,000 women enrolled as freshmen or sophomores in any institution of higher education in Hawaii. During the two-day workshop, the enrollees obtained information on career opportunities in the biological and physical sciences, counseling on the education required for such careers, advice about extra-curricular activities which would enhance their formal science training, and a chance to meet women scientists in person. There were workshops on the several scientific disciplines represented by the nearly one hundred women scientists who took part in the program, plus counseling sessions centered on the science education programs at various Hawaii educational institutions. The participants also toured scientific laboratories. Besides achieving its educational goals (as documented by evaluation forms and standardized tests), the workshop also provided support to the women scientists who assisted in it. Information on life-styles of women scientists proved as interesting to the students as did the career information. Five hours of the proceedings were videotaped; a one-hour version has been edited for subsequent use. Publication: Final Technical Report: The Hawaii Science Center Workshop for Women, January 15-16, 1977 (Report on NSF Grant SMI 76-20379), 1977, 52 pp. Dr. Madeline Goodman, Women's Studies Program, University of Hawaii, Honolulu HI 96822, (808) 948-7464

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

157 IT'S MY LIFE: SCIENCE CAREER WORKSHOP, Institute for Research and Development in Occupational Education (IRDOE), Graduate School and University Center of City University of New York (CUNY), New York, NY 10036 / National Science Foundation (NSF) / \$74,674 (estimated) (NSF 13%; IRDOE-CUNY 87%) / Aug 1977-June 1978 / Math, Phy, Chem, Bio, Med, Engr, Soc, Psy, Environmental Health / 13, 14 / 59 F / Recruit B, A, H, D, E; Involved 31% Min; Role models B, H, E / V.

Information about science careers, exposure to professional scientists working in non-academic settings, and guided career planning were the goals of this workshop. Recruitment strategies included posters and application forms sent to fifty-four colleges and universities in New York, New Jersey, Connecticut and Pennsylvania, as well as contacts made with a project liaison at each campus. News releases were sent to each campus, public newspapers, and fifty-six local radio and cable television stations. A special effort was made to publicize the workshop on campuses having a large proportion of minority and economically disadvantaged students. The application form also indicated that the workshop would be held at a barrier-free site, enabling handicapped students to attend. The workshop offered large group and small group sessions led by women scientists. Materials including exercises, guides and bibliographies were prepared and distributed to participants. Four months following the workshop, participants evaluated their experience as "very worthwhile" and expressed a high level of enthusiasm. The best part of the workshop, participants noted, was the use of scientists and other professional presenters who served as group leaders and role models. The directors of this project noted that the date of the workshop (December 21, 1977) was a poor choice, as many registrants were unable to attend due to final exams. In their evaluation, the project directors recommended that for one- or two-day workshops, some consideration might be given to follow-up activities, other than those for evaluative purposes. Publication: B.R. Heller, V. D'Lugin, and L. Gross. It's MY Life: Science Career Workshop. Center for Advanced Study in Education (IRDOE), Graduate School and University Center, CUNY. Case 33-78, December 1978. Videotape, 2.5 hours. Barbara R. Heller, CASE/IRDOE, Graduate School, City University of New York, 33 West 42nd Street, New York NY 10036, (212) 221-3519, 3517

158 SCIENCE CAREER WORKSHOP, University of Arizona, Tucson AZ 85721 / National Science Foundation (NSF) and private sector / \$15,914 (NSF 62%; Univ AZ 28%; Private Sector 10%) / April 16-17, 1977 / Math, Ast, Phy, Chem, Bio, Engr, Agr,

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

Soc, Geol, Psy / 13, 14 / 105 F / Involved 2% B, 8% H / V.

This workshop acquainted women students with the kinds of career opportunities available to those with science degrees. The program included presentations by established women scientists on their work and career patterns as well as panels and workshop sessions addressing potential problems for women science students, job-hunting techniques, and graduate education and training. Participants for the workshop were recruited through posters, news stories, and letters to engineering and science department chairpersons in Southern Arizona, and by personal appearances of the conference directors at science-related organizations. Following the workshop, attendees reported greater confidence in their ability to become scientists, raised educational and career aspirations and more specifically-defined goals. Publication: Final report: "Science and Engineering Applied to Careers for Women." 35 pp. Dr. Laurel L. Wilkening, Dept. of Planetary Sciences, University of Arizona, Tucson AZ 85721, (602) 626-2806

159 SCIENCE CAREER WORKSHOP, Gustavus Adolphus College, St. Peter MN 56082 / National Science Foundation (NSF) / \$7,220 (NSF 100%) / June 1977-May 1978 / Math, Phy, Chem, Bio, Med, Engr, Soc, Psy / 13, 14 / 175 F / Involved 2% B, 0.5% A, 3% D, 5% E / V.

The workshop organizer wrote and telephoned Deans of colleges within one hundred miles of St. Peter to recruit participants. The session imparted information about careers in science, outlined educational requirements for those careers, and explained how women scientists managed both family and professional activities. Besides a luncheon speaker and a panel discussion, the meeting employed small work groups, in which several students met with scientists for a structured review of opportunities in specific disciplines and with ample chance for questions. Small groups were set up for biology, physics, chemistry, psychology, medical research, and mathematics-engineering; each student was able to attend two groups of her choice. The meeting closed with informal discussions with the scientists, with Gustavus science faculty, and with other students in the workshop. Barbara Simpson, Gustavus Adolphus College, St. Peter MN 56082, (507) 931-4300, x2161

160 SCIENCE CAREER WORKSHOP, Michigan State University (MSU), East Lansing MI 48824 / National Science Foundation (NSF) / \$10,000 total (NSF 100%) / April 1977-Jan 1979 / Math, Phy, Chem, Bio, Med, Engr, Agr, Soc, Geol, Psy / 13, 14 / 219 F total / Recruit Min; Involved 8% B, <1% A, <1% H,

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

<1% D; Efforts B; Role models B / V.

This workshop acquainted participants with some current and projected career opportunities in science, provided information concerning necessary academic preparation and relevant work experiences for science careers, introduced participants to role models of women in science, and encouraged and reinforced the development of friendships and mutual support networks among participants. Workshop information was sent to freshman and sophomore advisors at MSU and to community college student personnel. Materials were also mailed to MSU freshmen and sophomore women listed as science majors as well as other women with high scores on math orientation exams. Publicity in local and student newspapers and newsletters of regional women's centers also recruited participants. During the two-day workshop lectures, panels, small group discussions, and handouts were offered to acquaint the students with various aspects of science careers. In a six-month follow-up, participants reported increased activity in seeking career information, development of supportive relationships with students with shared science interests, and increased educational goals. The workshop also assisted academic advisors and counselors by providing material for advising women students on careers in science. Publication: Final report to NSF. Dr. Jeanne E. Gullahorn, Dept. of Psychology, Michigan State University, East Lansing MI 48824, (517) 353-8672

161 SCIENCE CAREER WORKSHOP, Notre Dame College, Cleveland OH 44121 / National Science Foundation (NSF) / \$10,000 (NSF 100%) / May-Nov 1978 / Math, Ast, Phy, Chem, Bio, Med, Engr, Soc, Geol, Psy / 13, 14 / 165 F / Involved 10% B; Role models H, B / V.

To advertise the workshop, brochures, posters and application forms were sent to nearby colleges (two year and four year) and universities. The workshop encouraged students to consider the many career options in science, discussed the different life styles available in these careers, provided role models of outstanding women scientists, gave specific information on essential preparation for science careers, and presented a realistic picture of the job outlook in science careers both currently and in the near future. Participants received from several women scientists an overall view of women's roles in science careers today, the required preparation for these careers, and a sense of the challenge of science for women today. In addition, a panel discussion presented students with some idea of the preparation needed for a specific career. Small group workshops in the afternoon reviewed the job outlook along with specific information on science careers. During the

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

luncheon period, students interacted directly with the women scientists and thereby clarified issues and discussed problems. Sister Jeanmarie DeChant, Notre Dame College, 4545 College Road, Cleveland OH 44121, (216) 381-1680

162 SCIENCE CAREER WORKSHOP, University of Tulsa (UT), Tulsa OK 74104 / National Science Foundation (NSF) / \$12,500 (NSF 61%; UT 39%) / May 1979-Oct 1979 / Math, Phy, Chem, Bio, Engr, Soc, Geol, Psy / 15, 16 / 150 F / Recruit B; Involved 4% B, 1.3% A, 7% H / V.

The project was advertised by direct mail to college junior and senior women in the region around Tulsa (including to Langston University, to encourage the Black students there to attend), telephone calls to science faculty and administrators, and releases to news media. The workshop consisted of two major activities, panel discussions and small group sessions. Panel members and small group leaders were University of Tulsa faculty and administrators, and industry and government representatives. Topics addressed were graduate study, career opportunities in specific discipline areas, career opportunities in industry today, and the job search. The workshop structure permitted each participant to attend the three main panels and five small group sessions. An unexpected benefit was that one of the nearby colleges which sent participants is planning a similar workshop. The project director recommended that the workshops in the future be targeted for freshmen, sophomores, and juniors, since seniors' career options are limited by educational decisions already made. She noted that students enjoyed meeting each other and found it helpful to share experiences and information. She also discovered that the greater employment opportunities in engineering and physical sciences caused some surprise and concern among those majoring in other fields. Dr. Jane Brechin, Associate Dean of Students, University of Tulsa, 600 South College, Tulsa OK 74104, (918) 939-6351, x327

163 SCIENCE CAREER WORKSHOPS FOR FRESHMEN AND SOPHOMORE WOMEN, California State College (CSU), San Bernardino CA 92404 / National Science Foundation (NSF) / \$14,500 total (NSF 69%; CSU 31%) / June 1977-March 1979 / Math, Phy, Chem, Bio, Med, Engr, Soc / 13, 14 / 270 F, 30 M total / Recruit Min, E; Involved 4.5% N, 8% B, 5% A, 5% H; Role models B, A, H / V.

This program involved a two-day workshop at CSU for female undergraduates from five area four-year colleges and ten community colleges. Five additional mini-workshops (half-day sessions) were held on the campuses of neighboring

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

community colleges. Women scientists gave talks and provided role models for the students. Workshop discussions included an examination of stereotypes of women in science, and career decision-making for the students. Follow-up evaluations indicated that many of the students received reinforcement to pursue careers in science and have set their educational goals higher. One other outcome of the workshops was increased motivation for the participating faculty to work further in this area. Participants suggested the implementation of a similar program for junior high and high school female students. Publication: Final report. Florence Weiser, California State College, San Bernardino, San Bernardino CA 92407, (714) 887-7517

164 SCIENCE CAREER WORKSHOP FOR FRESHMAN AND SOPHOMORE WOMEN, Texas A&M University, College Station TX 77843 / National Science Foundation (NSF) / \$15,200 total (NSF 66%; A&M 34%) / April 1977-Nov 1978 / Math, Phy, Chem, Bio, Engr, Agr, Soc, Geol, Psy / 13, 14, faculty-employee development / 105 F total / Involved 8% B, 4% H, about 15% E / V.

Participants were recruited on campus through mailings to women students with high mathematics and science aptitude test scores; deans and faculty at other colleges and universities were asked to nominate students from their schools. Special efforts were made to reach those at Prairie View A&M University, a nearby historically Black school. The two-day workshop presented career information on science and enabled the students to interact with active women scientists. The students evidenced special interest in combining careers with family lives, and in typical work activities of scientists. The program featured two major speakers, three panel discussions with an extensive period for questions and comments, small group discussions on career opportunities for women in six major areas of science, a session on managerial skills, a videotape and discussion session for counselors on science career advising, and an exhibit area with career displays, fact sheets and resource personnel available throughout the period of the workshop. The exhibit included a computer scanning terminal allowing retrieval of science career information on an individual basis from a Houston data bank. Publication: Ethel Ashworth Tsutsui, "Science Career Workshop for Freshman and Sophomore Women: Final Report to the National Science Foundation," 1979, 50 pages. Dr. Ethel Tsutsui, Dept. of Biochemistry, Texas A&M University, College Station TX 77843, (713) 845-4338 or 1011.

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

165 SCIENCE CAREER WORKSHOP FOR WOMEN, Norfolk State College, Norfolk VA 23504 / National Science Foundation (NSF) / \$9,170 total (NSF 100%) / June 1976-Sept 1977 / Math, Phy, Chem, Soc / 13, 14 / 184 F total / Recruit B; Involved 85.3% B; Role models B, E / V.

This workshop motivated college freshmen and sophomore women to major or continue to major in the sciences, and alerted them to careers for women in the sciences, sources and availability of jobs, salaries, the necessary college and graduate preparation, and related summer experiences. The session provided minority and non-minority female role models for the participants, and distributed information on the career departments in each participating college. Several strategies, including the selection of a liaison officer at Norfolk and at the seven participating institutions, were used to recruit students for the workshop. Each liaison officer personally contacted potential participants, and requested the chairpersons of the department in selected disciplines to recruit their students. An advertising campaign was launched announcing the program in local newspapers, radio stations, campus newspapers, and posters on each campus. During the workshop, sessions to provide career information were conducted by teams of one theoretical and one applied scientist in each of the targeted disciplines. The project directors noted the success of the workshop in the overwhelming enthusiasm of the participants, especially in the students' request to continue the program on an annual basis. Recommendations of the workshop leaders (Dr. Barnes and Dr. Evelyn Jones of the Department of Mathematics) include specification in writing to the participants, in general terms, the desired workshop content and results; sponsorship of a workshop for the keynote speaker, luncheon speaker and consultants prior to their presentation; and inclusion of both a theoretical and applied scientist in each discipline. Publication: Final report to NSF. Annie S. Barnes, Ph.D., Sociology Department, Norfolk State College, Norfolk VA 23504, (804) 623-8164

166 THE NEW DECADE: WOMEN IN SCIENCE, State University College, New Paltz NY 12652 / National Science Foundation (NSF) / \$11,856 (NSF 100%) / Jan 16-17, 1980 / Math, Phy, Chem, Bio, Engr, Soc, Geol, Psy / 14, 15, 16 / 115 F / Recruit Min, D, E; Efforts B; Role models B / V.

This two-day workshop provided encouragement, information and advice to sophomore, junior and senior women majoring in the sciences. The workshop was publicized in local and college newspapers in cities within a one hundred mile radius of New Paltz, including many cities with substantial

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

minority and economically disadvantaged female residents. Additionally, applications were sent to science departments of every college or university in the region, and telephone calls made to colleagues on these campuses. The first day's program included panel discussions with nine professional women who had varied levels of education and were employed in government, industry and academe. The agenda for the second day focused on career planning and placement, utilizing panels and discussion groups as a means of providing information regarding resume writing, graduate school, employment opportunities, and academic advising. The project directors felt that the greatest benefit of the workshop was the opportunity for female science students to meet women scientists. Videotape, article, study paper in preparation. Marion G. Ben-Jacobs, State University College, Department of Mathematics, New Paltz NY 12652, (914) 257-2667, 2658

167 UCLA/NSF WOMEN IN SCIENCE CAREER CONFERENCE, University of California, Los Angeles (UCLA), Los Angeles CA 90024 / National Science Foundation (NSF) / \$5,972.92 (NSF with in kind support from UCLA) / June 1976-April 1977 / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Soc, Geol, Psy / 13, 14 / 505 (mostly F) / Recruit N, B, A, H, D, E, Min / V.

The participants for this one-day conference were recruited through an extensive publicity campaign involving letters to career planning and placement centers of two- and four-year institutions in Southern California, and announcements in university and commercial newspapers. The workshop provided career and academic information to the students, and exposed them to knowledgeable and supportive role models. Informal interchange between the students and scientists was encouraged through the use of small group sessions in which students could talk to scientists in their fields of interest. Follow-up activities at the participants' schools were reported to be less successful than was hoped for. Many participants, contacted five months after the conference, felt that meeting women scientists and others who share their interests was the most valuable contribution of the conference. Publication: Final report. Dean Jane S. Permaul, Experimental Educational Program, 50 Dodd, UCLA, Los Angeles CA 90024, (213) 825-2295

168 WHAT NEXT? CAREER AND EDUCATIONAL OPPORTUNITIES FOR JUNIOR AND SENIOR WOMEN, A SCIENCE CAREER WORKSHOP, University of Arizona, Tucson AZ 85721 / National Science Foundation (NSF) / \$13,370 (NSF 75%; Corporate donations 6%; Univ AZ 19%) / Oct 29, 1977 / Math, Ast, Phy, Chem,

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

Bio, Engr, Agr, Soc, Geol, Psy / 15, 16 / 111 F / Involved  
1% B; Role models B, A, H, E / V.

The workshop for science majors provided practical advice on career and educational opportunities in engineering and the physical, biological and social sciences. Through panel and individual presentations, information on such topics as graduate training, job opportunities in various fields, labor market projections, interviewing, employment applications and resume preparation was relayed to the workshop participants. A small discussion group session gave the women students an opportunity to discuss their educational and career goals. Publication: Final report: "What Next? Career and Educational Opportunities for Junior and Senior Women," 1977, 55 pp. Dr. L.L. Wilkening, Dept. of Planetary Sciences, University of Arizona, Tucson AZ 85721, (602) 626-2806

169 WOMEN AND MEN WORKING TOGETHER--A WORKSHOP FOR ISU FORESTRY STUDENTS, Iowa State University (ISU), Ames IA 50011; ISU Department of Forestry and Forestry Club / National Science Foundation (NSF) and ISU Forestry Alumni / \$900 (NSF 66%,; Alumni 34%) / Oct 14-15, 1977 / Forestry / 13 through graduate, faculty-employee development / 30 F, 30 M / Involved 3% B.

This symposium for female and male students in the ISU Department of Forestry led them to discuss mutual concerns of employment, career development and the competition and cooperation involved with the mixing of sexes in a once-male profession. Forestry-employed women (most graduates of other schools) and one male forester gave short, informal, candid talks on their views of women in forestry, participated in a subsequent question-formulation session with students, and spoke at a public breakfast and "Self-immolation" session where questions stimulated in the previous day's session were aired. Letters from earlier women forestry graduates of ISU were solicited and read at the workshop. The questions aired were honest, blunt, and sometimes painful according to the director. The reaction of all who participated was enthusiastic beyond expectations. The director recommends that each forestry school invite forestry-employed young women, preferably not graduates of the host school, to the campus for a serious discussion of forestry as a woman's career; and invite comment from women alumnae as far back as records permit. Publication: George W. Thomson, "Women and Men Working Together in Forestry--An Attempt at Understanding," mimeographed, 8 pages. Panel discussions were recorded on cassette, approximately 2 hours. George W. Thomson, Ph.D., Chairman, Department of Forestry, Iowa State

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

University, Ames IA 50011, (515) 294-1166

170 WOMEN AT WORK IN THE SCIENCES, Temple University (TU), Philadelphia PA 19122 / National Science Foundation (NSF) / \$10,000 (NSF 100%) / June 1977-June 1978 / Math, Phy, Chem, Bio, Engr, Geol, Psy / 13, 14 / 250 F, 20 M / Role models Min, E / V.

Counselors and faculty at Temple and four community colleges (Philadelphia, Bucks County, Delaware Valley, and Montgomery County) urged students to apply and distributed information on the one-day workshop. The workshop provided students with information on careers in science, on academic preparation required for them, on how to transfer from two-year to four-year colleges, on where to obtain funding for an education, and on the desirability of having flexible career goals. The students met women role models working in a variety of scientific areas with diverse backgrounds and education. The workshop consisted of an opening speaker in charge of an international research program; a panel of four women scientists working in computers, laboratories, engineering, and management; a panel of employer representatives; and a closing speaker who headed a science management and career development firm. The workshop drew on federal government reports on science careers and job availability, and used information on academic requirements assembled by counselors at the five cooperating schools. Some of the colleges went on to use the project design and some of the speakers at sessions on their own campuses. The director recommends planning for follow-up inquiries from the students who participated - "many women are still coming to us for information" - and funding to conduct a long-term evaluation. She feels that there should be "a strong push for women to achieve competence in math, science, and logic during primary and secondary school" so they will have the self-confidence to succeed in college programs. Publication: Final report to NSF. Dorothy B. Berner, Department of Biology, Temple University, Philadelphia PA 19122, (215) 787-8871

171 WOMEN EXPANDING: CAREERS IN SCIENCE, University of Wisconsin (UWSP), Stevens Point WI 54481 / National Science Foundation (NSF) / \$12,000 total (NSF 100%) / May 1979-Sept 1980 / Math, Ast, Phy, Chem, Bio, Soc, Psy, Paper science / 13 through 16, MA, Continuing-adult education / 125 F, 3 M first conference / Recruit N, B, A, H. Min; Involved 6% N, 3% B, 5% H; Role models B, Jewish, Latvian / V.

The goals of this project were to dispel myths about women

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

in science and provide information and support for women considering or preparing for careers in science. The project provided a forum for discussion of the mixing of career interests with other responsibilities and collected data for research on previous counseling of science students. Conferences, which include panel discussions, "rap sessions" and distribution of reading lists and references to relevant brochures were the primary methods of this project. Participants are building a network of individuals who support the overall objectives. The first conference for women students involved twenty-five female and three male scientists who stimulated the academic interests of participants and discussed ways of integrating family and career activities. This conference revealed that very few of the students had received any counseling, according to the director. A second conference will involve high school counselors and college advisors. Project participation was generated by newspaper announcements, letters to UWSP students and to advisors and colleagues at other Wisconsin colleges. A project report and evaluation will be produced. Toby F. Block, School of Chemistry, Georgia Institute of Technology, Atlanta GA 30332, (404) 894-4090,4031; Margaret Goodhue, Dept. of Biology, University of Wisconsin, Stevens Point WI 54481

172 WOMEN IN SCIENCE: A WORKSHOP FOR JUNIOR AND SENIOR WOMEN, Indiana University (IU), Bloomington IN 47405 / National Science Foundation (NSF) / \$30,764 (NSF 30%; UI 70%) / Oct 1977 / Math, Ast, Phy, Chem, Bio, Med, Engr, Soc, Geol, Psy, Science education, History and philosophy of science / 15 through graduate / 107 F / Involved 5% B, 1% A, 1% East Indian / V.

This workshop was planned and organized by women scientists for women students who had made a preliminary commitment to a career in science. The meeting motivated these students to maintain their interest in the sciences beyond the undergraduate degree. There were three keynote addresses by highly successful women representing the biological, physical and social sciences. Three less formal panel discussion groups focused on issues including types of opportunities in various fields, education and training required, and unique rewards of careers in these fields. Nine small group discussions allowed participants to explore issues of particular concern and relevance to themselves. The conference also included tours of science departments and a Career Resource Center staffed by representatives of industry and government who were available to discuss career opportunities. The workshop ended with a short evaluation session where ideas and experiences were shared and suggestions for future programs

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

were discussed. To recruit participants, posters, flyers and applications were mailed to contact people at twenty-eight institutions within 100 miles of Bloomington. Stipends were available for off-campus participants. News releases were sent to area newspapers and project staff and science faculty women appeared on a local television show. Press coverage and television appearances prior to the workshop and immediately following made the public more aware of science career options for women. The private sector was willing to send more women scientists for the program than could be scheduled. Approximately \$20,584 was provided through donated services of project staff, faculty, resource people, and students. Publication: Ina C. Ridgeway, "Women in Science--A Workshop for Junior and Senior Women Presented by Women Scientists, October 7-9, 1977." Judy Franz, Department of Physics, Indiana University, Bloomington IN 47405, (812) 337-4359

173 WOMEN IN SCIENCE CAREER CONFERENCE, University of Wisconsin, Milwaukee (UW-M), Milwaukee WI 53201 / National Science Foundation (NSF) / \$9,575 (NSF 49%; UW-M 51%) / Sept 1976-Sept 1977 / Math, Ast, Phy, Chem, Bio, Med, Engr, Soc, Geol, Psy / 13, 14 / 302 F, 6 M (as faculty) total / Involved about 10% Min; Role models B / V.

To advertise the workshop, brochures were placed in city and county libraries, mailed to freshmen and sophomore women at UWM and other campuses in a fifty mile radius, and given to faculty contacts at these campuses. An ad announcing the workshop, with a tear-off coupon for return, appeared in the campus newspapers. The workshop encouraged students to consider professional science careers, described opportunities available in the sciences and engineering, illustrated that women are succeeding in industrial as well as academic jobs, alerted the participants to possible psychological and sociological difficulties in entering fields where women are underrepresented, demonstrated what scientific research involves, and established a network of women professionals committed to motivating young women into professional careers. The workshop used speakers, panel discussions, scientific research demonstrations, and small work sessions to accomplish this across a two-day period. The director found that of the recruiting techniques, direct mail worked better than ads or posted brochures. She believes that a day or day and a half is the best duration for such a workshop. She warned that scheduling should be planned to avoid inclement weather which can cut attendance. Finally, she recommended that follow-up studies of long-term effects be funded at levels which permit the devotion, time and commitment of dedicated faculty. Publication: Final technical report to

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

NSF. Prof. Ethel Sloan, Zoology Department, P.O. Box 413, University of Wisconsin, Milwaukee WI 53201, (414) 963-5762.

174 WOMEN IN SCIENCE CAREER WORKSHOP, Dutchess Community College, Poughkeepsie NY 12601 / National Science Foundation (NSF) / \$10,000 (NSF 100%) / June 1978-May 1979 / Math, Phy, Chem, Bio, Med, Engr, Agr, Geol, Psy / 13, 14, Continuing-adult education / 128 F / Involved 14% B, 6% A, 10% H; Efforts D, E / V.

To recruit students, the organizers mailed a cover letter and brochures to heads of chemistry, biology, and physics departments of colleges within a hundred mile radius of Poughkeepsie. They also contacted deans, placement officers, and career development specialists at these schools. Another mailing and telephone calls followed up on the first contact. The college is accessible to wheelchair users, and draws on a substantial population of low income families for its enrollment. Lunch, coffee, and travel were paid by the workshop to insure representation from all income groups. Although targeted for freshmen and sophomores, the sessions attracted reentry students as well. The workshop informed students of various scientific careers, generated enthusiasm in bright women to pursue such careers, and permitted them to meet successful women scientists. One panel of women scientists outlined careers in physics, chemistry, and biology; and a second panel discussed opportunities in government, industry, and allied health fields. A keynote speaker started the proceedings with an overview of education and work in science. During lunch, each woman scientist sat with eight to ten students for informal discussion. A closing coffee hour permitted further small group interaction. Among the benefits was the discovery by the students that others scattered around the region were pursuing the same goals as they were, thus ending the isolation some had felt before the workshop. The project organizers remained on the success of the telephone follow-up to the initial mailing and on the importance of the informal sessions and ample time for questions. They recommend that geology and computer science be represented on panels for future workshops. Publication and evaluation: Judith Tavel, Women in Science Career Workshop: Final Technical Report, 1979, 36 pages. Ms. Constance Eames, Dutchess Community College, Biology Department, Poughkeepsie NY 12601, (914) 471-4500, x358

175 WOMEN IN SCIENCE CAREERS WORKSHOP, George Peabody College, Nashville TN 37203 / National Science Foundation (NSF) / \$10,000 (NSF 90%; Peabody 10%) / June 1978-July

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

1979 / Math, Ast, Phy, Chem, Bio, Engr, Soc, Geol, Psy / 15, 16 / 50 F / Recruit B; Involved 20% B, 10% A, 10% H; Efforts B; Role models B / V.

Notice of the workshop was sent via mailings to fifty colleges in the region, brochures were distributed on the campuses, and radio and television advertising were used. An intensive recruitment effort was made on Black campuses in the area, and Black women were involved throughout the project. The workshop opened with a plenary session on creativity, followed by small group meeting on that topic. There was then a plenary gathering on math anxiety, again with small group sessions following. Thereafter students could attend separate presentations by scientists on their fields, dealing with how to find a job, educational requirements, the nature of the work, and so on. Students met with the scientists during lunch to learn about such issues as balancing family and professional lives. The dinner session featured a keynote speaker. One unexpected spinoff was that a scientist in the workshop applied successfully for funding for a workshop on her campus the next year. Publication: Final report, in preparation. Jeanne M. Plas, Box 319, George Peabody College, Nashville TN 37203, (615) 327-8708

176 WOMEN IN SCIENCE CAREER WORKSHOP, Northern Illinois University, De Kalb IL 60115 / National Science Foundation (NSF) / \$10,000 year (NSF 100%) / April 1977-Jan 1979 / Math, Phy, Chem, Bio, Med, Engr, Soc, Geol, Psy / 13, 14, faculty-employee development / 162 F total / Involved about 5% B / V.

The one-day workshop provided information for advisers and students on career opportunities and educational requirements in science, offered participants the vision and experiences of women scientists, and inspired the conferees to consider a scientific profession. The workshop featured speakers on manpower demands for scientists and on general issues relating to women in science, plus a panel presentation by women scientists on their work and life. Small group discussions were conducted by the women scientists on their area of science, and questions and answers also were raised during luncheon sessions with the scientists. The schedule included a tour of campus science facilities. As a result of the conference, some faculty advisors changed their curricula, and two decided to organize a similar program later. The workshop staff recommend that programs balance the idealism of involvement in science with "nuts and bolts" information on careers and educational requirements. Publication: Eleanor Godfrey, paper to the Midwest Sociological Society, April 1979; Linda Sons,

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

"Science Career Workshops," Mathematics Teacher 71 (1978), 543-544. Linda R. Sons, Department of Mathematical Sciences, Northern Illinois University, De Kalb IL 60115, (815) 753-0567

177 WOMEN IN SCIENCE CAREERS WORKSHOP, University of Hartford, Hartford CT 06117 / National Science Foundation (NSF) / \$11,000 (NSF 70%; Hartford 30%) / June 1978-Sept 1979 / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Geol, Psy / 13, 14 / 110 F / Involved 10% B, 2% A, 3% H, 1% D; Role models B, E / V.

To advertise the workshop, posters and information were sent to science deans, career officers, college newspapers, and science faculty, at colleges within a one hundred mile radius of Hartford, as well as to women's centers in the area. Individual faculty and science bulletin boards seemed to have reached the greatest number of eventual participants. The workshop exposed enrollees to women scientists of all ages with successful careers, provided career information and answered specific questions about jobs and training, and encouraged participants to persevere in their plans for a scientific education. The two-day workshop included panels on various scientific disciplines as well as a final session of "Getting and Doing the Job: Special Problems of Women." An opportunity for questions was provided after each panel, either as part of the program or informally via breaks for coffee or meals. The workshop encouraged new attitudes in the students as well as imparting specific information on science careers--the panelists and the students felt they had taken part in an important venture in terms of their futures. Older women reentering education had different questions and problems from students of conventional college age, and the project leaders recommend that these be dealt with in future workshops, possibly through small discussion groups. The workshop concluded with written evaluations composed by panelists and students. Prof. Stephanie F. Troyer, Department of Mathematics, University of Hartford, West Hartford CT 06117, (203) 234-4517

178 WOMEN IN SCIENCE WORKSHOP, University of Maine, Orono ME 04469 / National Science Foundation (NSF) / \$8,200 year, \$16,260 total (NSF 50.4%; University of Maine 49.6%) / Sept 1976-May 1978 / Math, Phy, Chem, Bio, Engr, Soc, Geol, Psy / 13, 14 / 330 F total / Involved 1% N; Role models A / V.

The two workshops encouraged college women to pursue careers in the sciences by providing factual and realistic informa-

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

tion, contacts with successful scientists, role models to increase confidence and motivation, and greater appreciation for the subtle problems facing women in the sciences. Announcements of the conferences were carried on radio and television and in local newspapers. Information was sent to deans and science faculty at other colleges in Maine, along with application forms for interested students to complete and return. On receipt of application forms, selected participants were divided into twenty groups of ten women each, according to their academic interests. Each group of ten women remained as a unit for the two-day program and attended the same workshops along with one senior graduate student who acted as their leader. Prominent women scientists accepted invitations to present six workshops: 1) "Scientists at Work in the University;" 2) "Scientists at Work in Business and Industry;" 3) "Formal After-Dinner Talk and Discussion;" 4) "Panel Discussion;" 5) "Small Group Discussion;" and 6) "General Advising for Careers in the Sciences." Additionally, each woman scientist interacted with students in her own academic area of interest, thereby providing a vehicle for questions and candid discussion. In evaluating the students' pre- and post-conference questionnaires, a number of major differences were observed. More than half of the students who planned to stop at the bachelor's level decided to consider graduate school, stating they now felt it was more accessible. About a third of the students reported that exposure to role models had given them additional motivation, as opposed to nine percent before the conference. While one-third of the students attended the conference seeking specific information regarding future jobs, the majority reported that specific answers to questions concerning jobs and careers were not the most significant aspect of the conference. Instead, those women students reported a more realistic attitude toward their own ability to make decisions and handle difficulties. Elaine S. Gershman, Associate Dean, 100 Stevens Hall, University of Maine, Orono ME 04469, (207) 581-7733

179 WOMEN IN SCIENCE WORKSHOP, University of Nebraska, Lincoln NE 68588 / National Science Foundation (NSF) / \$10,000 (NSF 100%; University of Nebraska, personnel and misc. expenses) / Oct 6-7, 1978 / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Soc, Geol, Psy / 13, 14 / 200 F / V.

Colleges and universities in Nebraska were asked to select participants, and deans sent application forms to students, accompanied by letters encouraging them to apply. The conference included several lectures by prominent women scientists, small group discussions of about eight

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

participants each, tours of local scientific businesses and laboratories, a panel discussion by six women scientists focusing on lifestyles, career information booths, and a panel on career opportunities composed of various scientific employers. Following the workshop, the students filled out evaluation forms. Over ninety percent of the women stated that the workshop helped them become more enthusiastic about a career in science and brought about an increased awareness of the role of women in science. Publications: Anne Parkhurst and Sylvia Weigand, Women in Science Booklet, 32 pp; Women in Science Supplement, 60 pp; Women in Science Careers Workshop (final report), 1978, 40 pp. Videotapes, "Women in Science," 2 tapes, 30 minutes each. Dr. Sylvia M. Wiegand, Math Department, University of Nebraska, Lincoln NE 68588, (402) 472-3731

180 WOMEN IN SCIENCE CAREER WORKSHOP, Clarke College, Dubuque IA 52001 / National Science Foundation (NSF) / \$10,000 (NSF 100%) / July 1978-June 1979 / Math, Chem, Bio, Agr, Soc, Psy, Computer science / 13, 14, 15, 16 / 239 F / Recruit Min, E; Involved >1% B, >1% A, 2% H; Role model D / V.

This one-day workshop encouraged young women to aspire to careers in science, and made them aware of the choices and satisfactions of science careers. Women scientists, serving as role models, presented the students with information on their own scientific fields, and offered advice concerning the appropriate undergraduate experience, both curricular and extracurricular, needed for science. Student participants were recruited through the assistance of the deans of thirty area colleges, who informed and selected students from their own campuses. Publication: Final report. Dr. Mary L. Caffery, Clarke College, 1550 Clarke Drive, Dubuque IA 52001, (319) 588-6366

181 WOMEN IN SCIENCE CAREER WORKSHOP, Portland State University (PSU), Portland OR 97207 / National Science Foundation (NSF) and local business (NSF 82%; PSU 12%; local business 6%) / July 1977-Aug 1978 / Math, Phy, Chem, Bio, Med, Engr, Agr, Soc, Geol, Psy / 13, 14, continuing-adult education / 250 F / Recruit B; Involved 5% Min / V.

The workshop was advertised via large posters placed in colleges, universities, public libraries, etc., and by press releases to newspapers plus spot announcements on local radio and television. Individual faculty members were sought as contact persons at colleges and universities

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

within one hundred miles of PSU; they were kept in touch by phone and received application and promotional materials. To reach minority students, a press release was sent to a local Black newspaper and special mailings went to minority organizations. Information was given to faculty in PSU minority programs. The workshop program consisted of career seminars in twenty-five science and science related areas, twenty-five laboratory workshops, panel discussions on life styles, two keynote addresses, a social hour, and a luncheon. Each participant received an information kit which included background materials on science training and careers as well as details of conference proceedings. To encourage a wide range of women to attend, the workshop offered childcare services, reimbursement for travel, and help in finding lodging. The project included not only an evaluation by students at its close, but also a follow-up questionnaire for returning six months later. The project estimated that it received \$23,500 in donated labor from PSU and other faculty and administrators. The workshop also used several student employees during its preparation phase. Publication: Mary Kinnick and Carole Gatz, Final Technical Report: Women in Science Career Workshop, Portland State University (1978, 48 pp).

Dr. Carole Gatz, Department of Chemistry, Portland State University, Portland OR 97207, (503) 229-3811

182 WOMEN IN SCIENCE CAREER WORKSHOP, State University College, Buffalo NY 14222 / National Science Foundation (NSF) / \$9,880 (NSF 100%) / June 1978-Dec 1979 / Math, Phy, Chem, Bio, Med, Engr, Soc, Geol, Psy / 13, 14, 15, 16 / 150 F, 5 M / Recruit N, E, A, H, E; Involved 2% B, 1% A, 1% H; Role models B / V.

To recruit participants, the workshop was advertised via notices to campus and town newspapers, to department chairpersons, and to interested science faculty. Information was also sent to minority studies programs and minority newspapers. The workshop provided students with current information and guidance on science careers, insights into problems encountered by women entering various science fields, and guidance on graduate education in science. The workshop materials are being used to construct a multi-media guidance package for use by career development officers at SUCB and other colleges. The meeting consisted of presentations by successful women scientists, workshops, informal discussion groups, and the use of audiotaped and photocopied materials on science careers. One unexpected benefit was the interest generated among local scientists in encouraging women to enter science careers. Audiotape: of the speakers' presentations, about two hours long. Publication: the guidance packet, in preparation. Rosalyn

COLLEGE : CAREER WORKSHOPS, NSF FUNDED

Lindner, 107 College Street, Buffalo NY 14201, (716) 878-5534

183 WOMEN IN SCIENCE CAREER WORKSHOP, S.D. Bishop State Junior College, Mobile AL 36603 / National Science Foundation (NSF) / \$40,373.30 total (NSF 30%; Bishop 70%) / April 1977-March 1979 / Math, Phy, Chem, Bio, Engr, Soc, Geol, Psy, Environmental protection / 13, 14 / 280 F total / Recruit B, H, E; Involved 68% B, 70% E; Role models B, E / V.

This two-day workshop increased awareness among women from five area colleges of the desirability and availability of various science careers and influenced these women to choose majors which would prepare them for science careers. Women outstanding in the various areas of science conducted small group discussions in which they shared their experiences as women scientists. They outlined the advantages, disadvantages, training requirements, availability of opportunities and characteristics pertinent to their particular fields in a question-answer and discussion mode, aided by audio-visual materials. Students rotated so that all had the opportunity to talk with each consultant. Participants were chosen by recommendation of faculty members at participating schools. Advertising in local media, including newspaper feature articles about the consultants, and appearance on local radio and television talk shows generated public interest in the workshop. Students completed pre- and post workshop questionnaires; faculty evaluations of the workshop were completed at the end of the project. A one-year follow-up of student participants indicated that thirty-three percent (65) had changed their majors to one of the sciences dealt with in the workshop. Since the workshop, more classroom emphasis has been placed on women's participation in sciences. The consulting time and expenses of U.S. Government scientists were donated. Local media publicity was contributed in public service programs valued at \$17,855. The Chamber of Commerce provided personnel and equipment for two days to handle registration. Bishop's costs included a reception for consultants and college personnel. The director felt that the presence of Black women scientists as consultants helped diminish the myth that science fields are academically too demanding for Black women. The discussion sessions were tape recorded and a project report was produced. Dorothy Raine Carroll, S.D. Bishop Junior College, 351 North Broad Street, Mobile AL 36603, (205) 690-6424

184 WOMEN IN SCIENCE CAREER WORKSHOP, Spelman College,

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

Atlanta GA 30314 / National Science Foundation (NSF) / \$8,700 (NSF 80%; Spelman 20%) / Aug 1976-July 1977 / Math, Phy, Chem, Bio, Engr, Soc / 15, 16 / 136 F / Involved 90% B, 30% E; Role models B, E / V.

This one-day workshop was targeted for women majoring in the biological, physical, mathematical, or social sciences. To recruit participants, the project staff sent brochures to twenty-four colleges and universities within a one hundred mile radius of Atlanta, and mailed announcements to science department chairpersons at these schools. A special effort was made to publicize the project in schools where enrollment consisted of predominantly Black students. The workshop familiarized young women with the rigors, challenges, and opportunities in science careers; provided successful women as role models; and gave practical advice on selecting and gaining admission to graduate school. Fourteen outside consultants and seventeen faculty members at Spelman served as panelists and speakers, representing a variety of work settings and scientific disciplines. They met to go over the format the day before the workshop and the next morning was devoted to sessions with students on employment possibilities in the 1980s and graduate school admission and financial support. The afternoon consisted of small discussion sessions with students on graduate training in specific fields. The whole group of students and experts then reassembled for a final presentation on life in graduate school. Publication: Etta Falconer, Final Technical Report (1977), 27 pages and appendices. Dr. Etta Falconer, Box 28, Spelman College, Atlanta GA 30314, (404) 681-3643

185 WOMEN IN SCIENCE CAREER WORKSHOP, Wells College, Aurora NY 13026 / National Science Foundation (NSF) / \$10,000 (NSF 90%; Wells 10%) / July 1976-Aug 1977 / Math, Phy, Chem, Bio, Soc, Psy / 13, 14 / 454 F / Role models B / V.

The project advertised the workshop by sending letters and brochures to deans, teachers of math and science, and student organizations at thirty-four colleges in upstate New York. The workshop sought to increase the interest of women in academic study in the natural, physical, and social sciences; to provide information about careers in those fields; and to introduce students in the sciences from different kinds of institutions to each other. The workshop consisted of a keynote speaker and a closing speaker; panels on employment settings, life sciences, physical sciences and mathematics, and social sciences; faculty counseling workshops; and small group discussions

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

with the panelists. The director remarked that many of the students had career information only about medical and health fields before they attended, and that very few of the students had previous contact with working female scientists. Patricia A. Sullivan, Department of Biology, Wells College, Aurora NY 13026, (315)-364-3210

186 WOMEN IN SCIENCE-SCIENCE CAREER WORKSHOP, Christian Brothers College, Memphis TN 38104 / National Science Foundation (NSF) / \$9,310 (NSF 100%) / June 1978-Nov 1979 / Math, Ast, Phy, Chem, Med, Bio, Engr, Agr, Soc, Geol, Psy / 13, 14, 15, 16 / 100 F / Recruit B; Involved 25% B, 10% E; Efforts B; Role models B / V.

This workshop fostered an awareness of the problems inherent in being a woman, wife, and/or mother and pursuing a science career. The workshop provided science instructors and counselors who participated with information on advising women students interested in science. Widespread announcement of the workshop was accomplished through contact with female career counselors and science instructors at each of thirty area colleges who were sent posters and fact sheets. These women were asked to notify potentially interested students, and were themselves encouraged to attend. A prominent woman psychologist and a chemist-patent lawyer, in addition to a local group of women scientists, served as role models. Career interest groups in six broad areas of science led by the local scientists enabled the students to discuss questions concerning their personal and vocational lives. A session led by a career counselor was set up specifically for college science advisors, and an address on "the how to's of finding a job" was offered for those interested. A valuable outcome of the workshop was the contact made with interested women scientists in the Memphis area who can serve as a future resource for continued activity of this nature. Nancy W. Hinds, Dept. of Chemistry, Christian Brothers College, Memphis TN 38104, (901) 278-0100, x204

187 WOMEN IN SCIENCE WORKSHOP, East Tennessee State University, Johnson City TN 37601 / National Science Foundation (NSF) / \$8,000 (NSF 100%) / June 1979-Nov 1979 / Math, Phy, Chem, Bio, Med, Engr, Soc, Psy / 13, 14 / 180 F, 10 M / Recruit B, E; Involved 10% B, 1% D; Role models D / V.

The project identified contact persons at colleges and universities within one hundred miles of Johnson City who recruited students at their institutions. Students at

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

East Tennessee State University with a 3.0 grade average received special letters of invitation. Announcements were made in science classes, handbills were distributed, and releases were sent to local news media. The project staff spoke directly with Black student groups about the workshop. To encourage participation by low income students from out-of-town, free overnight housing was arranged. The session opened on a Friday afternoon with five simultaneous workshops on lifestyles; students could attend up to three of them. A keynote speaker that evening reviewed the status of women in science. The next morning's sessions consisted of four panels on job opportunities (academic, industrial, government, and summer employment) and two panels on planning (one on curricula and one on careers). Each workshop included scientists from different specialties and personal backgrounds, and offered time for questions. Cynthia S. Burnley, Department of Sociology, East Tennessee State University, Johnson City TN 37601, (615) 929-5315

188 WOMEN IN SCIENCE WORKSHOP, Mills College, Oakland CA 94613 / National Science Foundation (NSF) / \$10,000 (NSF 100%) / 1977 / Math, Ast, Phy, Chem, Bio, Med, Engr, Geol / 13, 14 / about 200 F / Involved about 20% Min; Role models B, A / V.

The two-day workshop opened with a keynote speech by a computer scientist, Nancy Martin, who reviewed statistics on women in science and the history of women's accomplishments in science. A panel discussion followed in which women from various disciplines (physics, mechanical engineering, medicine, and mathematics) outlined the nature of a life in science. Two sets of workshops were offered in the afternoon, one on career options in science and technology, and the other in which women scientists summarized their current research (some of them presented demonstrations of their work). In the evening, participants saw Lenore Weitzman's slide-tape show, "Images of Males and Females---" showing the portrayal of the sexes in school textbooks. The next morning was devoted to a third set of workshops on academic requirements for preparation for different science-related careers. The meeting closed with a panel discussion of the challenges of science and technology in the future. Project evaluations suggested that having the session over one evening was beneficial, as participants had a chance to become acquainted with each other, promoting a feeling of group cohesiveness. Costs of the workshop were low because Mills donated staff salaries and meeting place. Publication: "An Intervention Program for Women in Mathematics and Science: An Evaluation," Proceedings of the Conference on the Problem of Math

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

Anxiety, California State University, Fresno CA, May 19-20, 1978, L. Blum, R. Cronkite, L. Dobrofsky, and E. Scott. Dr. Lenore Blum, Department of Mathematics and Computer Science, Mills College, Oakland CA 94613, (415) 632-2700

189 WOMEN IN SCIENCE WORKSHOP, Oberlin College, Oberlin OH 44074 / National Science Foundation (NSF) / \$10,986.21 (NSF 90%; Oberlin 10%) / June 1977-June 1978 / Math, Ast, Phy, Chem, Bio, Engr, Soc, Geol, Psy, Information Science, Health related sciences (other than medicine) / 15, 16 / 209 F / Recruit Min; Involved 5% B, 5% A; Role models B / V.

A letter describing the workshop and inviting participation went to forty-nine institutions within a one hundred mile radius of Oberlin College. A faculty contact person at each of the forty institutions which expressed interest helped recruit participants. To encourage minority enrollment, the brochure cover used a photograph of a Black woman science student, and care was taken to include minority women scientists in sessions. The objectives of the workshop were threefold: (1) to provide women who have recently made the decision to major in science, but who may not yet have made a real career commitment, with information about employment opportunities in industry, government and academia, and the preparation required; (2) to provide these students with constructive information and support concerning the special problems which women may face as career scientists; and (3) to promote the development of improved science career counseling programs for women at participating institutions. The workshop included presentations by experts from diverse specialties and at various stages in their careers, career information booths, and opportunities for informal small group discussions. Follow-up meetings on the Oberlin campus were led by upperclass women who participated in the workshop. Participants from other institutions were urged to undertake similar follow-up activities and to share the results with each other. Workshop leaders remarked that its success stemmed from the format, the quality of the resource people, and the time devoted to planning and coordination. They added that "probably the single most important thing we did was hire an excellent coordinator" and urged others to consider this method. They found that the panel discussion (on "The Balancing Act" between personal and professional lives of women) was especially well received, and it is still being discussed on the campuses. Betty Vetter's\* keynote speech (about one hour) and the panel discussion (an hour and a half) were videotaped and are available at cost. The publications included a transcript of Vetter's speech (available for \$1.00), and Paula L. Goldmid and Anna Ruth Brummet, Final

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

Report: Women in Science Career Workshop, Oberlin College  
(1979, 24 pp.). Dean Paula L. Goldsmid, Cox Admin.  
Building, Oberlin College, Oberlin OH 44070, (216) 775-8410.

\*Betty Vetter, Executive Director, Scientific Manpower  
Commission

190 WOMEN IN SCIENCE WORKSHOP, Pomona College, Claremont  
CA 91711 / National Science Foundation (NSF) / \$4,590  
(NSF 100%; Pomona, staff time) / Oct 22, 1977 / Math, Ast,  
Phy, Chem, Bio, Med, Engr, Soc, Geol / 15, 16 / 125 F /  
Involved 6.3% B, 2.1% N, 10.4% A, 4.2% H / V.

This workshop was intended to educate women about the advantages of careers in science and the prospective and current demand for scientists in various fields. The program involved thirty-five women professionals in small group discussions, and included a panel discussion where scientists presented a variety of approaches to careers, families and womanhood; there was also a lunch with informal discussions by field, lectures on research and a keynote address. Students completed evaluations of the workshop and nineteen returned a follow-up questionnaire six months later. All junior and senior women at eight colleges were invited via science department chairs and direct mail. The director reported that the process of planning and conducting the workshop "helped highlight the plight of women in science on this campus". Since the workshop, he has observed a greater effort to invite women to be departmental guest visitors and lecturers by science department faculty. After the workshop, all science faculty received a copy of the workshop program which included a list of professional women and organizations which should be useful in advising women students. The workshop was beneficial to the women scientists, many of whom expected to continue their associations with other participants. Some students are continuing to communicate with the women they met at the workshop. Dr. L. W. Cohen, Biology Department, Pomona College, Claremont CA 91711, (714) 621-8000

191 WOMEN IN SCIENCE WORKSHOP, Texas Southern University  
(TSU), Houston TX 77004 / National Science Foundation (NSF) /  
\$7,000 (NSF 90%; TSU 10%) / Oct 13-14, 1978 / Math, Ast,  
Phy, Chem, Bio, Med, Engr, Soc, Psy, Communicative  
disorders / 13, 14 / 125 F / Recruit N, B, A, H; Involved  
95% B, 45% E; Efforts B, A, H, E; Role models B, A, H, E /  
V.

This project was designed to introduce a wide cross-section

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

of Houston college women, with particular emphasis on Black female students, to role models in the science fields, as well as to offer information and counseling regarding science careers and career planning. Students were told of the seminar through radio announcements, posters, brochures and flyers, personal contact with faculty, school newspapers, and student government offices at Houston area campuses. Speakers and panelists were chosen to represent a variety of ages, ethnic identities, economic backgrounds, educational qualifications, and work experiences. Literature and displays were available, including a photographic history of Black women in science and other fields. Students found their goals were clarified and their knowledge of science careers enhanced through participation in the workshop. The Planning Committee itself became a support group. The director remarked upon the very great need on the part of Black women for such workshops, since their female role models in the science fields are few and far between. She credited the experience as giving students inspiration to aspire to a career in the science fields as well as practical "how-to's" on obtaining their goals. Racial and sexual discrimination, and methods for coping with each were discussed throughout the session. Videotape: of speeches and panels, four hours. D. Gaye Perry, 1404 Paul Drive, Pearland TX 77581, (714) 482-4377

192 WOMEN IN SCIENCE WORKSHOP, Washington University (WU), St. Louis MO 63130 / National Science Foundation (NSF) / \$6,106.54 (NSF 100%) / July 1977-July 1978 / Math, Phy, Chem, Bio, Engr, Soc, Psy / 13, 14, 15, 16 / 49 F/ Recruit B, E; Involved 10% B, 2% H, 15% E; Role models B, E / V.

The workshop was advertised via news releases and posters, and also by letters and brochures sent to counselors and administrators of colleges and universities within one hundred miles of Washington University. Special contact was made with counselors at schools with high enrollments of minority and economically disadvantaged students. Sessions were designed for freshmen and sophomores, but juniors and seniors were also permitted to attend. The workshop provided information about careers in all scientific fields, encouraged female students to set high goals for themselves, and helped them develop a better understanding of the effects of a career on personal lives. The workshop included presentations by women scientists, group discussions, films, and field trips to work sites. The director noticed that many students, as a result of the workshop, began planning for graduate education and for acquiring scientific work experience during their educational years. Some participants suggested experiment-

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

ing with a "traveling workshop" of this format which went from campus to campus. Publication: Final Technical report to NSF. Dr. Hazel Sprandel, Box 1135, Washington University, St. Louis MO 63130, (314) 889-5970

193 WOMEN IN SCIENCE WORKSHOPS, University of Colorado, Denver CO 80202 / National Science Foundation (NSF) / \$10,000 year, \$20,000 total (NSF 100%) / Sept 1977-Aug 1979 / Math, Ast, Phy, Chem, Bio, Med, Engr, Soc, Geol, Psy / 13, 14 (1977-78), 15, 16 (1978-79) / Recruit N, B, A, H; Involved 1% N, 5% B, 1% A, 2% H; Efforts E; Role models B, A, H / V.

The workshops were advertised through posters, newspaper articles, and brochures distributed in science classes and at registration at Colorado college campuses. In addition, recruitment representatives on each campus discussed the program with counselors and faculty. Minority counseling programs were encouraged to recruit participants as well. The workshops provided information on educational requirements for various science careers, job marketability of different science majors, and graduate school. The sessions also offered role models, a chance for informal interchange with women scientists, and the opportunity to build the self-confidence required to pursue a career in science. To permit participation by low-income students, activities were free and transportation expenses were reimbursed. The project included a "career bazaar" with representatives from industrial, academic, and government research institutions, plus science professors and college counselors. It also sponsored a graduate panel, luncheons during which small groups could discuss science training and careers, and overnight visits with women scientists. One unexpected benefit of the project was that several women scientists got to know each other. The participants felt that personal contact with women scientists, especially in the overnight visit, was the most significant component of the workshops. Publications: Nancy Thoennes, Jana Everett, and Joyce Nielsen, "The Women in Science Workshop as an Enriching Experience," Report to the National Science Foundation (1978, 87 pages), and Jana Everett, "Women in Science: How to Organize a Workshop" (in preparation). Professor Jana Everett, Division of Social Sciences, University of Colorado, Denver CO 80202, (303) 629-2436

194 WOMEN, WHY NOT SCIENCE?, Cabrillo College, Aptos CA 95003 / National Science Foundation (NSF) / \$6,000 (NSF 80%; Cabrillo 20%) / March 1975-July 1976 / Math, Phy, Chem, Bio, Med, Engr, Geol / 13, 14, 15, 16 / 250 F, 10 M / Recruit B, A, H; Involved 1% B, 2% A, 2% H; Role models B / V.

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

This program introduced women students to women scientists in a wide variety of disciplines. Participants were recruited through letters to women's centers and science departments at surrounding colleges. A special effort was made to reach minority women students through a telephone search. Panel discussions, one historical and one practical lecture, and a series of discussion groups provided the students with information and a forum for questions. A small scholarship fund was set up by the women scientists participating in the program which gave \$600 to selected women science students. Sue Nichparenko, Cabrillo College, Aptos CA 95003, (408) 425-6328

195 WORKSHOP IN SCIENCE/ENGINEERING FOR FRESHMEN/SOPHOMORE WOMEN, University of New Mexico (UNM), Albuquerque NM 87131 / National Science Foundation (NSF) / \$13,000 total (NSF 100%) / Sept 1978-Jan 1980 / Math, Phy, Chem, Bio, Engr, Soc, Geol, Psy / 13, 14 / 150 F total / Recruit N, H; Involved 5% N, 29% H; Role models Min / V.

The workshop increased awareness of women's historic role in the sciences. Educated attendees about employment possibilities, gave guidelines for career management, and provided information on financial aid sources. A personal letter was sent to all (approximately 10,000) freshmen/sophomore female students in the state of New Mexico. Radio, television and newspaper announcements, posters and personal visits in classrooms were additional methods of recruiting participants. During the workshop, students received a career packet containing information on various careers and a bibliography of additional resources. The students attended large group meetings, panels and individual speaker sessions, as well as small discussion groups. The most spectacular by-product of the workshop was the formation of the New Mexico Network for Women in Science/Engineering. The Network is a growing organization which plans to conduct conferences for professional women, hold career workshops for female students, and coordinate a visiting scientist program. Final report in preparation. Professor Nancy Martin, 425 Dartmouth NE, Albuquerque NM 87106, (505) 266-0869

196 WORKSHOP ON CAREERS FOR WOMEN IN SCIENCE AND ENGINEERING, San Diego State University (SDSU), San Diego CA 92182 / National Science Foundation (NSF) and local industry / \$12,128 total (NSF 70%; Industry 20%; SDSU 10%) / July 1977-June 1979 / Math, Ast, Phy, Chem, Bio, Engr, Agr, Soc, Geol / 13, 14 / 196 F total / Involved about 15% Min / Role models B, H, Phillipine / V.

COLLEGE: CAREER WORKSHOPS, NSF FUNDED

Students learned about the one-day workshop primarily through brochures handed out at college registration and circulated in the Women's Studies, science, and engineering departments. Information was also distributed to minority studies programs and counselors, and through newspaper articles and radio announcements. The workshop provided inspiration and information about science and engineering to students, especially those not already committed to such a career. The workshop opened with an address on the job market for women in these fields, followed by four panels of women scientists speaking on different technical disciplines (social and behavioral science; engineering; life and medical sciences; and physical and environmental sciences and mathematics). Students had an opportunity during lunch and small group discussions to ask questions of the women scientists. The afternoon was spent in guided tours of science laboratories, counseling sessions on scientific and engineering education and careers, and a closing address on the personal rewards of work in these fields. In addition to evaluation done at the end of the workshop, students received a follow-up questionnaire to complete six months later. Nearly \$1,000 in travel, honoraria, and services were donated by faculty and scientists; in addition, University students, faculty, and administrators provided many services at no charge. Publication. Elyce Rotella and Marilyn Boxer, Final Technical Report: Workshop on Careers for Women in Science and Engineering (June 1979). Elyce Rotella, 1256 Broadway, Somerville MA 02143, (617) 776-7781

## VI. COLLEGE

GRADES 13 - 16\*

ENTRY NUMBERS 197 THROUGH 263

*SEE ALSO ENTRY NUMBERS 001, 003, 008, 010, 013,  
019, 025, 036, 040, 044, 045, 046, 048, 049, 052,  
AND COLLEGE: CAREER WORKSHOPS, NSF FUNDED ENTRIES*

*See also FACULTY EMPLOYEE DEVELOPMENT for faculty  
education programs for this level (entry numbers  
303, 304, 307, 309, 311)*

*\*Projects begin between grades 13-16, but may  
continue into graduate and reentry levels.*

## COLLEGE

197 ACADEMIC INTERNSHIP PROGRAM, Ursuline College, Cleveland OH 44124 / \$200 year / Sept 1973-present / Chem / 15, 16 / 1 or 2 F year, 12 F to date.

Students are chosen from among the chemistry majors at the college. Costs are low because the college covers the salary of the faculty director. The program provides women with the opportunity to relate academic and educational objectives to learning experiences beyond the limits of the classroom. The students develop professional skills and gain on-the-job training by spending one day each week for a semester working in a research group in an industrial, medical, or government laboratory. They are not paid but receive course credit. Most graduates of the program are now employed in industrial laboratories, many at companies where they did internships. Some of their work has been reported in papers at scientific meetings and in a few cases the results have been published. Sister Ann Gertrude Hill, Ursuline College, 2550 Lander Road, Cleveland OH 44124, (216) 449-4200

198 A COMPREHENSIVE MATHEMATICS INSTRUCTIONAL MODEL FOR INCREASING ENTRY OF MINORITY WOMEN INTO SCIENTIFIC AND HEALTH PROFESSIONAL CAREERS, Spelman College, Atlanta GA 30514 / Fund for the Improvement of Postsecondary Education (FIPSE), U.S. Dept. of Education / \$50,000 year, \$92,260 total (FIPSE 80%; Spelman 20%) / Sept 1978-Aug 1980 / Math / 15 / 43 F year, 150 F total / Recruit B; Involved 100% B, 10 D, 50% E; Efforts B; Role models B, E / V.

Spelman students who have declared or are considering majors in science, mathematics and engineering are invited to participate. The general goal of the project is to increase the number of minority women entering mathematics-related careers such as engineering and medicine. The specific objectives are: (1) to develop mathematical competency; (2) to encourage positive attitudes toward mathematics; (3) to reduce mathematics anxiety; (4) to overcome the tendency to avoid mathematics; and (5) to improve the ability to handle quantitative science problems. Students are placed in classes according to their level of achievement in pre-calculus mathematics. Each student participates in an academic component and counseling component. The academic component involves modular instruction with related computer assignments and laboratory sessions employing individualized or small group instruction. Science problems are integrated into the course content. The counseling component focuses on group techniques for reducing mathematics anxiety and creating positive attitudes. The interim evaluation indicated a higher success rate than in comparable classes. Dr. Etta Falconer, Spelman College,

## COLLEGE

Box 28, Atlanta GA 30314, (404) 681-3643

199 A MODEL PROGRAM FOR WOMEN ENTERING ENGINEERING, Purdue University, West Lafayette IN 47907 / Women's Educational Equity Act Program (WEEA), U.S. Department of Education; Purdue / start up costs: \$111,620 (WEEA 100%); continuation costs: \$15,000 year (Purdue 100%) / Sept 1976-Aug 1978 / Engr / 13, 14, 15, 16 / 200 F, 90 M total / Recruit N, B, A, H; Involved 10% B, 1% A, 1% H, 5% E; Efforts N, B, A, H; Role models B / V.

This project developed in the general program described in entry #046, and with a few modifications, the elements of the project are continued in that department at Purdue. The model program created courses (Hands On Laboratory, Women in Engineering Seminar, and Career Planning Sessions) to enhance the participation of first year women in engineering curricula. The courses and their ancillary educational materials were tested comparing women in the course to men in the course, and those in the course to a control group which did not enroll. The evaluation showed that the project closed the gap in technical knowledge between women and men students. The project staff then conducted a workshop on women in engineering for representatives from other engineering schools. The meetings featured the products of their work and also examined other problems and approaches relating to women in engineering. Project staff assembled information on factors which influence the education and careers of women for use in this project and subsequent work. Finally they issued conference papers, journal articles, reports, and audiovisual materials to disseminate information about the project nationwide. Care was taken throughout the project to incorporate the concerns of minority women students. Publications: Blaine Butler and W. LeBold, "Introducing Freshmen to Engineering: A Model Course," Engineering Education 69 (April 1979), 739-742; Butler, LeBold, et al., "An Action Research Proposal to Provide Educational Equity Opportunities for Women in Engineering," paper presented to American Society of Engineering Education conference, Champaign, Illinois, 1977; and project report ("Putting It All Together: A Model Program for Women Entering Engineering," 1978, 36 pages). Dr. William K. LeFold, Freshman Engineering, Purdue University, West Lafayette IN 47907, (317) 749-2594

200 ASSERTIVENESS TRAINING PROGRAM FOR WOMEN IN ENGINEERING AND SCIENCE, Carnegie-Mellon University (CMU), Pittsburgh PA 15213 / CMU College of Engineering and Science; CMU Counseling Center / \$3,000 (CMU 100%) / July 1978-July 1979 / Math, Phy, Chem, Bio, Engr / 13, 14, 15, 16 / 36 F / Recruit Min, E; Involved 5% B, 5% A, 5% E / V.

## COLLEGE

The project introduced assertiveness concepts for women considering careers in the traditionally male-dominated fields of engineering and science. The CMU Counseling Center recruited participants through letters to all female students on campus, phone calls to selected women, and news items in the student newspaper. Mini-lectures and exercises for individuals or groups were used to teach the students effective use of assertive behaviors. Specifically, these exercises included self-assessment, role-playing of situations calling for assertive action, development of scripts to enable women to deal with conflicts assertively, and relaxation training. Results of the project indicate that the female students learned the concepts, showed attitude change, and acted assertively in varying degrees depending on the individual and her initial status in these areas when she entered the program. In a follow-up to the program, participants urged continuation for future students. For future endeavors of this sort, the project directors suggest that it would be valuable to tailor the design of the program specifically for under vs upper class women, as the concerns of these two groups proved very different. Publication in progress: Pamela Weiss and Barbara Hartman Hanusa, *Assertiveness Training Manual for Women in the Sciences and Engineering*. Pamela Weiss, Carnegie-Mellon University, Counseling Center, Schenley Park, Pittsburgh PA 15213, (412) 578-2922

201 BASIC MATH SKILLS AND REDUCING MATH ANXIETY, California State University (CSUF), Fresno CA 93740 / CSUF / \$10,000 (CSUF 100%) / Sept 1975-June 1976 / 13, 14, 15, 16 / 36 F, 3 M / Involved 15% H / V.

The goals of this pilot project, sponsored by the CSUF Women's Studies Program, were twofold: to reduce "math anxiety" and to increase mathematical skills in women students. Methods used to achieve these goals included tutoring in mathematics, basic skills instruction, assertiveness training, effective studying and test-taking techniques, and relaxation training. The project was advertised in the college catalogue and special brochures, and was held as a regular elected semester-long class meeting twice weekly. Students tested at the beginning of the semester and again at the end showed increased mathematical skills as measured by the McGraw-Hill Math Skills Test. Beginning as a pilot project, the program was continued, enrolling between twenty-five to forty students each semester with fifteen to twenty-five percent male students. Publication: K.H. Brooks et al., Basic Mathematical Skills and Reducing Math Anxiety in Women Students. Darlys Alford or Beth Newell, California State University at Fresno, Women's Studies, Fresno CA 93740, (209) 487-9011

## COLLEGE

202 CAREER EXTERNSHIP PROGRAM, Trinity College, Burlington VT 05401 / \$150 year (Trinity 100%) / 1976-present / Math, Chem, Bio, Soc, Humanities and Arts / 13, 14, 15, 16 / about 7 F year, 22 F to date.

Students are recruited through a brochure distributed campus-wide; the alumnae who take on interns are found through mailings of the brochures and the efforts of the Alumnae Office. The Externships give students a chance to learn more about careers which interest them, and to test the work before they commit themselves fully to them. During the winter break (circa December 21 - January 21), students work "on the job" with an alumna at her place of employment. Students find they can plan their college curriculum more methodically as a result of their Externship experiences. Although students in all majors may apply, care is taken to match science and mathematics majors with alumnae whose jobs are directly related to those fields. Costs are low because alumnae donate their time, and the administrative expenses are absorbed in the Career Office general budget. Enzo Rebula, Career Office, Trinity College, Burlington VT 05401, (802) 658-0357

203 CAREER LUNCHEONS, Trinity College, Burlington VT 05401 / \$10 year (Trinity 100%) / 1978-present / Math, Chem, Bio / 14, 15, 16 / 10 F year.

Students are recruited through campus bulletin boards and by Trinity science teachers; the women scientists work in the greater Burlington area. The luncheons provide students with the opportunity to talk in a relaxed setting with professional role models who can give insight into career possibilities for women in science and who can encourage them to persist in their educational and job aspirations. Costs are low because speakers donate their time and because the College administers the program as part of its general career office activities. Enzo Rebula, Career Office, Trinity College, Burlington VT 05401, (802) 658-0357

204 CAREER PLANNING PROGRAM, Women Geoscientists Committee of American Geological Institute, Falls Church VA 22041 / University of Delaware (UD) / \$300 (UD 100%) / Jan 1976-present / Geol / 13 through graduate, faculty-employee development / 3,000-5,000 F and M to date / Role models B.

This program is intended to provide information on career options in the earth science fields and to encourage and assist with career planning by undergraduate and graduate

## COLLEGE

women scientists. A slide presentation shows professional women geologists who have successful careers and who are making significant contributions to the profession. It also presents information about education, including student research participation and field work, history of women in geology, employment of women in research settings, government employment, opportunities in industry, and jobs in service industries. A collection of suggestions from women geoscientists and general advice to students conclude the slide show. It can be mailed (on loan) and presented by anyone with sufficient background in earth science to answer questions or lead a discussion following the presentation. Users are encouraged to adapt the program to each audience and to make suggestions for improvement in the basic program. The time of individuals who prepared, presented and distributed the program was donated as were duplication and mailing costs incurred by other organizations. (The co figure of \$500 is only for mailing by the Committee.) The stimulation of discussion among students and between students and professionals of both sexes following presentations has been an unexpected benefit. Availability of the program has been publicized through the Women Geoscientists Committee Newsletter, an exhibit at the Geological Society of America's national convention in 1978, and notices in Geotimes and other publications. Women Geoscientists Committee, American Geological Institute, 5202 Leesburg Pike, Falls Church VA 22041, (703) 379-2480

205 CATALYST '77, Michigan State University (MSU), East Lansing MI 48824 / Industrial sponsors / \$6,000 (Industrial sponsors 80%; MSU 20%) / April 20, 1977-May 2, 1977 / Engr / 13, 14, 15, 16 / 150 : / Involved 2% N, 3% B, 2% A / V.

This program for women engineering students (primarily freshmen and sophomores) had two components--a one-day workshop held at MSU, and an optional "Day on-the-Job" for thirty-six students sponsored by eleven corporations at area locations. Workshop goals were to provide information about engineering courses, to break down stereotypes surrounding engineering, to identify and discuss issues related to the professional woman engineer, and to identify and provide support resources for women in engineering and women investigating the field. Women students who attended the workshop could choose to participate in the "Day on-the-Job" session, the goals of which were to acquaint the student with the day-to-day responsibilities of an engineer; the facilities, products, and corporate structure of a particular company; a type of industry which employs engineers; and possible careers in

## COLLEGE

engineering. Program information was mailed to counselors, faculty members and administrators at two- and four-year post-secondary institutions within a one hundred mile radius of MSU. Other recruitment efforts included poster displays and personal contact with counselors and science faculty at MSU. During the workshop, eight engineers and career specialists from industry, government and academe served as discussion leaders, speakers and resource persons for the students. Following the program, participants reported that the most appealing aspect was the support nature of the workshop. Wendy L. Baker, 156 Engineering Building, Michigan State University, East Lansing MI 48824, (517) 355-5165

206 CERTIFICATE PROGRAM IN SCIENCE MANAGEMENT, Douglass College, Rutgers University, New Brunswick NJ 08903 / William H. Donner Foundation / \$51,200 total (Donner Foundation 100%) / Sept 1979-present / Math, Chem, Bio, Psy, Home economics / 15, 16 / 34 F in first two years, expect 20 F each year thereafter / Role models B.

The project produces women graduates with a major in science and additional management training as part of the regular Douglass baccalaureate sequence. Students may major in biology, chemistry, psychology, mathematics, or home economics. The program consists of the requirements of the major and courses in economics, accounting, management, technical writing, and psychology. A non-salaried internship provides on-site experience under the supervision of a faculty member, and consists of two days each week for a semester in a science-based industry plus regular seminars. The program is publicized through campus news agencies, science department faculty, student peer group counseling groups, and the college counseling services (career, psychological, and academic advising offices). John Aiello, Psychology Department, Douglass College, Rutgers University, New Brunswick NJ 08903, (201) 932-9592

207 CHEMICAL TECHNOLOGY PROGRAM, St. Louis Community College at Florissant Valley, Ferguson MO 63135 / \$1,800 per student (student tuition 55%; state support 35%; local support 55%) / 1972-present / Chem / 15, 14 / 46 F, 53 M (1972-78) / Recruit B, E; Involved 25% B, 50% E; Efforts B; Role models B, A, E / V.

This program trains and places chemical technicians. A special effort is made to recruit women by visiting women's groups to outline the program and the attractive employment prospects in this field. Scholarships and part-time employment (usually related to chemical technology) are

## COLLEGE

offered. The program consists of a sequence of courses leading to an Associate Arts degree, normally within two years. The program uses instructional materials developed by the American Chemical Society which portray women as well as men at work in the classroom and in industry. Approximately ninety-five percent of the graduates receive jobs directly related to their training in the program. Jack Ballinger, 3400 Pershall Road, St. Louis Community College, Ferguson MO 63135, (314) 595-4535

208 CONFERENCE FOR UNDERGRADUATE WOMEN PHYSICISTS, Knox College, Galesburg IL 61401 / Sloan Foundation / \$500 / Nov 14-15, 1969 / Phy / 13, 14 / 28 F.

This conference was conducted to allow female physics majors to share experiences and exchange information. Participants were recruited through mailings to local colleges and universities. D. Wayne Green, Knox College, Galesburg IL 61401, (309) 343-0112

209 DEALING WITH MATH ANXIETY--A PROGRAM FOR WOMEN, Spring Garden College (SGC), Philadelphia PA 19118 / \$1,500 (SGC 100%) / Oct 1978 / Math / 13 through graduate / 25 F / Involved 16% B / V.

The goals of this four-week program were to enable women to study college mathematics with a prior knowledge of what such study involves; to enable them to handle or reduce anxiety caused by involvement in mathematics; to dispel the stereotype that women are "unmathematical"; and to inculcate a "can-do" attitude concerning mathematics. Participants explored possible causes of their math fear and avoidance. They were given a list of techniques describing the process of learning math and a list of practical hints on ways to make the learning process easier. The techniques were explored using basic mathematical concepts. The director reported that participants were quite eager and pleased with the results. She commented that "the idea of math as a social experience was fully realized in the workshop." She noted that some women wanted reassurance that their methods of doing math were correct and others wanted a refresher. For this reason the director advises that programs of this kind "start with very basic ideas." Brochures mailed to community organizations and excellent coverage by local papers generated a response sufficient to fill the class. Dr. Ellen Hetland Fenwick, Department of Math/Physics, Spring Garden College, 102 East Mermaid Lane, Chestnut Hill PA 19118, (215) CH2-3700

## COLLEGE

210 DUAL DEGREE ENGINEERING PROGRAM, St. Joseph College (SJC), West Hartford CT 06116 and George Washington University (GWU), Washington DC 20052 / tuition fees; overhead costs donated by SJC and GWU / May 1979-present / Math, Phy, Chem, Bio, Med, Engr, Geol / 13, 14, 15, 16 / 2 F (1979) / Recruit E; Efforts B, A, H, D, E; Role models A / V.

Students are recruited through extensive on-campus advertising at SJC and via contact with counselors, faculty, and administrators who might notice eligible women. To insure access by minority and economically disadvantaged women, the program has established special scholarships, the funds for which were raised among SJC alumnae and friends. The dual degree program offers engineering as an educational and career option to students at this women's college as part of a general interest in seeing more women entering non-traditional fields. Three years at SJC in liberal arts and two years at GWU in engineering result in two bachelor's degrees for the participants. One advantage the directors see is that more scientific theory and more liberal arts can be obtained by enrollees than in a standard four year engineering curriculum. They discovered that two freshmen were so eager to enroll that they had inquired about the program even before the official announcement and publicity campaign. The project directors also remark that "many small women's colleges, especially those under religious auspices, emphasize and receive largest enrollments in 'traditional women's fields', e.g., teaching, nursing. There is a great need for leadership from women's colleges, especially those with religious affiliations, to encourage, prepare and inspire women to use their talents in any profession for which they are suited." Chairman of the Mathematics Department, St. Joseph College, West Hartford CT 06117, (203) 232-4571, x285

211 DUAL DEGREE PROGRAM IN ENGINEERING, Saint Mary's College-University of Notre Dame, Notre Dame IN 46556 / Student tuition fees, St. Mary's and Notre Dame (\$2,000 per student per year) (Student fees 80%; St. Mary's and Notre Dame 20%) / Sept 1977-present / Math, Phy, Chem, Engr / 13, 14, 15, 16 / 8 F (in 1979) / Involved 10% H; Efforts E.

The program enables those who wish to attend a liberal arts college for women to pursue an engineering degree in addition to their degree in humanities or the sciences. The curriculum, which dovetails two distinct programs, one in liberal arts and the other in engineering, are offered on two separate but nearby campuses. Advisors at both schools guide the students through academic

## COLLEGE

choices. Scholarships are offered to encourage enrollment by needy students. Applicants to Saint Mary's College who express an interest in engineering on their application are sent brochures describing the dual degree program. According to program leaders, "women who attend a women's liberal arts college have an opportunity to develop intellectually and socially without competing with men for leadership and pre-professional experiences. They are taken seriously as persons with ability and potential. By the time these young women enter seriously into the male-dominated engineering program (third year) they have considerable self assurance which comes from their competence in science and mathematics, their training in analytic thinking and their skills of writing and oral expression." Administrative costs of the program are donated by Saint Mary's and the University. Miriam P. Cooney, Saint Mary's College, Notre Dame IN 46552, (219) 284-4022

212 DUAL DEGREE PROGRAMS IN LIBERAL ARTS AND ENGINEERING, Smith College, Northampton MA 01065 and University of Massachusetts (U. Mass), Amherst MA 01003 / GE Foundation, Raytheon, RCA, Shell Foundation / \$7,500 year (foundations & corporations 100%; Smith and U. Mass--staff time) / Sept 1976 (BA-BS program), Sept 1978 (BA-MS program)-present / Math, Phy, Chem, Bio, Engr, Soc, Geol / 13, 14, 15, 16, masters / 38 F to date / Involved 5% B, 5% A, 5% H, 5% E; Efforts E.

These dual degree programs are intended to provide women with both the humanistic awareness and the technological and scientific expertise necessary for careers in professional engineering. Participants are recruited through a series of talks and panel discussions on the role of technology in today's world, the types of jobs and future opportunities in engineering, and "the woman as a professional person." Students in these programs major at Smith in a field of science (usually), and at U. Mass in some field of engineering. Engineering study begins the second year. For three years, students take a balance of liberal arts and engineering courses. During the fifth year, they focus on engineering. One program results in the award of the Smith A.B. and the U. Mass M.S. The A.B./M.S. program allows the student to focus more on one of the specialties within engineering. Interest in engineering among Smith students has grown significantly over the past three years. Of 500 freshmen in the class that entered in 1979, more than twelve expressed interest in the major. One of the grants which support the program was for an economically disadvantaged student on financial aid. Professor Elizabeth Ivey,

## COLLEGE

Department of Physics, Smith College, Northampton MA  
01063, (413) 584-2700, x426

213 EDUCATING WOMEN FOR SCIENCE: A CONTINUOUS SPECTRUM, Mills College, Oakland CA 94605; Stanford University / Danforth Foundation / \$2,500 (Danforth Foundation 100%) / April 1976 / Math, Phy, Chem, Bio, Med, Engr / 15 through graduate, faculty-employee development / 400 F, 5 M / Involved 5% B, 5% A; Role models B / V.

The conference was intended to increase the number of women majoring in mathematics and science in San Francisco Bay Area colleges and universities. Personal invitations were sent to women through liaison faculty in each college. The conference program included a keynote address, a series of seven career profiles of women in diverse fields followed by a question period, and discussion groups on a wide range of topics. "Cooperative Programs in Engineering," "Pre-college Preparation for Math and Science Graduates," and "Admission and Attrition of Women in the Sciences" are examples of the topics addressed in the small groups. The conference helped to strengthen the regional network of women in science and math and generated ideas for additional projects which have subsequently been funded (see entries #008 and 021 for description of these). Jean H. Fetter, Building 10, Stanford University, Stanford CA 94305, (415) 497-2444

214 ENGINEERING STUDENT AFFIRMATIVE ACTION PROGRAM, California State University-Los Angeles (CSU-LA), Los Angeles CA 90032 / Private industry / \$5,000 year (Private industry 80%; CSU-LA 20%) / Sept 1978-present / Engr / 13, 14, 15, 16 / 125 F to date (estimated).

The goal of this on-going program is to increase the retention rates of female engineering students. A professional, hired by the program, is available to work individually with engineering students. The program works in cooperation with the student chapter of the Society of Women Engineers. Joel Nosscoff, Special Programs Coordinator, School of Engineering, California State University-Los Angeles CA 90032, (213) 224-3550

215 ENGINEERING WITHOUT FEAR, San Francisco State University (SFSU), San Francisco CA 94132 / Society of Women Engineers (SWE) / \$2,000 (SFSU 90%; SWE 10%) / Sept 1979-Dec 1979 / Engr / 13, 14, 15, 16 / 8 F / Recruit N, B, A, H, D, E; Involved 25% A; Role models A.

## COLLEGE

The project introduced women students to engineering, gave them hands-on laboratory experience, exposed them to role models in a variety of jobs, and discussed basic engineering concepts. Participants were recruited by flyers distributed throughout the campus. Besides attending a one hour lecture per week, the students spent four hours a week in the laboratory, learning drafting, taking apart engines and electric motors, building radios from kits, and experimenting with the use of computers. They also toured a nearby United Airlines maintenance shop and a Pacific Gas and Electric generating plant. Costs were low due to donated materials. The course was conducted in the Women's Studies program at the University, and students received grades and academic credit. Katharine Ku, Patent and Copyright Affairs, Sponsored Projects Office, Stanford University, Stanford CA 94305, (415) 497-3639

216 ENLARGING THE CAREER ASPIRATIONS OF WOMEN STUDENTS BY ALLEVIATING MATH AND SCIENCE ANXIETY, Western Michigan University (WMU), Kalamazoo MI 49008 / Office of Instructional Development, WMU / \$300 (Office of Instructional Development 100%) / Oct 1977-Dec 1977 / Math, Soc, Psy / 15, 14, 15, 16 / 20 F / V.

This six-week workshop ran concurrently with a course in the humanities (Women: Past, Present, and Future) at WMU; two-thirds of the students enrolled in that course elected to take the workshop as well. The instructor donated her time to minimize costs. The project provided math experiences in basic concepts, metrics, computer science and graphing; introduced the students to successful role models from non-traditional occupations who demonstrated the relevance of math and science to their careers; and counseled the students and built up their self-confidence in handling technical subjects. The workshop used informal seminars, discussions in class, homework exercises, "hands-on" sessions with computers, demonstrations of graphing, and a short film. Publication: Gilda Greenbrugh, "Enlarging the Career Aspirations of Women Students by Alleviating Math and Science Anxiety", paper presented to the Great Lakes Women's Studies Association Meeting, Chicago, Illinois, January, 1978, 11 pages; available from ERIC-Higher Education, ED 157417 - December 1978. Dr. Gilda Greenberg, 209 Moore Hall, Western Michigan University, Kalamazoo MI 49008, (616) 385-1845

217 EXPERIMENTAL PROJECT ON THE PHYSICS EDUCATION OF WOMEN, University of Oklahoma, Norman OK 73069 / National Science Foundation (NSF) / \$16,000 year, \$325,000 total (NSF 75%; Univ. of OK 25%) / Jan 1971-Sept 1978 / Phy / 15, 14, 15, 16 /

## COLLEGE

12 F, 10 M year; 86 F, 73 M (1971-73 women only; thereafter, open to men and women) / Involved 5% Min.

The project was designed to interest more women in pursuing careers in physics and related fields. It published press releases and advertised via brochures and posters, but the leaders attributed most of its ability to recruit students to the availability of scholarships. The project consisted of extensive laboratory work (including a very popular six week machine shop course), lectures complemented by a textbook, academic and personal counseling, and informal seminars and social events with visiting women scientists. A consulting clinical psychologist oversaw program evaluation, provided individual and group counseling, and served as a "bridge" between the physics faculty and students for conveying suggestions for improvement in the program. The first year students were divided into calculus and non-calculus groups to tailor the instruction for their mathematics backgrounds. One three hour lab session a week was devoted to experiments, and a second three hour unit each week centered on problem solving and "help sessions". When the program admitted only women (during its first three years), the project leaders noted greater ease in recruiting and retaining women students than when men were merged into the program. While the women students didn't want or need academically watered-down classes, they did enjoy group solidarity and the feeling of being part of a special and unique experiment. Films: "Women in Physics", 12 minutes (1975), and "Women in Physics at Work", 12 minutes (1978). Publication: Betty L. Pollack and Lee K. Little, "Experimental Project in Physics Education or New Avenues for Women", Physics Teacher 11 (October 1973), 391-399. Betty L. Atkinson, 1419 Greenbriar Drive, Norman OK 73069, (405) 321-0155

218 INCREASING WOMEN IN SCIENCE THROUGH RESHAPING ROLE PERCEPTION, Mary Baldwin College, Staunton VA 24401; Hollins College, Sweet Briar College, Randolph-Macon Woman's College / National Science Foundation (NSF) / \$99,682 total (NSF 100%) / July 1975-Feb 1977 / Math, Ast, Phy, Chem, Bio, Med, Engr, Soc, Geol, Psy / 15, 14, 15, 16 / 800 F total / Involved 1% N, 1% E; Role models D / V.

The students in this project were enrolled at four women's liberal arts colleges in the South. The project tested the effectiveness of various strategies to increase their interest in science careers, to provide them with direct experience in scientific work, and to offer science career information. The project devised videotaped interviews with women scientists as role models, conducted career seminars on a variety of topics (including medical fields,

## COLLEGE

government science jobs, opportunities in behavioral sciences and environmental sciences, and careers in industry), arranged externships at scientific workplaces during inter-session and summer periods, and ran a weekend counseling workshop. The women scientists who took part in these activities represented several workplaces, many lifestyles, and a wide range of scientific disciplines. Recruitment techniques varied with each effort - the videotapes, for example, were shown in science classes, while the seminars were advertised through news releases, flyers, written invitations, and posters. Publication: Donald Thompson and Hinda Levin, Increasing Women in Science Through Reshaping Role Perception (Staunton, Virginia: Mary Baldwin College, 1977), 95 pp. plus appendices. Dr. Donald Thompson, Professor of Psychology, Mary Baldwin College, Staunton VA 24401, (703) 885-0811

219 INTEGRATED PROGRAM TO DEVELOP CAPABILITY IN APPLYING MATHEMATICAL AND ANALYTIC PROCEDURES, St. Joseph College, West Hartford CT 06117 / National Science Foundation (NSF) / \$57,200 total (NSF 66%; St. Joseph 34%) / May 1978-Nov 1980 / Math, Phy, Chem, Bio, Soc, Psy / 15, 14, 15, 16, faculty-employee development / 115 F, 5 M year / Involved 2% B, 2% A, 1% H, 2% D, 2% Role models A / V.

The program introduced selected faculty and students to computer programming and its uses. They learn mathematical, analytical, and data processing techniques; practice the use and interpretation of quantitative data in the social sciences; apply the skills to policy- and decision-making problems (including nuclear energy); and integrate their knowledge into natural and social science courses. The project has established a computer facility at the College, developed instructional units, and upgraded the campus radiation laboratory. There are two special benefits for women: the students have a chance to conduct a summer research project as part of the program, and the project has created special software for remedial mathematics for those poorly prepared before entering college. Chairman, Department of Mathematics, St. Joseph College, West Hartford CT 06117, (203) 232-4571

220 INTERFACING A MICROCOMPUTER WITH INSTRUMENTS IN THE CHEMISTRY LABORATORY, Westminster College (WC), New Wilmington PA 16142 / National Science Foundation (NSF) / \$15,000 year, \$26,000 total (NSF 47%; WC 53%) / June 1978-June 1980 / Chem / 14, 15 / 2 F year, 1 F total / V.

Although this project did not start out to focus on training women, the director discovered that "their willingness to

## COLLEGE

pursue education and sacrifice some money led to their staffing the project." Initially men had expressed interest, but then decided to devote their summer to earning money in jobs which paid higher stipends than the project, regardless of the job's relevance to their scientific training. "Intensive cooperation between the teacher and the women quickly removed reservations the women had about working with computers, and they proved reliable, imaginative, and delightful" as collaborators. The director chose the students after interviews among chemistry and physics majors at the college. The program sought to create instructional materials which introduce students to interfacing a computer to laboratory instruments, particularly for upper-level laboratory work, and to provide the students on the project with intensive experience in hardware and software essential for the interfacing. The project involved seminars on interfacing, collaboration between the director and students on solving practical problems of the project, and assuming responsibility for hardware and software synthesis. Publication: in preparation. Robert P. DeSieno, Chemistry Department, Westminster College, New Wilmington PA 16142, (412) 946-8761

221 LEARNING MATH WITH CONFIDENCE (also titled WOMEN IN NON TRADITIONAL CAREERS: THE MATH CONNECTION or WOMEN AND MATHEMATICS: MEETING THE CHALLENGE), University of California (UCSB), Santa Barbara CA 93106; UCSB Women's Center and Mathematics Department / UCSB Women's Center / \$400 year (Women's Center 100%) / Sept 1978-June 1980 / Attitudes toward Math, Engr / 13 through graduate, continuing-adult education / 45 F, 5 M year / Recruit N, B, A, H; Involved 5% B, 2% A, 10% H; Role models E / V.

This program helped women uncover causes of their mathematics anxiety and learn practical steps to regain confidence. Study techniques were taught and participants were helped to set up plans of action. In a four to six hour workshop (held three times per year) participants were given a presentation of theory about "what situations facilitate learning." They explored mathematics equipment (C-Rods, A-blocks, geoboard, etc.), and had a discussion and question-answer period with a mathematics teacher. From the review of individual experiences, most participants discovered where their problems with math began and concluded that "it wasn't their fault" and that "they have no innate deficiency," reports the director. She commented that several women had reported that their grades and self-confidence in math classes had improved, and two who had graduated in other fields went on to become scientists. She observed that most women who were interviewed who liked math had had female or male role models who encouraged them.

## COLLEGE

Recruitment efforts included flyers sent to campus groups and local schools, quarterly program announcements, public information releases to local media, and personal encouragement of Chicano participation through a liaison with Chicano groups. Theresa Weissglass, 4420 Meadowlark Lane, Santa Barbara CA 93105, (805) 964-4956

222 MASTERY LEARNING IN ORGANIC CHEMISTRY AND BIOCHEMISTRY, Cuyahoga Community College-Western Campus, Parma OH 44134 / National Science Foundation (NSF) / \$28,700 total (NSF 66.7%; Cuyahoga 55.5%) / Sept 1977-June 1980 / Chem, Med / 15, continuing-adult education / 240 F, 10 M year ; 720 F, 50 M total / Involved 5% B, 25 A, 15 D.

Students were enrolled the first year of in-hospital nursing training programs, or were registered nurses taking additional chemistry before transferring to a four-year B.S. program. They learned of the course through the college catalog and word-of-mouth. The project was designed to reduce their anxiety about, and distaste for, the traditional lecture-style chemistry course. The student learned one unit of material at a time; upon passing a test on it with a B or better grade, she moved to the next unit. The instruction was thus self-paced, but students met at a regularly scheduled class time. The teaching method was more time consuming in a traditional class structure, but compared to previous years under the old system attrition dropped considerably and interest in chemistry increased markedly. Students saw the instructor as a helpmate rather than a taskmaster. Paper presented (abstract published): E. Laughlin, "Mastery Learning in Organic Chemistry and Biochemistry," at the International Conference on Chemical Education at Dublin, Ireland, August 1979. Publication: E. Laughlin, Mastery Units in Organic Chemistry and Biochemistry (Minneapolis: Burgess, 1979). Professor Ethelreda Laughlin, Cuyahoga Community College, 11000 Pleasant Valley Road, Parma OH 44134, (216) 845-4000

223 MATH APPRECIATION, Wheaton College, Norton MA 02766 / Wheaton / \$250 (Wheaton 100%) / Feb 1977-March 1977 / Math / 15 / 5 F total / Involved 50% E / V.

The project demonstrated the usefulness of a course which helped students overcome math anxiety, by teaching each student that she was capable of understanding and doing mathematics. The project also outlined the relevance of math to many diverse majors and to life in general. Students were chosen through interviews of fifteen Wheaton freshmen selected at random; those who were complete mathophobes or who were taking (or planning to take) math were excluded from the final group to insure that the course worked only

## COLLEGE

with the math anxious. The group met in a conference room, not a classroom, and discussions were kept informal. Major emphasis was placed on reading and interpreting graphs drawn from daily newspapers, textbooks in various fields, and the Law School Aptitude Tests to keep the course relevant to the students' other educational experiences. Two women spoke about the importance of math to their research in ostensibly non-mathematical fields. The students found the course useful in economics and psychology courses they were taking. One student went on to complete a year of calculus. Student reaction being so positive, the Department of Mathematics set up a course on "Understanding Mathematics" thereafter. The project director stressed the importance of an informal, relaxed atmosphere for such courses, and the desirability of equipping students with skills, the mastery of which helped them in other fields and built up their self-confidence. Katherine Gilbert, Department of Chemistry, Wheaton College, Norton MA 02766, (617) 285-7722, x416

224 MATH ANXIETY COURSE, University of North Dakota, Grand Forks ND 58202 / Student fees \$15 each / Fees 100% / Jan 1979-April 1979 / Math/ 15 through graduate, continuing-adult education / 20 F / Involved 5% E.

This course began in the Women's Program at the University, rather than the Mathematics Department, and was taught by Dr. Jan Vanderver, an instructor at Moorhead State University in Fargo, who commuted weekly to Grand Forks to lead the session. Participants were recruited through the Women's Program newsletter, flyers distributed on the campus, radio announcements and local newspaper stories, and personal contact with University faculty. The course dealt with emotional anxiety brought on by the prospect of studying mathematics, and started students working on basic math concepts. Costs were kept low because the instructor donated her time; the Women's Program covered the student recruitment effort from its general budget. Linda Volz, Women's Programs, Box 51, University of North Dakota, Grand Forks ND 58202, (701) 781-4500

225 MATH ANXIETY PROJECT, Wesleyan University (W.U.), Middletown CT 06457 / Fund for the Improvement of Post-secondary Education (FIPSE), U.S. Dept. of Education, and W.U. / \$75,000 from FIPSE (start up costs, 1976-1979); \$15,000 year from Wesleyan (1980-- , continuation costs) / 1976-present / Math, Psy / 15, 14, 15, 16 / about 50 F year, about 10 M year / Involved 10% M; Role models B (as tutors) / V.

## COLLEGE

During the start up phase, the program developed reentry mathematics courses (algebra and pre-calculus) for students with inadequate math backgrounds. Through campus-wide publicity the clinic raised awareness of the concept of the mathematics filter and the problems associated with math anxiety. Students enrolled in the clinic courses could choose to work also with a counselor who used psychological methods to alleviate attitudinal problems, which might prevent students from succeeding in learning math. After the start up phase, the Mathematics Department integrated the courses into the regular mathematics sequence. At present, the Mathematics Department offers courses in Pre-Calculus and Discrete Mathematics, and also Algebra and Graphing Review for fractional credit. The clinic now offers individualized math tutoring for students as well as individualized counseling. The Director of the clinic (R.A. Rosenbaum) and the Coordinator-Counselor (B. Donady) have helped to organize a state-wide network of individuals concerned with the improvement of mathematics learning in Connecticut. Bonnie Donady, Math Clinic, 547 Science Tower, Wesleyan University, Middletown CT 06457, (203) 347-9411

226 MATH WITHOUT FEAR, San Francisco State University (SFSU), San Francisco CA 94132 / Chancellor's Fund for Innovation of the California State University System and San Francisco State University / \$40,000 for start up--Chancellor's Fund 100%; \$500 and salaries for annual continuation--SFSU 100% / Jan 1975-present / Math / 13 through graduate / 200 F, 65 M year; 400 F, 130 M to date / Recruit N, B, A, H, E; Involved 6% N, 34% B, 6% A, 10% H, 1% D, 20% E / V.

The course (offered for credit) is advertised through flyers and inclusion in the University bulletin. To attract minority students, the course is also advertised in the Ethnic Studies Program of the University, and a special section of Math Without Fear is offered there. The class prepares students to succeed in subsequent math encounters, builds their confidence in their math ability, and increases their interest in and enjoyment of math. The course employs concrete examples and materials, games and puzzles, guessing and use of patterns, work in small groups on problems, and a supportive environment. Students have access to a "math lab" with microcomputers, tutors, and puzzles and games. Students are encouraged to discuss homework with each other (a directory of enrollees' phone numbers is provided). Faculty of the separate sections meet frequently to share experiences and check progress. Ninety percent of Math Without Fear graduates with overall grades of C or better succeed in their next math course. After initial support from the Chancellor's Fund for set-up and

## COLLEGE

research costs, the University agreed to fund instruction as part of its regular academic budget. Several other colleges and universities are experimenting with Math Without Fear methods. The project leaders may start Statistics Without Fear and Computers Without Fear courses if funding is located. Publications: Diane Resek, Final Report to the Chancellor's Fund, 1978, 33 pages; and a brochure explaining how to create a Math Without Fear course. Diane Resek, Math Department, San Francisco State University, 1600 Holloway, San Francisco CA 94132, (415) 469-2071

227 MINORITY WOMEN IN MANAGEMENT, Polytechnic Institute of New York (PIN), Brooklyn NY 11201 / U.S. Dept. of Education, Fund for the Improvement of Postsecondary Education (FIPSE), and PIN / \$81,000-first year; \$92,000-second year (FIPSE 52.5%; PIN 47.5%) / Sept 1978-Aug 1980 / Soc, Management / 13 through Masters, continuing-adult education / 33 F / Recruit E; Involved 70% B, 30% H, 100% E; Efforts Min; Role models B, H / V.

This program awarded a B.S. degree in Social Science and an M.S. degree in Management to talented minority women recruited from the two-year community colleges in the City University system. The program sought to increase the number of minority women in management by enabling those with excellent academic records to continue beyond the two-year college and attain advanced degrees. Participants entered the program after completion of business and commerce programs and received extensive counseling, as well as financial aid and remediation in mathematics, if needed. A summer mathematics program for participants and year-round tutoring in math and computer science was offered. High level minority and/or women managers in New York City corporations serve as role models for women in the program and comprise an advisory board. Advisory board members also assist with placement of graduates. In addition to recruitment through faculty and counselors at the community colleges, posters, brochures, and television announcements have been used to publicize the program. Several conferences on career opportunities for minority women in management have also been held. Overhead costs on this project were shared by FIPSE and the Institute. Dr. Pam Kramer, Program Director. Polytechnic Institute, 333 Jay Street, Brooklyn NY 11201, (212) 643-3943

228 MODEL PROGRAMS TO REDUCE MATHEMATICAL ANXIETY AND ENCOURAGE STUDENTS TO ENTER MATHEMATICS COURSES AND MATHEMATICS RELATED CAREERS, Wellesley College, Wellesley MA 02181 / Alfred P. Sloan Foundation (1975-76); Fund for

## COLLEGE

the Improvement of Postsecondary Education, U.S. Department of Education (1976-79) / \$119,510 total (funding agencies 50%; Wellesley 50%) / Sept 1975-July 1979 / Math / 13, 14, 15, 16, continuing-adult education / 30 F year average, 120 F total / Involved 10% B / V.

The participants in the program were Wellesley students (including reentry women); they learned about the project through letters to incoming students, articles in the campus newspaper, publicity from the Dean's office, and material posted in dormitories. The program consisted of three special courses. A Discovery Course in Mathematics and Its Application encouraged women who had not planned to take mathematics in college to broaden their career and educational options by acquiring mathematics skills needed for a variety of fields. A non-credit course on Preparation for Professional Examinations (four weeks) gave seniors skills and practice for the mathematics-related parts of standardized tests. The course of Preparation for Calculus (also four weeks) provided a short review for those who need it before entering the regular calculus courses at the College. The courses used student tutors, discussion group formats, group homework exercises, stress-free classes, and other educational innovations rather than the traditional lecture format which many students found forbidding. Care was taken throughout the classes to deal with feelings of mathematics anxiety which arose from previous bad experiences with mathematics or from sex-role socialization. The instructors developed special syllabi and accompanying materials for use in the courses. The two Preparation courses fulfilled their intended function, judging by student feedback. The Discovery course led many students to change their majors to fields which require mathematical knowledge, a switch they could not have made previous to taking the course. About a third of the Discovery students took calculus later, and many of the other two-thirds took mathematics-related courses such as statistics. Videotapes: 70 minutes each, of 1976 and 1977 Discovery classes. Publication: the curricular materials, "A Discovery Course..." by Alan Suchat, Judith Wason, et al., 65 pages. Professor Alice T. Schafer, Department of Mathematics, Wellesley College, Wellesley MA 02181, (617) 235-0320, x550

229 NEW CAREER OPPORTUNITIES FOR WOMEN, Denison University, Granville OH 43023 / The Andrew W. Mellon Foundation / \$44,000 year, \$132,000 total (Mellon 100%) / July 1978-July 1981 / Math, Ast, Phy, Chem, Bio, Med, Engr, Soc, Geol, Psy / 13, 14, 15, 16, faculty-employee development, continuing-adult education, community / V.

## COLLEGE

This project is intended to enlarge the career vision of Denison female students (to include the non-traditional) and to enhance the role of faculty as career advisors. A Visiting Professionals Program brings successful professional women (including a physicist, a biomedical engineer, a physician, and a computer scientist) to campus for one-to-three days. The Math Component includes a visit by Sheila Tobias of Overcoming Math Anxiety (see entry #010), a three-week summer Math Workshop to upgrade mathematics skills for entering freshmen, and a January-term workshop. In addition, a weekend Faculty Career Advising Workshop helps faculty accept and improve their functions as career advisors and to consider special issues in advising women. For orientation staff there is a Pre-orientation Workshop designed to alert them to special issues in orienting women with respect to major choice, career direction, etc. At freshman orientation, a special presentation is made regarding the math workshop and course. Another activity which includes science or mathematics is the Career Exploration Trip. Sophomore and junior students, in particular, are encouraged to travel to the District of Columbia, Bridgeport, or New York (accompanied by a faculty advisor) to interview women professionals in non-traditional careers. They write a report, either in profile form or reflecting on pursuing careers in male-dominated areas. This experience is usually helpful in making career choices. Professionals for interviews are identified by faculty and alumni. Although this program is still underway, the enrollment of women in mathematics has already increased. Project staff report that students are exploring a wider range of careers before declaring majors, discussing openly the process of career selection and their choices and that male students have also gained from exposure to the program. An evaluation will be done. Videotape: "Dilemmas in Advising," May 1979, 15 minutes. Mary Schilling, The Mellon Office, Denison University, Granville OH 43023, (614) 587-0810

250 NONSTANDARD COURSE IN PREPARATION FOR CALCULUS, Southern Methodist University (SMU), Dallas TX 75275 / \$2,400 (SMU 100%) / June 1979-July 1979 / Math / 13, 14, 15, 16 / 4 F, 4 M total / Role models N / V.

In a special effort to recruit women, the instructor announced and described the course at math avoidance and anxiety workshops sponsored by the Women's Studies Council and conducted by Dr. Lenore Blum of Mills College. A detailed description of the course also appeared in the SMU summer school catalog. The course prepared a student to enter and succeed in the regular sequence of college calculus courses, regardless of the student's previous background in mathematics. Between course lectures, work sessions were held to

## COLLEGE

give mathematics background necessary to complete the homework assignments. The instructor recommended that a time longer than summer terms be devoted to such courses, and that workbooks on algebra and trigonometry be prepared which correlate with whatever text is used for the lectures. It is also advisable to be prepared for psychological blocks which hinder student achievement in mathematics. Dr. Jean Richmond, Mathematics Department, Southern Methodist University, Dallas TX 75275, (214) 692-2515

231 OPTIONS IN ENGINEERING--A CONFERENCE FOR WOMEN STUDENTS, University of California (UCB), Berkeley CA 94720; CCEW-Women's Center, Society of Women Engineers, College of Engineering UCB / U.S. Department of Energy (DOE) / \$1,000-5,000 (DOE 80%; UCB 20%) / Feb 2, 1980 / Engr / 13 through graduate / 150 F / Recruit N, B, A, H; Involved 4% B, 35% A, 3% H; Role models B, A, H / V.

The goals of this conference were to provide accurate information on engineering, engineering specialties, and career opportunities; to provide support and reinforcement to women engineering students; to provide women students who have an interest in the engineering major with information on the curriculum and application process; and to permit women students to meet and form personal contacts with professional women engineers. The conference included speakers, concurrent workshops on various specialties in engineering, distribution of information packets, and concurrent panel discussions on topics including "How to survive in engineering school," and "Work/study options in industry." The project provided follow-up academic counseling. A midday break allowed time for conversations with other students or professional women. Recruitment for the conference was through news releases, public service announcements and direct mailings to minority students and campus organizations as well as to other potential participants. The director observed that "women engineering students have usually made the choice to study engineering late, and welcome the reinforcement by role models at large conferences. There are still few women on engineering faculties and thus, a real need for exposure to women engineers in the field exists on college campuses." Publication: Sheila Humphreys, "Measuring the Effectiveness of Science Career Conferences," University of California, Berkeley, 1979 (10 pp). Dr. Sheila Humphreys, CCEW-Women's Center T-9, University of California, Berkeley CA 94720, (415) 642-4786

232 OVERCOMING MASCULINE BIAS IN INTRODUCTORY COLLEGE HUMAN GEOGRAPHY COURSES, Association of American Geographers. Washington DC 20009 / Women's Educational Equity Act (WEEA) /

## COLLEGE

\$14,900 (Association of American Geographers 23%; WEEA 77%) / Sept 1978-Jan 1980 / Soc / 13, 14, 15, 16, reentry women and teacher education / 250 F, 250 M / Recruit N, B, H, E; Efforts B, H, E.

This project created, tested, revised and distributed six modules on women which supplement existing lectures and texts used in college-level introductory human geography courses. The packets include readings for the students and their instructors, exercises (role playing, simulations, statistical work) and bibliographies. One module on Latin American women should prove of special interest to Hispanics and another on day care is especially significant for low income women. The project wrote and telephoned instructors in geography at several colleges, inviting them to take part in a workshop to review materials and to test the modules in their own classrooms, making adaptations which the authors then used in revising the modules. The "test" colleges were chosen for variety in size, location, minority enrollment, student composition (especially reentering women), and so on. Although the project is still underway, the directors already note that modules with several alternative teaching strategies are preferred by instructors, that students react best to materials which emphasize changing roles for women and men (e.g., shared day care for working parents), and that personal contact with instructors (especially male teachers) is most effective as a dissemination strategy. Publications: in preparation. Professor Arlene Rengert, Department of Geography, West Chester State College, West Chester PA 19380, (215) 726-4154 or 436-2724 or Professor Janice Monk, Associate Director, Southwest Institute for Research on Women, University of Arizona, Tucson AZ 85721, (602) 626-1476

233 PREFACE, University of Dayton, Dayton OH 45469 / U.S. Department of Energy, Aeronautical Systems Division of Wright Patterson Air Force Base, and corporations (Broadway Glass, Chrysler, Goodyear Atomic, Mead, and Delco Air Division of General Motors) / \$40,000 year, \$250,000 total (Federal agencies and industry 85%; University of Dayton 15%) / May 1970-present / Engr / 13, 14, 15, 16 / 46 F, 24 M to date / Recruit B, E; Involved 40% B, 50% E; Efforts B, E; Role models B, E / V.

The objective of this program is to recruit and retain women and minority and low income students in engineering. There are freshman year scholarships; co-op employment with a sponsoring employer; and support services including counseling, career seminars and academic study sessions. Recruitment is by promotion of PREFACE for eligible participants in the two summer career awareness programs, direct mailing

## COLLEGE

of brochures to selected students and counselors, and presentations at high schools. All programs provide a variety of role models, thereby increasing the probability of recruitment of minority group members. Of sixty-nine students funded in this program, sixty are continuing in a four-year engineering or engineering technology curriculum. In addition to bringing in non-traditional students to these high employment areas, the support services, special career seminars, counseling and academic group study sessions have been made available to a larger group of engineering students. The director explained that "faculty advisors currently act as academic advisors to all undergraduate students. Faculty often are not equipped to counsel students and to provide the emotional support necessary for students to later seek out these advisors if they run into academic or nonacademic difficulties. This is particularly true for non-traditional students." The PREFACE Program uses PREFACE advisors with skills in counseling students. Inventory entries #090 and 105 describe related programs. Mrs. Nancy Cook Cherry, Director, Individual and Adult Oriented Programs, or Carol M. Shaw, Assistant Dean of Engineering, University of Dayton, Dayton OH 45469, (513) 229-2736

234 PROJECT FOR THE ADVANCEMENT OF WOMEN IN SCIENCE CAREERS, Kansas State University, Manhattan KS 66506 / U.S. Dept. of Education, Women's Educational Equity Act Program (WEEA) / \$15,000 year / Sept 1976-Aug 1978 / Math, Ast, Phy, Chem, Bio, Soc, Psy, History of Science / 13, 14, 15, 16 / 20 F, 2 M total / Involved 5% N; Efforts B / V.

The staff of this project prepared a collection of readings to enable science teachers at the college level to teach a course on "Science, Sex and Society." The goals of such a course were to increase the number of women with aptitude in science choosing science careers, and to enlarge students' understanding of the nature of science-society interaction. The pilot course, taught at KSU, included readings, laboratory experiences, conversations with women scientists, and career counseling. Students in the course were invited to provide feedback on improving the collection of readings. The resulting publication, containing articles, references, resource lists and laboratory exercises, is disseminated through the Educational Development Center, 55 Chapel Street, Newton MA 02160. Publications: Ann E. Kammer, Cherlyn S. Granrose and Jan B. Sloan, "Science, Sex and Society," 1979, 569 pages (copies at EDC). Ann E. Kammer and Cherlyn S. Granrose. Final report on project for the Advancement of Women in Science Careers (1978) is filed with EDC and ERIC. Dr. Ann E. Kammer, Division of Biology, Kansas State University, Manhattan KS 66506, (913) 532-6646

## COLLEGE

235 QUARTERLY WORKSHOPS ON SCIENCE FIELDS, University of California Women's Center, Berkeley CA 94720 / U.C. Student registration fees and U.S. Department of Energy / \$50-\$200 per workshop / Jan 1978-present / Math, Phy, Chem, Bio, Med, Engr / 13 through PhD, continuing-adult education / 200 F year / Recruit B, A, H; Involved 6% B, 10% A, 2% H; Role models B, A, H, D, E / V.

The Women's Center advertises the workshops via flyers, ads, faculty announcements in classrooms, news releases, and word-of-mouth. Each academic quarter, a workshop is conducted on a different topic (e.g., women and engineering); there are four or five sessions held once a week, usually during the noon hour. The sessions may feature a panel, guest speaker, or discussion. The workshops are designed to disseminate accurate information on preparation for various science careers in the public and private sectors, to increase the number of women choosing science majors, to raise retention of those who do pursue science training, and to provide role models. Unexpected benefits have been closer ties with some graduate departments, closer links with women's science caucuses, and greater awareness among some university faculty and staff of women's aspirations and abilities. Costs reflect the travel expenses of speakers; the university donates meeting rooms, and staff salaries are part of the Women's Center general budget. The project director notes that "it is possible to develop and run effective programs with very little money" under these circumstances. Publications: one page handouts, such as selective bibliographies, are often prepared for the sessions. Dr. Sheila Humphreys, Associate Director, CCEW-Women's Center, Bldg. T-9, University of California, Berkeley CA 94720, (415) 642-4786

236 RESEARCH EXPERIENCE IN CHEMISTRY FOR WOMEN, St. Joseph College (SJC), West Hartford CT 06116 / National Science Foundation (NSF); other federal agencies; local industry; and SJC / \$50,000 (Federal agencies and local industry 50%; SJC 50%) / Sept 1952-present / Chem, Bio, Geol / 13 through masters, reentry women, teacher education / 10-12 F, 3-4 M year / Involved 2% B, 2% H, 2% E / V.

This program enables women students to recognize their aptitude for research and to develop their competencies and skills in it. It also encourages them to pursue advanced studies in science and gives them a sense of belonging to a technical profession. Students enroll because the program is part of the undergraduate and Master's major. They take part in cooperative research projects funded by federal science agencies. In an earlier phase of the project, high school teachers took part in the program under an NSF program which has since been

## COLLEGE

terminated. Recently, efforts have increased to enroll SJC alumnae and other women who wish to reenter scientific work after several years of family responsibilities. Publications: at least two videotapes on scientific research done in the program, plus over a dozen articles on chemistry-related research published in scientific journals. Sr. Mary E. Murphy and Sr. Claire Markham, Chemistry Department, St. Joseph College, West Hartford CT 06117, (203) 232-4572, x241

237 RESEARCH IN APPLIED MATHEMATICS AND STATISTICS, Mary Baldwin College (MBC), Staunton VA 24401 / National Air and Space Administration (NASA)-Langley Research Center / \$8-10,000 year, \$25,000 total (NASA 90%; MBC 10%) / Jan 1976-April 1979 / Math / 15, 16 / 5 to 7 F year, 20 F total / Recruit B, E; Involved 10% B, 20% E; Role models E.

Students for the program are recruited from among Mary Baldwin undergraduates; minority students and students from economically disadvantaged backgrounds are approached individually about the possibility of enrolling. Students learn what careers are available in mathematics and cognate sciences and obtain on-the-job experience in those lines of work. They spend one to three months at Langley working on projects ranging from cost analysis of the space shuttle to monitoring global pollution using satellites. Several students have gone into engineering or computer science after their experience with NASA. Mary Baldwin faculty remark that they had to work to persuade students to try the Langley project, but found that the students all profited from and enjoyed their assignments. Students learned as much about what the work world was like as they did about mathematics. Faculty discovered that giving academic credit helped attract students to the project. Dr. Janet W. Campbell, Mail Stop 272, NASA/Langley Research Center, Hampton VA 23665, (804) 827-3645

238 RETENTION OF WOMEN IN SCIENCE, School of Science, Purdue University, West Lafayette IN 47907 / Fund for the Improvement of Postsecondary Education (FIPSE) / \$99,987 total (FIPSE 100%) / Sept 1973-Jan 1976 / Math, Chem, Bio, Med, Geol / 13, 14, 15, 16 / 120 F year, 240 F total.

Participants were chosen at random from the entering Purdue science freshman classes, 1973 and 1974. This was basically a demonstration project with an embedded research design. It showed that the attrition of women from science programs could be reduced through intensive counseling, exposure to appropriate role models, and participation in research projects. Each participant was assigned to an

## COLLEGE

academic advisor who provided individual counseling for the first two years of a four-year degree program. Participants enrolled in a seminar which covered the history and roles of women in science and featured practicing women scientists representative of all the science disciplines and the medical profession. Guest speakers also interacted with students informally and presented a public lecture on their area of expertise. Each student worked with a faculty member and up to six other students on a research project for one or two semesters, with variable academic credit. Unexpected benefits were the greater sensitization of science faculty to the aspirations and problems of female science undergraduates, and a reorganization of counseling activities in the School of Science to meet better the needs of all science students at Purdue. The project director reported that "the sex of the counselor was irrelevant to the counseling situation; rather, the availability of constant supportive personnel was critical. Secondly... there is an appreciable difference in the way young women respond to a non-scientist telling them to be scientists, and scientists telling them to be scientists. Third, young women, in general, need extra encouragement in the beginning science lab situation..." Audiotapes: A radio series of twelve tapes approximately fifty minutes each. "Women and the Science Disciplines." Each show consisted of excerpts from lectures delivered by guest speakers. Lynne Harrington Brown, Department of Psychological Sciences, Purdue University, West Lafayette IN 47907, (317) 749-2221

259 SCIENCE CAREERS PANEL DISCUSSION, San Diego State University (SDSU), San Diego CA 92182; Sigma Delta Epsilon-Graduate Women in Science, Tau Chapter / \$30 (SDSU 100%) / November 13, 1977 / Math, Ast, Phy, Chem, Bio, Geol / 15, 16 / 37 F / Role models D.

The project shared the experiences of women scientists with young women about to embark on scientific careers. Students were recruited by letters mailed to all women juniors and seniors majoring in science at SDSU. A panel of six women scientists presented ten-minute discussions of their work as research technician, public health microbiologist, medical technologist, part time junior college instructor, faculty member at SDSU, and assistant director of the San Diego County Office in charge of environmental impact studies. These discussions included comments on the nature of the work, skills and specific training required, general location of potential jobs, and chances for advancement. In some cases, ways to integrate one's job with other responsibilities, such as family life and children, were considered. Informal discussion followed during a refreshment period. One unexpected benefit of the project was the increased knowledge

## COLLEGE

about Sigma Delta Epsilon among women students on the campus. The project leaders believe that freshmen and sophomore students (or even high school women) might gain from being present at the discussion. They also recommend wider representation of jobs in the physical sciences, possibly in a separate panel. They kept costs down via time donated by the organizers and the speakers. Dr. Phoebe E. Roeder, 6789 Alamo Way, La Mesa CA 92041, (714) 469-6460

240 SEMINAR FOR WOMEN IN ENGINEERING, Oklahoma State University (OSU), Stillwater OK 74074 / OSU / \$5,000 year (OSU 100%) / Aug 1975-present / Engr / 15 and transfer students / 50 F year / Involved 10% B, 10% E; Efforts Min; Role models Min, E / V.

This project is a seminar-discussion course covering topics of use and interest to women preparing to enter the engineering field as a career; although engineering students are the primary target group, women with other majors may take the course to find out more about engineering. The class meets weekly for two hours. It is listed in the college catalog and advertised by flyers on bulletin boards. The course is designed to provide students with the confidence to achieve their educational goals, and to help them cope with specific problems which arise along the way. Outside speakers are invited to serve as role models as well as to impart information on professional ethics, technical writing, resume preparation, managing family and job responsibilities, and graduate school. Wide-ranging class discussions are encouraged. The students tend to form an informal support group among themselves, and also discover the value of having a mentor (professor, counselor, or an engineer who addressed the class) as they proceed through the major. The instructor has found that retention through graduation for those in the course is seventy-seven percent of those qualified to enter an engineering major, whereas only fifteen percent of the academically qualified entering students who do not take the seminar stay in engineering until graduation. Ruth C. Erbar, EN 415A, Oklahoma State University, Stillwater OK 74074, (405) 624-5282

241 SOCIETY OF WOMEN ENGINEERS AWARDS WEEKEND, Purdue University, West Lafayette IN 53707; Society of Women Engineers, Purdue Student Section / local industry / \$15,200 year (Industry 90%; Purdue 10%) / Oct 1978-Feb 1979 / Engr / 15 through Masters / 275 F, 10 M total / Involved 2% B / V.

## COLLEGE

The Awards Weekend consisted of several activities designed to honor outstanding women in engineering at Purdue, honor graduating senior women at Purdue, and provide an opportunity for industry and women students to interact on an informal basis. The weekend began with Student-Industry workshops--thirty-minute presentations by industrial representatives followed by a thirty-minute discussion period. The eleven topics were in two categories: career skills (e.g. resumes, interviewing, financial planning, etc.) and industrial overview (e.g. electrical, petrochemical, etc.). Later in the day a champagne reception at a local restaurant honored all the graduating women in engineering along with the industrial benefactors of the Women in Engineering Program. The second day a Merit Awards Luncheon was held to recognize and encourage nearly ninety women in engineering with awards totaling over \$9,000. Over 350 people attended. Following the Awards Luncheon was a Job-Fair, held jointly with the National Society of Black Engineers (NSBE). At this time company representatives were able to talk with students about specific opportunities for summer, co-op, or permanent employment in their firms. Approximately 100 industry representatives participated in the Awards Weekend. An unexpected benefit was realized through the joint sponsorship of the Job-Fair with NSBE. They were able to involve many more minority women in this segment of the program than originally expected. This Awards Weekend effectively expanded and improved on an already successful series of programs to meet the needs of these students. It strengthened ties between NSBE and SWE, thus avoiding a duplication of efforts and enhancing the standing of both groups with industry. The project continued responsiveness to industry's needs by modification and expansion of the program. Publication: Annual Report, mimeographed, 19 pages. Mrs. Jane Daniels, Society of Women Engineers, Purdue University, Room 224, Potter Engineering Center, West Lafayette IN 47907, (317) 749-6347

242 SPECIAL PROBLEMS/BIOLOGY/CHEMISTRY, Caldwell College, Caldwell NJ 07006 / \$500-\$900 year (Caldwell 100%) / 1953-present / Chem, Bio, Med / 13, 14, 15, 16 / 8 F (1979).

This research course was, until eight years ago, required for completion of the BA in Biology at this women's college. Currently, enrollment is by application or invitation. Students conduct research projects and report their findings at the annual Eastern Colleges Science Conference. The intent of the program is to develop women students' ability to work independently, to develop self assurance and confidence, to encourage creativity and to expose the students to the reality of the scientific world. The research

177

## COLLEGE

course is paid for from regular school funds, but the expenses for attending the Conference are generated through "fund-raisers." Sister Bernadette Agnes, Caldwell College, Caldwell NJ 07006, (201) 228-4424

243 STUDENT ENGINEERS DAY, TRW Inc, Defense Space Systems Group (TRW/DSSG), Redondo Beach CA 90778 / \$1,000 year (TRW 100%) / Sept 1965-March 1969 / Math, Phy, Chem, Bio, Engr, Geol / 13, 14, 15, 16 / 40 F, 1 M / Involved 10% B, 15% A, 5% H; Role models B, A, H / V.

This project acquainted women engineering students with actual work situations by showing them what women do in the fields of science and engineering at a large corporation. Students were invited through mailings to student sections of the Society of Women Engineers at five Los Angeles area universities. Each student was assigned an "escort" (a scientist or engineer matched closely to the student's interest) with whom she spent a number of hours observing and discussing what the person did in a typical work day. The students were also given a guided tour to see the finished products of the work. Besides obtaining a good idea of the nature of technical employment at close hand, a number of the students were later hired for summer employment at TRW. Florence Bloom, TRW/DSSG Building R5-2161, 1 Space Park, Redondo Beach CA 90278, (213) 536-4260

244 SUMMER FELLOWSHIPS FOR WOMEN AND MINORITIES, National Center for Atmospheric Research (NCAR), Boulder CO 80307 / National Science Foundation (NSF) / \$273,000 total (NSF 100%) / Summers, 1973-79 / Math, Ast, Phy, Chem, Engr / 13, 14, 15, 16 / 26 F, 22 M total / Recruit B, H; Involved 15% B, 15% H.

The program at NCAR was conducted to encourage more women and minority students to enter graduate programs in the atmospheric sciences. Scientists from NCAR visited predominantly minority institutions' science departments to recruit participants. Each student selected for the program was given an individual research project as well as class work and computer instruction. Between fifteen and twenty percent of the program participants did begin graduate study in the atmospheric sciences. At present, this program has been suspended, and the internship program run by the Equal Employment Opportunity section of the NCAR Personnel Office is being expanded. Maurice Blackmon, National Center for Atmospheric Research, Boulder CO 80307, (303) 494-5151, x400

## COLLEGE

245 SUMMER RESEARCH FELLOWSHIP PROGRAM, Douglass College, Rutgers University, New Brunswick NJ 08908 / Merck Foundation at Rahway / \$6,100 year (Merck Foundation 100%) / March 1979-Sept 1981 / Math, Chem, Bio, Psy / 15 / 4 F year / V.

The project introduces talented women science students to the methods of scientific inquiry. The program is advertised via campus and local newspaper stories, and through contact with science faculty members, who nominate students in ranked order for consideration for funding. Students are provided with fellowships and equipment funds to conduct a research project under the supervision of a faculty member. Costs are low because Douglass donates faculty time and administrative time for the coordination of the project. Merck Foundation funds cover the fellowships and equipment expenses. Evelyn F. Apgar, Douglass College, College Hall-Room 204, New Brunswick NJ 09803, (201) 952-9729

246 TEACHER EDUCATION AND MATHEMATICS (TEAM), Queens College of the City University of New York, Flushing NY 11367 / Women's Educational Equity Act (WEEA) / \$555,411 total (WEEA 85%; Queens College 15%) / Sept 1978-Sept 1980 / Math / 13, 14, 15, 16 / 45 F total in pilot group / Involved 7% B, 7% H / V.

The project sought to reduce math anxiety, increase perception of math as a female domain, and develop skill in identifying (and eliminating) sex-role bias. The target population was beginning teacher education students, whose confidence and skills the program enhanced before they learned how to teach math to children. Students learned math content through an inductive approach, discussed feelings about math, studied instances of sex-role stereotyping, saw the importance of math in careers, and learned about female mathematicians. Mathematics content materials, math anxiety counseling materials, and sex-role stereotyping and women in math materials were developed for adoption by other colleges which wish to train their education students by using these techniques. Three audiotapes were edited, each ten minutes in length, entitled "Interviews With the Past," "Teachers Are Important," and "Getting From Here to There." The math content modules were "Patterns," "Approximation and Estimation," "Choice and Chance," and "Metric Measurement." The attitudinal modules consisted of "Demystifying Math," "Women and Math," and "Sex Role Stereotyping in Mathematics Materials." There was also a handbook drafted on how to implement a project such as this and explaining how to use the materials. All items are available through the WEEA

COLLEGE

1

dissemination program. Dr. Elaine B. Chapline or Dr. Claire Newman, Dept. of Elementary and Early Childhood Education, Queens College, Kissena Boulevard, Flushing NY 11567, (718) 226-7395

247 5-2 ENGINEERING PROGRAM, Huston-Tillotson College, Austin TX 78702; University of Texas at Austin / tuition fees / \$1,400 per student per year (tuition 100%) / Aug 1975-present / Engr / 13, 14, 15, 16 / 4 F, 55 M year / Involved 9% B, 90% A, 1% H (estimated); Role models B.

The project is advertised through mailings to teachers and counselors and to organizations concerned with the education of minority and female populations, including the Black sororities, and League of Women Voters. The program offers Huston-Tillotson students a chance to pursue an engineering degree from the University of Texas at the same time they work on a Bachelor of Science degree (most often in mathematics, but occasionally in chemistry or biology) from the College. Women role models are used in counseling, recruiting, and teaching, not only to assure women students that they can indeed be successful engineers, but also to eliminate any unconscious bias against women among the male students. One unexpected finding of the project has been that many minority and female students in the Southwest have been poorly advised by high school and junior high school personnel on the importance of taking mathematics and science before applying to college; accordingly, Huston-Tillotson tries to reverse this message during the recruiting work with counselors and students at these schools. Dr. Exalton A. Delco, Jr., Huston-Tillotson College, 1820 East 8th Street, Austin TX 78702, (512) 476-7421

248 5-2 ENGINEERING PROGRAM, Seton Hill College (SHC), Greensburg PA 15601 / SHC / about \$500 year administrative costs (SHC 100%) / 1978-present / Math, Chem, Engr / 13, 14, 15, 16, graduate / 5 F year, 10 F to date / Involved 10% D; Efforts E.

The 5-2 Engineering Program at Seton Hill College, conducted in cooperation with St. Vincent College, offers the mathematics and science courses usually found in the first two years of an engineering program. Cooperative agreements for transferring after three years are maintained with Pennsylvania State University, Georgia Institute of Technology, University of Pittsburgh, and University of Notre Dame, although students may transfer to other schools. The student earns a BA in Mathematics or Chemistry from Seton Hill in addition to her engineering

## COLLEGE

degree. Some students have opted to study four years at Seton Hill and then obtain a masters in engineering. Scholarships are offered to encourage enrollment by the economically disadvantaged, and special services are provided for students for whom English is a second language. Students enter through the standard college admissions procedure at Seton Hill. The College also offers competitive examinations to attract the attention of talented high school girls to the program. Dr. Russell C. Walker, Seton Hill College, Mathematics Department, Greensburg PA 15601, (412) 834-2200

249 3-2 MATH-ENGINEERING PROGRAM, Russell Sage College (RSC), Troy NY 12180 / RSC and Rensselaer Polytechnic Institute (RPI) / about \$1,000 year (RSC 100%) / Sept 1978-present / Math, Phy, Chem, Engr / 13, 14, 15, 16 / 5 F year / V.

This program encourages college women at RSC to enter the non-traditional field of engineering by offering them a chance to graduate with a Bachelor's degree in mathematics and a second degree in engineering. Students spend three years at RSC, a women's liberal arts college, and two years at RPI, an engineering university. Those few who do not complete the program do not "drop out"; rather, they continue in Mathematics-Computer Science and complete training in that field instead. The project director stresses the importance of informing college-bound women about the desirability of taking physics courses in high school and college if they are at all interested in engineering. He suggests that recruitment materials directed at women as potential engineers explain what engineers do, not just emphasize the attractive job market and impressive salaries in the field. Dr. James Voytuk, Dept. of Mathematical Sciences, Rensselaer Polytechnic Institute, Troy NY 21280, (518) 270 5346

250 UNDERGRADUATE RESEARCH PROGRAM, Georgian Court College, Lakewood NJ 08701 / Toms River Chemical Corp / \$6,000 year, \$72,000 total (Georgian Court 50%; Toms River Chemical Corp 50%) / 1968-present / Chem / 15, 16 / 7 F year, 50 F to date / Recruit E; Involved 3% A, 2% H, 30% E; Efforts E.

The project interests women students in a career in chemistry by having them be part of an on-going research program and be junior authors on papers which are published as a result of the work. Participants come from among chemistry majors at the school. The program has informed minority students at the college of the opportunity through informal discussions, and attracts low-income students by offering to pay fully for research costs. The students join a

## COLLEGE

research team and work in the laboratory on specific experiments, acquiring experience in writing up the results for publication and learning sophisticated techniques of analysis. Besides benefiting the students, the program has aided in recruitment of chemistry majors and has increased interest in the college as a place to obtain an education. At least ten scientific papers have been issued so far from the program, with several others in press or under review. S. Mary P. Coakley, Ph.D., Georgian Court College, Lakewood NJ 08701, (201) 364-2200, x39

251 UNIVERSITY ASSOCIATION FOR THE ADVANCEMENT OF WOMEN ENGINEERS (UAAWE), University of Kansas, Lawrence KS 66045 / Industrial contributions / \$7,000 year (Industrial contributions 90%; University of Kansas 10%) / 1975-present / Engr / 15, 14, 15, 16 / 100 F year, 400 F to date / Involved 5% B.

This ongoing program at the University of Kansas encourages women in engineering by offering free tutoring services, by providing scholarships based on academic standing and need, and by social events sponsored to acquaint women engineering students with each other. Scholarship funds for the students are solicited from various industrial sources. Each semester, the program organizes a series of speakers. All women students enrolled in the School of Engineering are automatically members of U.A.A.W.E. and are encouraged to participate in all events. Project results show an increase in the numbers and retention rate of female students in engineering. In Fall 1979, there were 224 women enrolled in engineering, compared with Fall 1971 with an enrollment of seven. Dr. Mary F. McGhee, Assistant Professor of Civil Engineering, 4002 Learned Hall, The University of Kansas, Lawrence KS 66045, (913) 864-3751

252 VIEW AN ENGINEER AT WORK, Clarkson College of Technology, Potsdam NY 13676; Society of Women Engineers (SWE) / \$10 year, \$40 total (SWE 100%) / 1975-present / Math, Phy, Chem, Bio, Engr / 15, 16 / 15 F, 50 M year; 60 F, 200 M to date / V.

Students are recruited to this program through notices in the college newspaper, signs around the campus, and announcements at Society of Women Engineers meetings. They visit companies which employ scientists and engineers, usually across Christmas vacation, spending the day with one particular person at the firm to see what kind of work they do and to ask questions about it. College women are thus introduced to the types of jobs which persons in their

## COLLEGE

line of study might enter upon graduation, and are more knowledgeable about what options they have for professional and scientific work when they complete school. The project uses a one-page evaluation form filled in by each student to assess the success of the experience. Kathy Capizzi, Apt. 201, 1741 S. Country Club Road, Decatur IL 62521, (217) 425-4698

253 WOMEN AND CAREER OPTIONS, Massachusetts Institute of Technology (MIT), Cambridge MA 02139; University of Massachusetts-Boston and Amherst; Hampshire College; Boston College; Brandeis University / Carnegie Corporation of New York / about \$40,000 year (Carnegie Corp 100%) / July 1973-July 1975 / Math, Phy, Chem, Bio, Engr, Soc, Geol, Psy / 15 through graduate and faculty-employee development / 100 F total / V.

The project conducted several activities to interest women in engineering, to improve the engineering education of women students, and to enhance the professional life of women engineering faculty; some of these have continued under different auspices at the Institute. An Open House was sponsored by the School of Engineering for women students. Internships for women in engineering were provided. An orientation course on "What is Engineering?" introduced women to the nature of education and employment in the field. Information was collected and distributed regarding non-traditional careers for women. For women faculty, the project offered a series of get-together luncheons, opportunities to meet with women faculty at other institutions, and an informal organization in which they could discuss how to increase their visibility as faculty and as scientists or engineers. MIT and the colleges and universities donated in kind services. Publications: Francine Trachtenberg and Melissa Richter, "Women and Career Options: Expanding Career Opportunities for Women in Higher Education," 1976, 211 pages. Dorothy Bowe, MIT 5-119, Cambridge MA 02139, (716) 253-4971

254 WOMEN AND MINORITY SCHOLARSHIP PROGRAM, College of Applied Science, University of Cincinnati (UC), Cincinnati OH 45210 / Local industry and the University / about \$100,000 year (Local industry 80% in 1979, percentage varies across time; UC 10% in 1979, percentage varies across time) / Sept 1969-present / Engr / 15, 14, 15, 16 / 105 F, 118 M to date / Recruit B; Involved 50% B, 25% E; Efforts B, E; Role models B / V.

The project finds students by sending recruiters to local high schools, by publishing notices in local Black magazines and newspapers, and by personal contact with the Black

## COLLEGE

Catholic Caucus and other local groups. It seeks to increase the number of women and minority persons in the technical work force, by providing relevant educational opportunities for community minority and women students. A full time counselor/program administrator at the college offers support services, such as finding tutors, giving career advice, and leading group discussions on racism and sexism. To encourage enrollment of minority and women students, the program offers scholarships of varying amounts. It offers classes at the college prior to formal enrollment to enhance science and mathematics skills, and it conducts a ten-week summer internship in industry. Some of the program graduates are offered scholarships to continue work toward a Bachelor's degree in engineering or engineering technology. The project finds that "support services are essential to a high level of success" and that mutual support among the students is also very important for achievement. Local chapters of the Society of Women Engineers and National Society of Black Engineers began in connection with the project. Frances May Brooks, College of Applied Science, 100 East Central Parkway, Cincinnati OH 45210, (513) 475 5586

255 WOMEN AND SCIENCE, University of Michigan (UM), Ann Arbor MI 48109 / \$600 total (UM 100%) / Sept 1978 and Feb 1979 / Math, Ast, Phy, Chem, Bio, Geol / 15 / 250 F total / Role models B / V.

These two one-day workshops were conducted primarily for incoming women students whose college applications showed interest in or aptitude for science. For the first workshop, letters of invitation were sent to first-year female students, while wider publicity in campus publications and information distributed to faculty was used to recruit participants for the second workshop. Both workshops encouraged entering women students to consider careers in science, provided students with information resources within the University, and used female role models in the sciences. Women scientists and female graduate students gave presentations and participated in question-answer sessions to allow the young women to discuss the relations of studies and careers in the sciences. Upon evaluation, the student participants reported widespread appreciation and enthusiasm for this program. Barbara Sloat, Coordinator of Women in Science Programs, Center for the Continuing Education of Women, 330 Thompson Street, University of Michigan, Ann Arbor MI 48109, (513) 764-2582

## COLLEGE

256 WOMEN AND TECHNOLOGY: DECIDING WHAT'S APPROPRIATE, University of Montana (UM), Missoula MT 59812 / Women's Resource Center, UM; Montana Committee for the Humanities / \$5,000 year (Women's Center 10%; Humanities Committee 90%) / April 1979-present / Math, Phy, Chem, Bio, Engr / 15 through graduate, continuing-adult education / 225 F year / Recruit N; Involved 10% N / V.

A conference informed and involved women in the processes of scientific and technological decision making by addressing questions on what makes certain technologies appropriate. It gave women access to skills and data primarily relating to energy issues. The meeting featured speakers, small group discussions, hands-on workshops, and information exchange sessions. Participants were recruited through mass mailings, posters, and radio and television interviews. The conference arrangers worked with Native American studies program staff and with area reservations on publicity. Childcare and housing were provided and registration fees were kept low to encourage low income women to attend. The conference attracted national as well as regional interest. Out of it arose a network linking women interested in the issues raised there; they exchange information, issue a directory of those in the network, and are publishing the conference proceedings. Both the conference and the network emphasize examples from everyday lives of women as they relate to science and technology, especially to energy concerns. Publication: Conference Proceedings: Women and Technology: Deciding What's Appropriate (Missoula, Montana: Women's Resource Center of the University, 1979), 40 pp. The conference was audiotaped. Judy Smith, 315 South 4th East, Missoula MT 95801, (406) 728-5041

257 WOMEN IN ENGINEERING-ENERGY MANAGEMENT PROJECT, University of New Hampshire (UNH), Durham NH 03824; New Hampshire College and University Consortium (NHCUC) / \$13,000 total (UNH and NHCUC 100%) / June 1977-Sept 1977 / Engr, Soc (economics) / 15, 14 / 12 F / Involved 8% A, 50% E.

The project conducted an energy audit of the twelve colleges in New Hampshire College and University Council. The goals were to give women students actual engineering and scientific experience, and to do something constructive about the energy crisis. The participants were members of Women in Engineering (which subsequently became a student section of the Society of Women Engineers) and women students in economics recruited through cooperation with the Dean of the University's school of business and economics. Besides conducting the audits, the students

## COLLEGE

also ran a publicity campaign to insure high visibility; the University received favorable public notice in exchange for its support of the project. The project leaders endorse the idea that women in science programs should "take a chance and think BIG." They also recommend using consultants--in their case, a professional engineer and a university professor. Publication: final report, currently out of print. Pat Martin, 14 Albion Street, Malden MA 02148, (617) 524-5548

258 WOMEN IN SCIENCE AND MATH COURSE, Humboldt State University, Arcata CA 95521 / Humboldt State / \$4,500 (Humboldt State 100%) / June 1977-June 1978 / Math, Ast, Phy, Chem, Bio, Med, Engr. Soc, Geol, Psy / 14, 15, 16, graduate, faculty-employee development / 12 F / Recruit N, B, A; Involved 8% A, 25% E; Effects N, B, A, H; Role models A, E / V.

The project was advertised in a variety of ways: notices on science building bulletin boards, flyers to ethnic studies and women's studies students, announcements in selected science and mathematics courses, a listing in the university course bulletin, and a fifteen-minute television interview on a local station. The course offered perspectives on historical and modern-day women in science and mathematics, on sexism in mathematics and science books and classrooms, and on psychological and sociological causes of women's attitudes toward science and mathematics. The instructor wrote to persons who had taught courses similar to this one at other schools and prepared a special syllabus and bibliography for the sessions. The reading list included publications on minority women scientists. She recruited fifteen women scientists, mathematicians, and engineers working in Humboldt County who visited the class, as guest speakers. The participants in the class obtained realistic ideas of what is required to be a woman in science; despite the drawbacks they had discovered during their study, most felt inspired to continue in science as a future career. The students completed an evaluation form for the benefit of any later offering of a similar course. Publications: Dr. Phyllis Zweig Chinn, Women in Science and Mathematics Bibliography (Revised), October 1980, 44 pages, \$5.00, and a circular letter summarizing the results of correspondence with course instructors elsewhere. Phyllis Chinn, Math Department, Humboldt State University, Arcata CA 95521, (707) 826-5145

259 WOMEN IN SCIENCE CONFERENCE, Douglass College, Rutgers University, New Brunswick NJ 08903 / Merck Foundation at Rahway / \$2,400 year (Merck Foundation 100%) / March 1979-

## COLLEGE

Aug 1981 / Math, Chem, Bio, Psy / 13, 14, 15, 16 / 26 F  
(in 1979) / Role models B, A, H / V.

The conference introduces women students to women scientists who serve as role models for future careers. At the first conference in 1979, six women scientists from a variety of disciplines and lifestyles reviewed their own career paths and discussed their scientific work. The morning session was a panel discussion, and the afternoon was devoted to individual workshops on the scientists' research topics. Flyers were sent to all Douglass students, and science faculty members urged students to attend; the local press and campus media printed releases about the event. Students rated the experience quite highly. Project leaders predict that on-campus functions such as these will draw a bigger audience if scheduled on a weekday, and they expect to conduct the next two conferences accordingly. Costs are low on this project because Douglass donated overhead expenses and administrative time for coordination of the project; Merck Foundation covers the expenses of speakers, hospitality, and publicity. Evelyn F. Apgar, Douglass College, College Hall - Room 204, New Brunswick NJ 08903, (201) 932-9729

260 WOMEN IN SCIENCE CONFERENCE, Oberlin College, Oberlin OH 44074 / Oberlin / \$1,300 (Oberlin 100%) / April 1973 / Math, Chem, Phy, Bio, Engr / 13, 14, 15, 16, faculty-employee development / 100 F, 20 M / Involved 13 A.

Using lectures and small group discussions, the conference raised student and faculty consciousness about careers in science in government, academic and industrial settings. The sessions also dealt with strategies for balancing a full professional life with one's personal commitments. The meeting was publicized on the campus by written and inperson contact with science departments and individual faculty. A tape of the sessions is available in the Science Library. Ann L. Fuller, 68 Elmwood Place, Oberlin OH 44074, (216) 775-4031

261 WOMEN IN SCIENCE COURSE, University of Wisconsin, Madison WI 53706 / Student tuition and UW-Madison / about \$5,000 / Spring 78-79 / Math, Ast, Phy, Chem, Bio, Med, Soc, Geol, Psy / 13 through graduate, reentry women / 15 F.

This seminar examined the lives of women scientists, using historical materials and behavioral studies to illuminate the ways in which gender affects career choices, patterns of work, and recognition of achievement. The first two sessions provided an overview of the history of women in

## COLLEGE

science, with readings and discussions on the nature of biography and historical method. The next seven meetings followed a sequence of lifestages and also detailed the history of women within various scientific disciplines. Participants learned to gather and evaluate the raw materials of biography so that each could prepare a study of a woman scientist, past or present, by the end of the term. Students assessed these materials in the context of social and political history, as well as the history of science. The seminar stressed sex role development, role conflict, response to discrimination, and personal activities as areas of study. Each student prepared five 600 word "diary entries" on the readings, the presentations and discussions, and the process of selecting and exploring her research subject. They also completed an article-length biography of a woman scientist. Susan Friedman, Women's Studies Program, 209 North Brooks Street, Madison WI 53706, (608) 263-4703

262 WOMEN'S CAREER EMPLOYMENT CONFERENCE, University of Illinois (UI), Champaign IL 61820 / UI Career Development and Placement Center / \$750 to date (UI 100%) / 1977-present / Math, Chem, Med, Engr, Agr, Soc, Psy, Education, Business Fields, Communications / 13, 14, 15, 16 / 1,820 F (1979) / Recruit Min; Involved 2% N, 4% B, 2% A, 2% H, 5% D, 5% E / V.

The career conference informs women students at the University about employment opportunities in a variety of settings (business, government, hospitals, and so on) and in many different fields (with scientific and technological work well represented). Starting in 1979, senior-year women can prepare resumes in advance of the session and interview employers during the conference. Before the conference, two seminars on job-hunting strategies are conducted. The conference consists of booth displays by potential employers in which printed materials about the firm are available. The exhibits are staffed by persons from the businesses who talk with the students about their firms and the kinds of jobs they offer. Company representatives meet with conference organizers for orientation before the session opens. The project is run in cooperation with cosponsoring student organizations such as the Society of Women Engineers chapter on campus. Publications: annual reports, and the self-help manual for the students (45 pages in the 1979 version). Barbara S. Hundley, Office of Career Development and Placement, University of Illinois, 610 East John Street, Champaign IL 61820. (217) 553-0820

## COLLEGE

263 WORKING IN ENGINEERING AND COMPUTER SCIENCE--A CONFERENCE FOR WOMEN, University of California, Berkeley (UCB), Berkeley CA 94720; CCEW-Women's Center, College of Engineering, Lawrence Hall of Science, Society of Women Engineers, Women in Computer Science / Bank of America, Ford Motor Company Fund / \$1,000-\$5,000 total (Bank of America, Ford 80%; UCB 20%) / May 13, 1978 / Math, Engr / 15 through graduate / 450 F / Recruit N, B, A, H; Involved 6% B, 6% A, 2% H; Role models B, A, H / V.

This conference offered an opportunity for women students to meet and form personal contacts with professional women engineers and computer scientists, and receive information about opportunities for women in these fields. Participants were encouraged to prepare for careers in engineering and computer science. The conference increased their computer literacy and their knowledge of the diversity of computer applications. The program included a keynote speech; a discussion of careers by a panel of women engineers, computer scientists and graduate students; and a series of workshops. The morning workshops offered a choice of hands-on activity, tours, or counseling on topics including admissions, cooperative education programs, biomechanics, earthquake testing, text editing with a computer, and computer games. Afternoon workshops offered career exploration in small groups with women from a wide range of engineering and computer science careers, as well as from science and math related occupations. Information packets were distributed and follow-up counseling provided. The director commented that "intervention programs to offer support to engineering students are particularly appropriate at the college level." She observed that due to the scarcity of women on engineering facilities, conferences which introduce students to women engineers, who can be role models and reinforce their career goals, are useful. Recruitment efforts include news releases, public service announcement, and direct mailings to some minority students and campus organizations, as well as to other potential participants. Publication: Sheila Humphreys, "Measuring the Effectiveness of Science Career Conferences," University of California, Berkeley 1979 (10 pages). Dr. Sheila Humphreys, CCEW-Women's Center T-9, University of California, Berkeley CA 94720, (415) 642-4786

VII. GRADUATE SCHOOL AND REENTRY WOMEN

POST BACCALAUREATE

ENTRY NUMBERS 264 THROUGH 299

SEE ALSO ENTRY NUMBERS 003, 008, 010, 013,  
044, 048, 049, 052, 062, 063, 077, 110,  
112, 117, 118, 119, 123 THROUGH 126, 131, 133,  
136, 138, 148, 151, 169, 172, 174, 181, 204,  
209, 212, 213, 221, 222, 224, 226 THROUGH 229,  
231, 232, 235, 236, 241, 248, 253, 256, 258, 261, 263

## GRADUATE AND REENTRY

264 ACCESS FOR WOMEN IN TECHNOLOGY, Hartford College for Women (HCW) and Hartford State Technical College (HSTC), Hartford CT 06105 / Connecticut Board of Higher Education / \$49,722 total (HCW, HSTC 53.5%; CT Board of Higher Ed 66.7%) / June 1978-Aug 1979 / Math, Chem, Engr, Technology / Reentry Women / 75 F total / Recruit B, H; Involved 20% B, 10% H, 7% D, 50% E / V.

AWT consisted of introductory and refresher courses and training to lead adult women to specific career opportunities in the state's technology-based businesses. The staff assessed employment possibilities in area industries, designed a pre-tech curriculum to lead into a one-year training program (see entry #298), recruited and selected the participants, and offered the women counseling and orientation as well as instruction in math and science needed for technology-based jobs. Women were recruited primarily during a "Technology Day" conference which was heavily advertised (including the Urban League and other minority groups); a brochure and structured interviews were also part of recruitment efforts. The conference featured adult women successfully employed as technicians and students in technology programs. The directors believed that the multiple roles of adult women must be planned for in programs such as AWT. They recommend using educational strategies which encourage cooperative work among the group. Finally, they discovered that projects such as AWT may require flexible thinking from faculty and staff of traditionally male institutions. Publication: report, in preparation. Mary Merritt, The Counseling Center of Hartford College for Women, 1285 Asylum Avenue, Hartford CT 06105, (203) 236-5838

265 CAREER EDUCATION WORKSHOPS FOR WOMEN IN SCIENCE AND ENGINEERING, University of Dayton (UD), Dayton OH 45469 / National Science Foundation (NSF) / \$10,000-\$15,000 average cost per workshop (NSF 75%; UD 25%) / May 12, 1979, April 12, 1980, April 4, 1981 / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Geol / Graduate and Reentry women / 300 F total (estimated) / Recruit B, D, E; Involved 14.6% B, 4% A, 2.67% H; Efforts B; Role models B / V.

This series of three workshops was designed for women with degrees in mathematics, science and engineering who were unemployed, underemployed or seeking new careers. Participants in 1979 and 1980 were introduced to a variety of "role models"--some women in science who had changed careers, others who had reentered or recently entered careers in science, as well as some who had made significant career advances. The program provided professional consultation on resumes, job interviewing, and career change.

## GRADUATE AND REENTRY

Eleven colleges and professional organizations provided information on educational opportunities for updating skills. In addition, approximately twenty-five women served as role models for informal discussions over lunch. In a follow-up survey conducted by mail six weeks after the 1979 program, seventy-six percent of the women responded and over ninety percent of the respondents indicated that they had actually used the career information provided and taken some action to improve careers after the workshop. Unexpectedly, a networking group of women scientists, engineers, and executives is developing to assist with similar programs in the community. The director commented that the process of bringing women scientists and engineers together to work and assist aspiring scientists is very exciting and rewarding. Recruitment efforts included direct mail brochures to women in science, math and engineering, college graduates alumnaelists; direct mail to women's magazine subscribers in the region; contact with women's and professional organizations; contact with institutions with excellent communications with handicapped, low income and minority individuals; and advertisement in newspapers, including a local Black newspaper. Two predominately Black educational institutions were involved in the planning, advising, recruiting and presenting of the program. Mrs. Nancy Cook Cherry, Director, Individual and Adult Oriented Programs, or Carol M. Shaw, Assistant Dean of Engineering, University of Dayton, Dayton OH 45469, (513) 292-2736

266 CAREER FACILITATION PROJECT, Alcorn State University, Lorman MS 39096 / National Science Foundation (NSF) / \$52,670 (NSF 100%) / June-Aug 1977 / Phy, Chem, Bio / Reentry women / 8 F / Involvee 100% B; Role models B.

This program updated and upgraded the science background of the participants and prepared them to enter new jobs or advance in existing jobs in science related fields. The project consisted of lectures and laboratory instruction in biology, chemistry and physics in an integrated fashion. Of the eight participants, one so far entered a new science job and one was given greater responsibility at a previously held job. Recruitment was done by personal contacts, announcements in public press, and announcements sent to female graduates of Alcorn State and other universities which supplied lists of graduates. Dr. Ruth M. Brady, Department of Chemistry, Alcorn State University, Lorman MS 39096, (601) 877-5711

267 CAREER FACILITATION PROJECT FOR WOMEN IN ENGINEERING, California State University (CSU), Northridge CA 91330;

## GRADUATE AND REENTRY

School of Engineering and Computer Science / National Science Foundation (NSF) / \$47,000 year (Aug 1976-Aug 1979), \$82,500 year (Sept 1979-81); \$103,400 total (Aug 1976-Aug 1979) (NSF 90%; CSU 10%) / Aug 1976-1981 / Engr / Graduate and Reentry women / 34 F to date / Recruit N, B, A, H, D, E; Involved 6% A, 9% H, 12% E; Efforts E; Role models B, A / V.

This program identifies unemployed or underemployed women holding at least a BS in science and retrains them for placement in engineering occupations. The goal is accomplished through intensive academic instruction and paid industry internships. Women who have completed the program have realized an average salary increase of \$13,800 per year (from \$5,200/year to \$19,000/year), as a result of placement in professional engineering positions. The director reports a surprising improvement in the attitudes of engineering professors and industry personnel toward women as engineers. Support funds are available for economically disadvantaged women. Recruitment efforts include workshops, seminars, posters in Women's Centers, personal mailings, newspaper articles and advertisements, announcements in magazines and professional journals, and mailings to community organizations, including those of minority groups. Much staff time is donated to the project. Bonita J. Campbell, School of Engineering, California State University, Northridge CA 91330, (213) 885-2146

268 CAREER FACILITATION TRAINING FOR WOMEN TO ENTER GRADUATE PROGRAMS IN ENVIRONMENTAL HEALTH, ENGINEERING AND SCIENCE, University of Notre Dame, Notre Dame IN 46556 / National Science Foundation (NSF) / \$64,297 total (NSF 100%) / June 1976-Aug 1978 / Math, Chem, Bio, Engr, Geol / Graduate and Reentry women / 16 F total / Recruit B; Involved 6% B / V.

This program developed and tested a method of facilitating the entry or reentry of women with degrees in science or engineering into graduate education programs. The program included introductory lectures, a seminar series (with plant and site visits), mini-courses, tutorials, research participation, audit of formal courses and independent study in three twelve-week sessions. The director reported that despite an unexpected extensive recruitment effort, it was difficult to find participants. Recruitment included communication with twenty placement schools, over one hundred newspapers in Indiana and Ohio, three hundred alumnae publications of U.S. colleges and universities, sixty professional women's organizations, eighty-five potential employers, several hundred local industries, one hundred members of the Association of Environmental Engineering Professions, as well as presentation at a national conference

## GRADUATE AND REENTRY

and paid announcements in eleven major U.S. newspapers. Also unanticipated was the large proportion of participants who sought direct employment after completion of the program. Only three participants were in graduate school, and one was seeking admission at the time of the report. The others found direct employment, except for two who were still seeking jobs and two who returned to their prior activities. L.H. Ketchum, Jr., Department of Civil Engineering, University of Notre Dame, Notre Dame IN 46556, (219) 283-3709

269 CARFEW (CAREER FACILITATION IN ENGINEERING FOR WOMEN), University of Houston, Houston TX 77004 / National Science Foundation (NSF) / \$52,070 total / June 1977-May 1979 / Engr / Reentry women / 23 F total / Involved 5% N, 20% B, 13% A, 20% H; Role models A.

This project consisted of an intensive one-week seminar to help participants (reentry women interested in science and engineering) increase communication skills, develop problem-solving strategies, identify individual and professional strengths, set career goals, and draw up personal plans for action. Recruitment was mainly via radio and television announcements. The students received vocational and academic counseling and met with industry representatives, University faculty, and psychological consultants. Twelve of the participants sought follow-up support from the seminar staff, four of whom enrolled in engineering school, one pursued a PhD in mathematics, three obtained engineering related jobs, and four redrafted resumes to search actively for employment. G.F. Paskusz, EE Department, University of Houston, Houston TX 77004, (713) 749-1770

270 ENHANCING POTENTIAL FOR WOMEN IN SCIENCE (EPWIS), City University of New York (CUNY), New York NY 10036; Center for Advanced Study in Education, Graduate School and University Center / National Science Foundation (NSF) / \$104,369 year, \$417,476 total (NSF 70%; CUNY 30%) / July 1977-July 1981 / Computer science / Graduate and continuing-adult education / 90 F total / Recruit B, A, H; Involved 8% B, 7% A, 1% H, 11% E; Efforts E; Role models B / V.

EPWIS is a tuition-free program for women with bachelors or advanced degrees in the sciences who are unemployed or underemployed and wish to reenter a field of science. This program is designed to supplement their original training and, over a two-year period, prepare women to either enter the job market as systems analysts in an area related to their previous scientific training or enter

## GRADUATE AND REENTRY

graduate programs in computer science. The program includes technical courses, counseling, seminars, an individually guided project in the student's scientific discipline and assistance with job placement and/or enrollment in graduate school. The women in the first group have completed the project and are working or enrolled in graduate school. The directors reported that employers are very enthusiastic. They commented further that "reentry women are usually highly motivated, but somewhat anxious student groups who benefit from the peer support provided by all-female classes and role models."

Publications: D. Chitayat and G. Ross, "Re-entry Women in Science," in C.K. Tittle and E.R. Denker, Returning Women Students: Policy Implications in Higher Education (New York: Praeger, 1980); D. Chitayat and G. Ross, "Enhancing Potential for Women in Science: Interim Report," 19 pages plus appendix; and D. Chitayat and G. Ross, "Women in Science Year End Evaluation: First Year Report," 1978, mimeographed, 16 pages plus appendix. Dr. Deanna Chitayat, Dr. George Ross, Project Directors, EPWIS CASE/IRDOE, City University of New York, 33 West 42nd Street, New York NY 10036, (212) 221-3698

271 FAST-TRACK LATE ENTRY PROGRAM, University of Dayton (UD), Dayton OH 45469 / National Science Foundation (NSF) / \$112,000-\$176,000 year, \$288,000 total (NSF 100%) / July 1976-Dec 1979 / Engr / Reentry women / 71 F total / Recruit B; Involved 5.6% B, 1.5% A, 10% E; Efforts E; Role models B / V.

This program retrained chemists, physicists and mathematicians as either chemical engineers or electrical engineers. Most participants were employed at the time of their acceptance to the program but were dissatisfied with their opportunities for advancement. Participants attended the University of Dayton full-time for twelve months and enrolled in special and regular undergraduate courses, averaging about thirty-five credit hours. Four of the fifteen electrical engineering courses were self-paced. The chemical engineering sequence utilized a lecture/examination approach coupled with regular problem sessions and self-help sessions. Reentry students took some courses with other undergraduate students and typically performed as well as or better than other students in these classes. A professional development program was created which included lectures, individualized instruction and workshop modules in skills assessment, job hunting skills, and planning for career growth. Regular University counseling services and special modules on test anxiety and stress reduction were used. A tutorial center was established. Student ratings, attrition analysis and other measures indicate

## GRADUATE AND REENTRY

that a reentry program that begins with self-paced modules provides a smoother transition into academics, and that integration with undergraduate students in a traditional classroom provides the opportunity to compare academic performance and to build self-confidence. Recruitment was by direct mail, in response to individual inquiries, and to lists of alumnae of universities in the targeted region who had degrees in appropriate fields. The program was publicized in technical journals, newsletters, magazines, local newspapers, and television appearances. Stipends were awarded on the basis of financial need. Staff secured part-time employment for approximately forty percent of the women in the program. Publication: Carol M. Shaw, "Interim Report, February 1980, Women in Science Career Facilitation Project, University of Dayton SP176-20470 A01," 33 pages. Carol M. Shaw, Assistant Dean of Engineering, University of Dayton, 300 College Park, Dayton OH 45469, (513) 229-2736

272 FOCUS ON WOMEN SEEKING A SECOND CAREER IN PSYCHOLOGY, Johns Hopkins University (JHU), Baltimore MD 21218 / National Institute of Mental Health (NIMH) and JHU / \$40,000 year, \$160,000 total (NIMH 25%; JHU 75%) / Sept 1979-Sept 1982 / Psy / PhD / 6 F year / Efforts E / V.

The program seeks, enrolls, trains, and places women who already have baccalaureate degrees in psychology and who wish to reenter the field with a doctorate. The department advertises the project through releases to news media, mailings to universities likely to have graduated women eligible to apply, and brochures distributed directly to potential applicants. The program offers fellowships, assistance with childcare and travel (if necessary), individual counseling on academic and professional goals, and special review training for those who might have been out of an academic environment for several years. The counseling is designed, among other things, to guide the student away from the overspecialization which forces many women who are geographically immobile to accept jobs below their qualifications. Students complete the standard doctoral curriculum in the department, consisting of area seminars, research seminars, topical seminars, independent research, and a teaching practicum. Dr. William Garvey, Psychology Department, Johns Hopkins University, Baltimore MD 21218, (301) 338-7057

273 INDUSTRIAL CHEMISTRY WITH A MANAGEMENT OPTION, Chatham College (CC), Pittsburgh PA 15232 / National Science Foundation (NSF) / \$70,559 (NSF 86.85%; CC 13.15%) /

## GRADUATE AND REENTRY

April 1977-July 1978 / Chem / Reentry women / 23 F /  
Involved 13% A; Role models B / V.

This program offered courses and laboratory instruction in chemistry, computer science, economics, finance and corporate structure to prepare women previously trained in science to enter scientific careers or graduate school. These women, who had been out of the science workforce and school for some time, were given an introduction to modern industrial techniques and an industrial chemistry course. They were assisted in defining career goals. Exposure to individuals employed in industry and facilitation of employment were provided through field trips, internships, special programs and "recruitment week." Ninety-one percent of the women have either been employed or entered graduate programs since completing the program, and all participants acquired the desired knowledge and skills. An unexpected benefit has been the development of closer ties between Chatham and area industry, resulting in increased recruitment of Chatham undergraduates by area firms. Participants in this program were recruited by means of newspaper advertisements and articles, public service announcements, direct mail to potential participants, television and radio interviews, and letters to local hospitals and politicians. Funding has been renewed and will continue through June 1981. The new grant includes stipends for some participants, which the director views as crucial if the program is to serve those who need it most. Dr. Diane K. Wakefield, Chatham College, Pittsburgh PA 15232, (412) 441-8200, x307

274 INSTRUMENTAL ANALYSIS FOR CHEMISTRY/BIOCHEMISTRY  
GRADUATES, College of St. Catherine (CSC), St. Paul MN  
55105 / National Science Foundation (NSF) / \$8,750 year,  
\$26,250 total (NSF 100%) / Feb 1977-May 1979 / Chem /  
Graduate / Involved 4% A, 4% D, 4% E; Role models B / V.

This program served women who had completed an undergraduate or master's degree in the sciences who, after a period of absence from the field for which they were trained, wished to update, change career plans and return to the work force. The program consisted of a self-paced slide/tape sequence (developed by Communications Skills Corporation), which could be completed at the student's home or at the college; hands-on experience on instruments; and attendance at courses without charge. Participants were recruited through advertisement in local, suburban, and university newspapers; human-interest stories on project participants in local papers; stories and announcements in campus publications reaching alumnae, parents and friends of the college; brochures mailed; a

## GRADUATE AND REENTRY

speech on the role of women in science; and word-of-mouth recruitment by past participants. Staff found that instrumentation had not been part of the routine science education fifteen years ago and that strong motivation was needed for the students to proceed at a pace which would complete the program. Materials are now available for more women to enter the program at a small cost to defray faculty time, without cost to the college for materials. Sister Mary Thompson, Argonne National Laboratory, Chemistry Division, Argonne IL 60439, (312) 729-2000

275 MATHEMATICS CAREER REENTRY FOR WOMEN, Washington State University (WSU), Pullman WA 99164 / National Science Foundation (NSF); Weyerhaeuser / \$93,470 (NSF 61%; Weyerhaeuser 6%; WSU 33%) / Aug 1977-June 1978 / Math / Graduate and Reentry women / 8 F / Recruit E; Involved 12% A, 50% E; Role models E.

The goal of this project was to enable unemployed or under-employed women with at least bachelor's degrees in mathematics to reenter the job market as applied mathematicians or to go on to graduate school with the same ultimate goal. The participants were given an intensive, short refresher course in core mathematics and computing prior to the academic year. During the academic year, they took regular undergraduate and graduate courses in applied mathematics and computing as appropriate to their interests and needs. All of the women either found suitable employment at the termination of the program or are still in graduate school. Recruitment efforts included newspaper ads, TV shorts, announcements in the NOTICES of the American Mathematical Society, and direct mailings to former students. The director advises that "such a program cannot be maximally effective unless stipends are made available. Otherwise, women who need the program most cannot afford to participate." Calvin T. Long, Department of Mathematics, Washington State University, Pullman WA 99164, (509) 335-3134

276 MONTHLY MEETINGS, BETA CHAPTER, SIGMA DELTA EPSILON (ΣΔΕ)-GRADUATE WOMEN IN SCIENCE, University of Wisconsin (UW), Madison WI 53706 / members dues, Beta Chapter / about \$800 year / 1966-present / Math, Ast, Phy, Chem, Bio, Med, Engr, Agr, Geol / Graduate, faculty-employee development, continuing-adult education / 50 F total / Involved 6% B, 12% A, 5% H (in 1978-79); Role models N, B, A, D, E.

From its founding in 1922 until 1966, Beta chapter meetings were primarily devoted to upgrading the technical competence of its members. Since 1966, the chapter's monthly meetings

## GRADUATE AND REENTRY

provide familiarity with a broad range of science research on campus and an opportunity to become acquainted with persons doing and reporting research. Some meetings have also been devoted to personal considerations such as the compatibility of marriage, family and a job in research; planning for financial security; and equal opportunity. The program offers informal opportunities for development of friendships and networks of communication for visibility, advice on courses and research projects, plus complementary professional support throughout careers. The chapter recommends women for inclusion on research advisory panels and in standard biographical reference works. As a result of Beta meetings, women scientists and students have identified obstacles to the participation of women in science and have arrived at several remedies for strengthening women's science education and for dealing with discrimination. Names of prospective attendees are obtained through representatives in science departments, and personal invitations are extended to encourage participation in meetings and enrollment in the chapter. Costs for the monthly meeting are modest because the University of Wisconsin donates a meeting room rent-free and because Beta members donate their labor in planning, advertising, and conducting the sessions. Ruth Dickie, 610 Walnut Street, Rm 464, University of Wisconsin, Madison WI 53706, (608) 263-5604

277 NEW ALTERNATIVES FOR WOMEN SCIENCE GRADUATE STUDENTS, University of Arizona (UA), Tucson AZ 85742 / National Science Foundation (NSF) / \$15,961 (NSF 53.7%; UA 46.3%) / June 1976-Oct 1977 / Math, Ast, Phy, Chem, Bio, Med, Engr, Soc, Geol, Psy / Masters / 78 F / Involved 11% Min; Efforts E; Role models H / V.

The goals of this workshop were to encourage participants to complete their training by helping them to deal with particular problems of women science graduate students, and to increase their knowledge of career and educational options. Posters, announcements to department heads, and letters of invitation to female graduate students were used to recruit participants. Problems such as the lack of female role models or mentors, and the difficulties of combining career and marriage, were discussed by professional women scientists. Information was provided on post-doctoral and career possibilities in new areas of science. Eight outstanding scientists representing the fields of biological, physical, and social sciences were invited from out-of-state to participate in the workshop. These scientists were augmented by their counterparts drawn from the faculties of the University of Arizona and Arizona State University. The two-day program began with a panel consisting of four

## GRADUATE AND REENTRY

experts (within the same broad field, i.e. Physical Sciences) discussing their careers, fields, and lifestyles. The first day's workshops covered the Physical Sciences, Graduate Students, and the Biological Sciences. The second day began with a talk on finding jobs, followed by panels and workshops on the Social Sciences and post-doctoral opportunities. The second day ended with informal sessions with panelists and departmental representatives. According to the project director, "overall participant responses indicated an enormous need for this type of workshop to continue at the graduate level to provide motivation, support, role models, mentors, and increased awareness of post-doctoral and job opportunities." Publication: the project director is writing a book tentatively titled New Alternatives for Women in Science, based in part on the workshop. Dr. Jo Ann Brown Hansen, Cancer Center Division, Arizona Health Sciences Center, Tucson AZ 85724, (602) 626-6347

278 NEW OPPORTUNITIES FOR WOMEN CHEMISTS: RECOVERING AND UPDATING LOST SKILLS, Rosemont College, Rosemont PA 19010 / National Science Foundation (NSF) / \$34,040 total (NSF 100%) / Sept 1974-1976 / Chem / Reentry women / 21 F total / Involved 5% B / V.

This program prepared women for employment who had earlier received bachelor's degrees in chemistry but had not worked as chemists. The objectives were to refresh the participants' knowledge in chemistry, to update their laboratory skills and to strengthen their self-confidence, if necessary. Students enrolled in two and one-half units of undergraduate work each semester for two years. The program included lecture courses in analytical chemistry and biochemistry, advance laboratory work which stressed instrumentation and methods, and a weekly industrial seminar. The industrial seminars included lectures by industrial personnel, visits to local industries, and discussion with Rosemont faculty. A six-week paid internship at the conclusion of their retraining proved to be highly successful. "Not only does it acquaint the participating companies with the capabilities of the women, but more importantly it provides the women with a sense of confidence they can acquire in no other way. The income earned more than covers the college (audit) tuition. In many cases, participation in the program would have been impossible without this opportunity." An increasing number of cooperating education arrangements with local industries have made these temporary internships less available. This program has established an interface between activities at the college and at least half a dozen industries and has extended Rosemont's reputation for strong, modern science

## GRADUATE AND REENTRY

education, and concern for the education of women. Recruitment has been by letters to area alumnae of Rosemont and other colleges, news releases and paid advertisements in local newspapers, spot radio announcements and notices in newsletters of area AAUW chapters. The program has been continued since 1976. The only special costs to Rosemont are for industrial seminars. Dr. Suzanne Varimbi, Rosemont College, Rosemont PA 19010, (205) 257-0200

279 NEW VIEW (NEW VOCATIONAL INTERNSHIP EDUCATION FOR WOMEN), Foothill-De Anza Community College (F-DACC), Los Altos Hills CA 94022; National Air and Space Administration-Ames Research Center / Carnegie Corporation, NASA-Ames / \$100,000 year (Carnegie 85%; NASA-Ames 10%; F-DACC 5%) / Dec 1974-present / Math, Chem, Engr / Reentry women / about 25 F year / Recruit N, B, A, H, D, E; Involved 2% B, 12% A, 2% H, 1% D, 4% E; Efforts E / V.

NEW VIEW is an education program for adult college women who want to begin or resume technical and professional careers in mid-life. Of the first several years' enrollees, seventy-seven percent were thirty years or older, and thirty-three percent had not earned college degrees. A contingency fund for emergency childcare, transportation, and similar expenses helps low-income women to participate. Potential minority enrollees are reached through faculty and staff contacts. NEW VIEW students work twenty hours a week during school terms and forty hours a week in the summer in internships provided by NASA. Internship assignments are determined by the Ames Research Center's needs and the student's career plans and major; data processing is the option for a plurality. Each woman takes at least two academic courses during the fall, winter, and spring terms. Some students complete certificate or degree programs; others take specific courses in mathematics, science, and communication which add to their earlier education. Individual and group counseling are provided throughout the program year. Job placement services are offered to participants past and present to help students with resume preparation, references, and assessments of local employment possibilities. Seventy-five percent of those who have completed the program are known to be employed, virtually all of them in jobs related to their program experiences. Audiovisual: slide show with sound/sync, 16 minutes, 1976. Publications: NEW VIEW (F-DACC, September 1977, 26 pages and January 1979, 8 pages). Margaret T. Shoenhair, Foothill-De Anza Community College District, 12345 El Monte Road, Los Altos Hills CA 94022, (415) 918-8590, x408

## GRADUATE AND REENTRY

280 POST BAC, School of Engineering and Applied Science, University of Virginia (UV), Charlottesville VA 22901 / U.S. Steel and IBM / \$12,000 year, \$30,000 total (U.S. Steel and IBM 40%; UV 60%) / June 1975-June 1978 / Engr / Graduate, second Bachelor's degree / 32 F, 3 M total / Recruit B / V.

This project prepared women with BA/BS degrees in mathematics, physics, or chemistry for engineering careers in industry and government. The students spent eighteen months in courses and completed a six month job training experience. They received a BS degree in engineering from the University. Participants were recruited through mailings to small women's liberal arts colleges (including minority women's colleges), industrial contacts, and other employers of engineers and scientists. As the number of women enrolling in regular engineering undergraduate programs rose, demand for the program gradually declined, and it was phased out. The director felt that it was a "timely, affirmative program which demonstrated that outstanding science graduates can be redirected into engineering in a reasonably short time." Publication: Annual reports to the sponsors. David Morris, Thornton Hall, School of Engineering and Applied Sciences, University of Virginia, Charlottesville VA 22901, (804) 924-3164

281 PROJECT ACT: ACCESS TO CAREERS IN TECHNOLOGY, Women's Enterprises of Boston, Boston MA 02116 / Fund for the Improvement of Postsecondary Education (FIPSE), U.S. Department of Education / about \$190,000 projected (FIPSE 100%) / Sept 1978-Aug 1981 / Math, technologies and technical work / Continuing-adult education / 157 F year / Recruit E; Involved 10% B; Role models E / V.

This project is designed to increase the number of women enrolled in technical training in the Boston area, provide direct technical career planning services to adult women, and provide better access and support for women pursuing technical training. ACT is expanding communications among postsecondary technical institutions, industry and prospective female students via a school consortium, group dialogue, panel discussions, site tours, and guest speakers. ACT provides consultations and technical assistance to individual postsecondary schools regarding improvement of recruiting practices and support and instruction of female students. The project has assisted schools with proposal development, planning of hands-on workshops, open houses and staff development. A comprehensive pretraining program, operated by ACT, helps individual women assess their skills and provides access to training options. Direct services have been expanded and improved and, in

## GRADUATE AND REENTRY

ACT's two years, twenty-nine women have entered technical training programs. Currently, ten have completed training and are employed in technical positions. The director commented that "participants need a great deal of encouragement and support through the process of considering an alternative career. It is high risk; they have many misconceptions about the field and lack of confidence in their own abilities to succeed in it. Schools and employers must approach outreach and retention issues, i.e., lack of mentors, insensitivity of staff, isolation, sex biased literature, if they seriously want to integrate females in their programs." A handbook has been developed. Recruitment methods included promotional material sent to community agencies, organizations and business newspaper articles, staff appearances on TV and radio, presentations to local groups and contact with employers, CETA officers and welfare officers. Audiovisual: "You Can Get There From Here," eleven minute slide show. Cynthia Buzzetta, Director, Project ACT, Women's Enterprises of Boston, 739 Boylston Street, Boston MA 02116, (617) 266-2245

282 REENTRY WOMEN IN SCIENCE CAREER WORKSHOP, University of New Mexico (UNM), Albuquerque NM 87131 / National Science Foundation (NSF) / \$15,488 total (NSF 74%; UNM 26%) / July 1978-Sept 1979 / Math, Phy, Chem, Bio, Engr, Soc, Geol, Psy / Graduate and Reentry Women / 105 F total / Recruit N, H; Involved 2% N, 1% D, 9% H; Role models Min / V.

A two-day conference was held to provide women who had educational backgrounds in natural, physical or social sciences or engineering with (1) information concerning current employment opportunities and further education for entry or reentry into a science field; (2) experience in career decision-making skills, career planning, and techniques for obtaining employment; and (3) an opportunity to meet and share ideas with other women who are interested in science and engineering. Ninety-six percent of the participants reported that their expectations of the conference were met satisfactorily or exceeded. Following the workshop, a women in science chapter was formed in Los Alamos. Publicity and recruitment were done with brochures and flyers sent to women's groups, female leaders, scientific organizations, tribal leaders, alumnae of the University, state and federal agencies and public schools, and by advertisement on radio, television and newspapers. Publication: Peggy J. Blackwell and Carolyn Wood, "Reentry Women Science Career Workshop Final Report, 1979," 56 pages and appendices. Peggy J. Blackwell, 1920 Lomas NE, University of New Mexico, Albuquerque NM 87131, (505) 277-4233

## GRADUATE AND REENTRY

283 SCIENCE CAREER FACILITATION PROJECT IN ENERGY RELATED FIELDS, George Mason University, Fairfax VA 22030 / National Science Foundation (NSF) / \$33,000 year, \$66,000 total (NSF 100%) / Sept 1976-Nov 1978 / Math, Phy, Chem, Bio, Soc / Reentry women / 28 F year / Involved 10% N, 3% B / V.

This project prepared women for jobs or further study in energy related fields. The goal was achieved through lectures, laboratory sessions, self-paced instruction, and career and psychological counseling. All women seeking jobs or graduate school placement were successful in finding positions. The self-confidence of participants increased during the program. The director recommends that projects such as this be established nationwide and that outside support for initiating them be available for more than two years. Natalia Meshkov, Community and Public Policy Studies, University of Chicago, 5735 South Ellis Avenue, Chicago IL 60637, (312) 753-8243 or 8286

284 SCIENCE CAREER FACILITATION IN POLYMER SCIENCE, University of Lowell, Lowell MA 01854 / National Science Foundation (NSF) / \$79,000 total (NSF 100%) / June 1976-April 1980 / Chem, Polymer science / Graduate and Reentry women / 24 F total / V.

This program for women with obsolete B.S. degrees was a combination of updating and retraining. There was a blend of self-paced and structured instruction, laboratory experience, internships and career counseling. In addition to achieving the goals for individual women, the project has had a positive impact on the institution by improving the perceptions of faculty and staff regarding reentry (part time) students. The director noted that placement of mature individuals who lack geographical mobility poses some problems. Publication: R.B. Blumstein, "Introductory Polymer Courses in Continuing Education," Symposium on Polymer Education, Organic Coatings and Plastics Chemistry, (1979), p. 226. Dr. R. B. Blumstein, Department of Chemistry, University of Lowell, Lowell MA 08154, (617) 452-5000, x2554

285 SCIENCE CAREER FACILITATION PROJECT, Southern Illinois University (SIU), Edwardsville IL 62035 / National Science Foundation (NSF) / \$68,168 year, \$119,294 total (NSF 52.64%; SIU 38.14%; miscellaneous contributions 9.22%) / July 1977-April 1979 / Math, Chem, Technical writing / Graduate and Reentry women / 18 F / Involved 28% Min; Efforts Min; Role models B / V.

## GRADUATE AND REENTRY

The project refreshed and updated the scientific and mathematical skills of women trained in science who had been away from the practice of science for from two to fifteen years, and assisted these women to enter graduate school or employment in science. Academic courses, seminars and guest lectures were the major parts of the program. Participants were assisted with writing of resumes and letters of inquiry, and preparation for job interviews. Job interviews were arranged through the University's Job Placement Office. Field trips to many local industry sites were conducted. Counseling was available. Recruitment methods included participation in radio talk shows, distribution of brochures to local women's groups, and display of posters in area businesses. The most effective recruitment channel was newspaper advertisement. More than fifty percent of the participants decided to return to school. At the end of the project five women were still seeking employment. Although some women reportedly felt that their time would have been better spent looking for jobs, many realized benefits from the project. The director noted that stipends and scholarships would have reduced stress caused by financial problems of some participants. (Part-time jobs were provided for six of the women.) She also commented on the difficulty of designing a single program for retraining women with degrees in other science disciplines for work in chemistry and mathematics. A project report was produced. Dr. Charlotte O. Lee, 333 North Cuyler, Oak Park IL 60302, (312) 848-2847

286 SCIENCE CAREER FACILITATION PROJECT, University of Texas (UTA), Arlington TX 76019 / National Science Foundation (NSF) / \$228,562 total (NSF 90%; UTA 20%) / Sept 1977-Nov 1981 / Math, Phy, Chem, Bio, Geol, Psy / Graduate and Reentry women / 80 F total / Recruit N, B, A, H; Involved 10% B, 8.8% H, 2.5% D; Role models B, A, H / V.

This program was designed to assist women in updating their scientific knowledge and skills in preparation for graduate school or employment in science. The program encouraged the participants to pursue challenging, high level careers. As special graduate students, the women took two semesters of academic course work with tailored updating courses in various disciplines and a course in communication and professional skills; and attended seminars on assertiveness, resume writing and interviewing. Career and personal counseling were provided to strengthen the self-esteem and confidence of the participants as well as to increase their awareness of career options. A Science Career Facilitation program will be integrated into the graduate school when current funding expires. Many

## GRADUATE AND REENTRY

women who participated in this program have "re-examined their roles in society, strengthened their self esteem and confidence (and) redirected their career goals." The director advised that "women...be encouraged to take career risks and thus set higher goals," and be given courses in decision making and leadership skills. Recruitment efforts for this program included a news release distributed to newspapers via UPI and sent to television and radio stations for public service announcements, feature stories sent to ethnic newspapers, paid advertising in both kinds of print media, a brochure sent to women's organizations, ethnic groups and women alumnae of large universities, and brochures and posters sent to women's centers and libraries. Ann Benham, Department of Chemistry, The University of Texas at Arlington, Arlington TX 76019, (817) 273-2805

287 SCIENCE CAREERS FACILITATION PROJECT FOR WOMEN, State University of New York, Stony Brook NY 11794 / National Science Foundation (NSF) / \$54,000 total (NSF 100%) / Sept 1977-Dec 1979 / Engr / Graduate and Reentry women / 19 F total.

This program retrained women with backgrounds in physics, chemistry, health sciences, biology and mathematics as materials science engineers for placement in industry or graduate school. The program consisted of several weeks of one-to-one remedial classes and tutorials followed by selected, flexible courses based on the goals of the students. Included in the program was a Special Topic Laboratory, a Summer Employment Program with local industries and a Placement Program. Seventeen of the original students completed the program. Eight are now employed in industry and nine have been accepted into masters' programs in materials engineering. The director observed that "employers are eager to hire the highly motivated women graduates" whom he characterized as being "of extremely high academic caliber with excellent prospects for the future." There was extensive recruitment in local and college newspapers, local television and radio broadcasts, libraries, civic associations and women's groups, local industries and area colleges, as well as in the SUNY Adult Continuing Education Program. Professor Patrick J. Herley, Department of Materials Science and Engineering, State University of New York, Stony Brook NY 11794, (516) 246-5000

288 SCIENTIFIC UPDATE FOR WOMEN, Chestnut Hill College (CHC), Philadelphia PA 19118 / National Science Foundation (NSF) / \$38,958 (NSF 100%) / Sept-Dec 1977 / Math, Chem, Bio / Reentry women / 30 F / V.

## GRADUATE AND REENTRY

This program to improve the knowledge and talents of women who had been away from their science fields for two to fifteen years, also sought to restore the participant's self-confidence. To update their undergraduate training before re-entry in the job market, Chestnut Hill offered a program of interdisciplinary study in biochemistry, biology and computer science. The academic section of this fifteen-week program consisted of three short courses of four week duration, each designed as a lecture-laboratory "hands-on" experience. Where possible, the data collected in laboratory experiments were used as the basis for computer work. The first of two career-preparation seminars was conducted by five women in varied science fields--all successful role models. Topics covered include the relevance of home-making and volunteer experience to the requirements of paid employment, the competition for jobs, ways of strengthening scientific knowledge, strategies for re-entering the workforce, and the value of maturity as an attribute in job seeking. The second seminar, conducted by the Directors of Continuing Education, Placement and Women in Management, dealt with the process of job seeking and ways of continuing and reinforcing the process begun in this program. Although a certificate was presented for completion of this non-credit pilot program, the next Scientific Update will give a Continuing Education Unit of credit. The director commented that although most women felt they had grown as a result of participation, many of them "were still much involved with family responsibilities, and could not pursue full time employment." She observed further that "mature women are very much interested in developing their potential, and can learn much quicker than the average undergraduate, once they overcome their anxiety about their absence from the field." Publication: Mary K. McElroy, "A continuing education project for updating women in biochemistry," Journal of Chemical Education 55 (October 1978), 649. Sister Mary Kieran McElroy, Chestnut Hill College, Philadelphia PA 19118, (215) 248-7195

289 STEPPINGSTONE MATH, Hartford College for Women (HCW), Hartford CT 06105 / George A. and Grace L. Long Foundation; student fees; HCW / about \$5,000 year (Long Foundation 50%; fees 25%; HCW 25%) / Jan 1975-present / Math / Reentry women / 160 F total / Involved 10% B, 2% D, 20% E / V.

This series of three to five courses is designed to help adult women refurbish out-of-date mathematics skills and overcome math anxiety. Students are recruited through notices sent to Hartford area insurance companies and banks, the HCW Counseling Center Newsletter, radio and television spot announcements, news releases to local papers,

## GRADUATE AND REENTRY

speeches to women's groups, and word-of-mouth from former participants. Classes are limited to fifteen to eighteen, and placement is made by pretesting. In 1980-81, math is offered on three levels. Level I concentrates on arithmetic and geometry; II on algebraic equations; III on factoring, graphing linear equations, word problems, and simultaneous equations, and on topics usually covered in second year algebra courses. Some graduates have gone on to enroll successfully in pre-calculus courses at HCW. The instructors notice that confidence gained by the women in the course spills over into other aspects of their lives including their work. They recommend at least partial tuition subsidies to encourage women to "do something that they have avoided for years." Publication: Linda Raffles, Steppingstone Math (textbook). Barbara Grassick, Program Coordinator, The Counseling Center of Hartford College for Women, Hartford CT 06105, (203) 236-5838

290 UPDATING WOMEN FOR ACTIVE CAREERS, American University (AU), Washington DC 20016 / National Science Foundation (NSF) / \$112,762.50 year, \$225,525 total (NSF 90.8%; AU 9.2%) / July 1976-Oct 1980 / Chem / Reentry women / 49 F total / Recruit E; Involved 4.3% B, 6.4% A, 2.13% E; Role models Min / V.

This project's goal was to update women who had been away from chemistry to prepare them for return to the work force or graduate school. Courses were developed in physical, organic, analytical and biochemistry with inorganic chemistry covered in all the courses to some extent. There was heavy emphasis on laboratory skills and instrumental methods. Lectures on career planning, resume writing and similar topics were conducted; one-to-one counseling on the graduate school selection and application process and examination of job possibilities was available. The new courses have been incorporated into the Chemistry department's regular core of courses. The program consisted of a twenty-eight week session and a fourteen week accelerated schedule. The twenty-eight week program was revised to give twelve hours of graduate credit which facilitated classification for federal employment. Recruitment was by advertisement in newspapers--major ones as well as local and minority papers--university radio announcements, and brochures mailed to members of the American Chemical Society, women's associations, government agencies and others. The director reported that "nearly equal to the required academic updating is the necessity to build and instill confidence in their own abilities and intelligence... Their overall problems were similar and they supported and sustained each other..." Publication: Nina Matheny Roscher, "Updating Women Chemists for Active Careers," Journal of

## GRADUATE AND REENTRY

College Science Teaching, VII (1978) 220-222. Nina Matheny Roscher, Paul F. Waters, Thomas S. Cantrell, Louise Hanson and Frederick W. Carson, "A Curriculum for Continuing Education in Chemistry," Journal of Chemical Education, 55 (1978) 646-648. Nina Matheny Roscher, "Retraining Chemists--Is It Worthwhile?" Journal of Chemical Education 57 (January 1980) 60. Dr. Nina Matheny Roscher, The American University, Washington DC 20016, (202) 686-2124

291 WOMEN IN ENGINEERING, University of California (UCD), Davis CA 95616 / National Science Foundation (NSF) / \$100,000 total (NSF 80%; UCD 20%) / 1975-1979 / Engr/ Reentry women / 40 F, 2 M total / Recruit E; Efforts E / V.

This program recruited women with bachelor's degrees in science fields and retrained them for employment as engineers. Participants enrolled in two summer sessions and took eight courses during the academic year. The first summer session was remedial. The second summer and the eight courses were in electrical engineering or related engineering specialties. A majority of the participants in this program entered engineering employment. Recruitment was primarily through press releases and newspaper advertising. Richard Dorf, University of California, Davis CA 95616, (916) 752-1011

292 WOMEN IN POLYMER CHEMISTRY CAREER FACILITATION, Polytechnic Institute of New York, Brooklyn NY 11201 / National Science Foundation (NSF) / \$59,424 year (NSF 100%) / Sept 1977-Sept 1979/ Chem, Engr / Reentry women / 60 F total / Recruit B, H; Involved 12% B, 12% H; Role models B, A / V.

The primary goal of this program was to enable unemployed or underemployed women who had received bachelor's degrees in chemistry to upgrade their skills either to reenter the job market or to improve their employment status. A second goal was to encourage women to obtain graduate degrees in chemistry. Based on her previous background and experience, each woman was assigned an educational program consisting of short courses, regular graduate courses, and audio-workbook courses designed to enable her to compete, after one year, with current B.S. degree graduates in polymer chemistry. Personal and placement counseling were provided. Seminars on resume writing, job search, and interviewing were held and attended by prominent women polymer chemists who served as role models for participants. In the first year, recruitment was by direct mailings to chemistry graduates in the New York City metropolitan area and to companies likely to employ potential participants. Because this method did not generate large numbers of

## GRADUATE AND REENTRY

applicants, the second year recruitment was by advertisement in print media, which proved more successful. The director observed that "motivational variables, as opposed to conventional indicators including previous college grades and scores on standardized examinations, proved to be better predictors of which women would do well in the program." She notes that "fifty-four percent of the first group of women, and thirty-seven percent of the second, were unemployed when they applied to the program. At the end of the one year of updating, seventy-nine percent of the first group and eighty-seven percent of the second were employed, most as professional chemists, or in chemistry related positions. Fifty-three percent of the first group, and twenty-two percent of the second were considered to have upgraded their jobs. In addition, forty-seven percent of the first group, and thirty-five percent of the second, continued in graduate school." Dr. Pam Kramer, Polytechnic Institute, 333 Jay Street, Brooklyn NY 11201, (212) 643-3943

293 WOMEN IN SCIENCE, Mount St. Mary's College, Los Angeles CA 90049 / National Science Foundation (NSF) / \$28,678 year, \$57,359 total (NSF 87%; Mount Saint Mary's 13%) / July 1977-June 1979 / Math, Phy, Chem, Bio / Graduate / 20 F total / Involved 5% B, 20% H, 15% Min, 2% E; Role models A, H / V.

This program was widely publicized in major newspapers, local area newspapers, and the Chronicle of Higher Education. A brochure was distributed to local industries, the League of Women Voters, and several hundred individuals. It recruited women whose education has been interrupted, or whose career advancement has been hampered by lack of current training, and brought their learning, skill, and expertise to the level of current graduates. A second goal of the program was to assist participants in placement within the fields of science in industry, education, medical and graduate school or in jobs in the health professions. These goals were achieved through a three semester (summer optional) program of short courses, self-paced instructional modules, hands-on experience in computer sciences, faculty and guest lectures, internships, and network building activities. Reentry sessions on career planning, time and stress management and study and math skills, decision-making and risk-taking, role conflicts, and assertiveness were an integral part of the program. All twenty participants have been suitably placed in employment or graduate or medical school. "The most striking insight gained by the Women in Science faculty was the need of the participant to strengthen her self-image. The level of success achieved by the women was primarily due to the strong self-motivation exhibited by each

## GRADUATE AND REENTRY

individual in the program. None of the women lacked the intellectual ability to complete the program." The director felt that the placement of newspaper announcements (next to the daily horoscope in one case and next to "Dear Abby" in another) influenced the rate of response and visibility. The Los Angeles Times announcement was a paid ad. All other news releases, including an editorial in the Los Angeles Times, were free. Dr. Annette Bower, Mount St. Mary's College, 12001 Chalon Road, Los Angeles CA 90049, (213) 476-2237

294 WOMEN IN SCIENCE CAREER FACILITATION PROJECT, University of Texas, Austin TX 78712 / National Science Foundation (NSF) / \$196,865 total (NSF 100%) / Sept 1976-Aug 1979 / Math, Ast, Phy, Chem, Bio, Engr, Soc, Psy / Reentry women / 59 F total / Involved 5% B, 1.7% A, 3.4% H / V.

This program gave women with a degree in natural or social sciences a year's training in computer science as preparation for employment or graduate study. The program included twelve hours of special instruction over two semesters, plus regularly scheduled computer science courses. Of those who have completed the course of study, all have been placed in jobs or graduate school. Publication: N. Daie, "Women in Science: A Pilot Project in Accelerated Computer Training for Returning Women Students," Proceedings of ACM-SIGSCE Conference on Computer Science Education, Lafayette, August 4-5, 1977. Dr. Nell Dale, Computer Science Department, University of Texas, Austin TX 78712, (512) 471-4353

295 WOMEN IN SCIENCE CAREER WORKSHOP, University of California (UCLA), Los Angeles CA 90024 / National Science Foundation (NSF), UCLA and local industry / about \$18,000 (NSF 55%; UCLA 28%; Industry 17%) / June 1978-Nov 1979 / Math, Ast, Phy, Chem, Bio, Med, Engr, Geol, Psy / Masters, Ph.D., Reentry women / 402 F total / Involved about 5% Min; Role models Min, D, E / V.

The project used direct mail extensively to recruit participants. Six colleges and universities provided mail labels for their women graduate students in the sciences, and a list of addresses was purchased for over 5,000 recent and current graduate students in southern California. Brochures were distributed on 39 college campuses and via panelists and employer representatives. A newspaper, radio, and television campaign supplemented the distribution of brochures. The workshop encouraged women in their graduate work and entry into the scientific job market. It served as a forum in which information was exchanged on practical aspects of graduate work and the job market in science. The

## GRADUATE AND REENTRY

workshop featured a "Job Faire" in which employer representatives were available to answer questions and to recruit qualified applicants from among participants for jobs in the field of science. For information about education and employment in particular fields of science, panels of professional women discussed their area of expertise and experience. These women functioned as role models for aspiring women graduate students and science professionals. The workshop leaders noticed that women scientists in industry were more enthusiastic about chances for employment and advancement than those in academe. They also discovered that students from smaller colleges needed more information about opportunities in science than those from major universities. They recommend that workshops which use a job fair avoid scheduling overlaps with panels, speakers, and counseling sessions. Publication: Jane S. Permaul and Ayesha Gill, Final Report: Women in Science Career Workshop (1979, 20 pp. plus appendices). Dean Jane S. Permaul, Experimental Education Programs, 50 Dodd, University of California, Los Angeles CA 90024, (213) 825-2295

296 WOMEN IN SCIENCE-CHEMICAL INSTRUMENTATION, Mount Holyoke College, South Hadley MA 01075 / National Science Foundation (NSF) (1978); General Electric Foundation (GEF) (1979) / \$12,500 year, \$25,000 total (NSF, GEF 100%) / Aug 1978-Aug 1979 / Chem / Reentry women / 6J F total / V.

This was a retraining program to bring women with technical training who have been out of chemistry back into the field. The program emphasized the reacquisition of laboratory skills and the development of scientific confidence and competence. A two-week intensive course in chemical instrumentation was provided along with career counseling. "Perhaps the greatest surprise (to the director) is the benefits that derive from being in a program at a residential college. The participants really enjoy each other's company and the chance to talk with other women with scientific backgrounds about career achievements and aspirations." Recruitment efforts included direct mail to known chemistry graduates, brochures to all chemistry departments in the United States, articles in private and public press, and advertising in the Journal of Chemical Education. Publication: In Journal of Chemical Education 56 (1979) 509. Dr. Edwin S. Weaver. Department of Chemistry, Mount Holyoke College, South Hadley MA 01075, (413) 538-2214 or 2224

297 WOMEN IN SCIENCE WORKSHOP, Creighton University, Omaha NE 68178 / National Science Foundation (NSF) / \$11,406 (NSF 85%; Creighton 15%) / June 1978 / Math, Ast, Phy, Chem, Bio, Engr, Geol, Psy / Reentry women / 63 F / Involved E / V.

## GRADUATE AND REENTRY

The participants were women in Iowa and Nebraska who had undergraduate degrees in science and who had not been employed in that field for five or more years; several had low incomes at the time of enrollment, but could afford to attend because of the short duration of the session (two days). The project recruited attendees via a direct mail campaign to alumnae of Iowa and Nebraska colleges and universities. The workshop introduced them to scientific and technical employment options (other than teaching and clerical jobs) within the eastern Nebraska-western Iowa region, apprised them of educational requirements which would be needed, and reinforced the participants' confidence in their ability to enter the labor force. About fifteen women scientists in a variety of occupations discussed their work, training, and lifestyle. Personnel officers from nine employers of scientists within the region also addressed the group. These potential employers discovered that women returning to work were serious about careers and competent to fill professional or para-professional roles. The program audience learned of numerous job opportunities in the region of which they had been previously unaware. Some were counseled on the need for additional education which would help them compete successfully in certain careers which attracted them. The participants provided mutual support for each other: many from small towns realized they were not odd or unique in their aspirations and were encouraged to persist in their preparation and plans for reentering a life in science. Dr. Anne E. Scheerer, Summer Sessions-Lifelong Learning Ctr., Creighton University, Omaha NE 68178, (402) 449-2888

298 WOMEN IN TECHNOLOGY (WIT), Hartford Technical College (HSTC), Hartford CT 06106; Hartford College for Women (HCW) / Connecticut Board of Higher Education / \$77,890 (CT Board of Higher Ed 66.7%; HSTC, HCW 33.3%) / Sept 1979-Aug 1980 / Math, Phy, Chem, Engr / Reentry women / 35 F total / Involved 11% B, 2% H; Recruit B, H / V.

WIT participants were mostly Access for Women in Technology graduates (see inventory entry #264). They took classes in mechanical and manufacturing engineering technologies, received personal and academic counseling, and are being placed in jobs developed in consultation with local industry. Besides training and placing the women, the project hopes to strengthen the Counseling Center's expertise in technological fields and to facilitate institutional change at the State Technical College in regard to training adult women. Publication: report in preparation. Carolyn Q. Tertes, Director. Women in Technology, The Counseling Center of Hartford College, 1283 Asylum Avenue, Hartford CT 06105, (203) 236-5838

## GRADUATE AND REENTRY

299 WOMEN MOVING UP, Lawrence Hall of Science, University of California (UCB), Berkeley CA 94720; The Math/Science Network, Zoology Department, UCB / National Science Foundation (NSF) / \$20,000 total (NSF 50%; UCB 50%) / June 1978-Nov 1979 / Math, Phy, Chem, Bio, Med, Engr, Agr, Soc, Geol, Management of scientific and technical research and development / Continuing-adult education / 300 F./ Role models B, A / V.

This conference was held to share information and exchange resources between underemployed women who have earned degrees in the life, physical and social sciences, and professional women who have advanced their careers in these fields. At this one-day session, sixty-five workshop leaders representing a wide range of careers in business, government and higher education provided information about the variety and scope of management careers; insight into how people acquire skills and training to move into management; and suggestions and strategies for career mobility and advancement. In addition, sessions were held on specific fields, for example "Opportunities for Women in Agricultural Sciences," "Jobs in a Booming Field: Electronics and Data Processing," "Research and Development in the Sciences," and "More Women Geoscientists Needed." Post-conference questionnaires indicated that the participants identified "personal contacts with women in the field" as the most valuable resource for gaining access to jobs and promotions. Lack of specific skills and discrimination were identified as significant obstacles to career advancement by the participants. A six-month follow-up of participants showed significant impact of the conference on the participants' career plans. Flyers, press releases, public service announcements and posters were used to publicize the event. Publication: Christine Cremer, A Resource Directory for Women Moving Up (Berkeley: Regents of University of California, 1980), 120 pages, \$5.00; order from Lawrence Hall of Science, University of California, Berkeley CA 94720, Attn. Careers. Nancy Kreinberg, Lawrence Hall of Science, University of California, Berkeley CA 94720, (415) 642-1823 or Marvalee Wake, Department of Zoology, University of California, Berkeley CA 94720, (415) 642-4743

## VIII. FACULTY-EMPLOYEE DEVELOPMENT

ENTRY NUMBERS 300 THROUGH 315

*SEE ENTRY NUMBERS 003, 005, 007, 008, 010,  
019, 020, 022, 025, 028, 031, 033, 040, 041, 044,  
045, 052, 061, 076, 077, 083, 097, 098, 105, 111,  
113, 116, 117, 118, 133, 135, 141, 150, 153, 164,  
169, 176, 204, 213, 219, 229, 232, 236, 253, 258, 260, 276*

## FACULTY-EMPLOYEE DEVELOPMENT

300 ADVANCED STUDY AND RESEARCH IN SCIENCE EDUCATION FOR WOMEN FACULTY AT MINORITY INSTITUTIONS, Purdue University, West Lafayette IN 47907 / National Institute of Education (NIE) / \$99,191 total (NIE 100%) / Sept 1978-Aug 1981 / Math, Bio, Soc / Faculty-employee development / 10 F total / Recruit B; Involved 100% B; Role models B / V.

Participants were recruited from minority colleges in Alabama and Georgia. Their ages ranged from 24 to over 50, and their training varied from an M.A. from a teacher's college to a Ph.D. from Columbia University, yet none had conducted a research project or published an article. Applications were solicited using forms and brochures distributed on target campuses by Dr. Bernice Cobb, the project's associate director. Dr. Cobb met with applicants during her visits to the campuses, and Dr. Kahle met the applicants before final selections were made, and also reached them by mail and telephone from Purdue. The major goal of the project is to enhance participants' career opportunities by improving their research skills and productivity. Subordinate goals include upgrading research and writing skills; increasing awareness of problems facing women in academe; providing professional sponsors or mentors for minority women in higher education; and developing, implementing, and publishing individual and group research projects. The project conducted two summer workshops at Purdue University during which specific skills and important issues were stressed. Research papers are being written by the students for publication in national journals. Their topics center on science education issues related to minority students, such as locus of control, cognitive style, and spatial ability. Response to the summer workshops, especially in terms of specific research skills gained, has been very positive. The women feel their work on the seminar has improved their visibility and influence on their home campuses. Without the support system provided by this grant, their normal heavy teaching loads would preclude any research, regardless of the women's interest or ability. Publications: a report on the project and the research papers are in preparation. Dr. Jane Butler Kahle, Biological Sciences Department, 221 Chemistry Building, Purdue University, West Lafayette IN 47907, (317) 494-1721

301 ANNUAL EMPLOYMENT SURVEY, History of Science Society (HSS), University of Pennsylvania, Philadelphia PA 19104; Committee on Women, HSS / \$20 for postage and printing (HSS 100%) / 1973-present / Soc / Faculty-employee development / Varies: approx. 15 women are seeking jobs in a given year.

The survey collects data from chairs of search committees

## FACULTY-EMPLOYEE DEVELOPMENT

on how many applicants (female, male, with and without doctorates) they had for jobs advertised previously in the History of Science Society Newsletter. By publishing the information annually in the same Newsletter, the Committee on Women publicizes which institutions have or have not hired women recently and hopes to encourage potential employers to seek women candidates. It also hopes to inform women (and men) coming into the job market what degree levels, types of jobs, specialties (topical, national, or chronological), geographical regions, and the like are good or bad prospects for historians of science. The survey indicates the number of positions (academic or otherwise) opening up each year or which are expected to open, the intensity of the competition, and the kind of applicants employers are willing to consider (particularly in regard to degree level). A survey form with a cover letter is sent to the person chairing the search committee at every institution which advertises a position in the HSS Newsletter or other publications which list jobs in the history of science. The highest rate of return rate of forms has been seventy-five percent. Survey coordinators note that many positions are still not being advertised, which may make the record of hiring women skewed if only the surveyed positions are considered. They also remark that they are uncertain of the base numbers of women in the profession of seeking work from year to year; accordingly, the interpretation which accompanies the results is usually cautious in tone. The labor of the survey coordinator is donated. Publications: reports in the HSS Newsletter, February 1975, July 1977, and January 1979, and October 1979 issues. Dr. Margaret Rossiter, 2410 Oak, Berkeley CA 94708, (415) 525-3012 (through December 1980); Dr. Kathryn Olesko, Clarkson College, Potsdam NY 13676, (315) 268-6400 (January 1981 on)

302 ASEE NON-TRADITIONAL CAREERS FOR WOMEN -- CAREER GUIDANCE WORKSHOP, Stevens Institute of Technology (SIT), Hoboken NJ 07030 / American Society for Engineering Education (ASEE) / \$9,500 (ASEE 60%; SIT 40%) / July 29, Aug 1, 1979 / Math, Phy, Chem, Med, Engr, Business, Urban planning, Accounting / Employee development / 30 F, 7 M / Role models D / V.

This workshop for guidance counselors was intended to increase their knowledge of engineering, and their awareness of opportunities for women in a variety of non-traditional fields. Panels and presentations by women in various non-traditional fields, hands-on laboratory experiences, career development seminars and literature displays were the means for achieving project goals. The director reported that although individual attitude changes were not

## FACULTY-EMPLOYEE DEVELOPMENT

measured, all participants "rated the overall effectiveness of the workshop as excellent." Several participants have since contacted her with an interest in organizing workshops on this model. Initially co-sponsored by ASEE, this program will be continued in 1980 with a grant from the International Paper Company. Susan S. Schwartz, Stevens Institute of Technology, Castle Point, Hoboken NJ 07030, (201) 420-5245

303 CHAUTAUQUA SHORT COURSE ON STRATEGIES FOR INCREASING THE PARTICIPATION OF WOMEN IN MATHEMATICS-BASED FIELDS, American Association for the Advancement of Science, Washington DC 20036 / National Science Foundation (NSF) / about \$4,000 per course (NSF 100%) / 1979-1981 / Math / Faculty-employee development / about 15 F, about 10 M year / Involved 8% N, 4% B (1979) / V.

Participants are college teachers recruited through mailings to colleges throughout the United States. National Science Foundation funding supplies overall support and lodging; those chosen to attend (or their institutions) pay travel and meals. The project director donates much of her preparation time. This Chautauqua took place in Kansas City, Missouri and Salt Lake City in 1979-80, and is scheduled for Amherst, Massachusetts and Beaverton, Oregon in 1980-81. Participants meet for two days with the instructors in the fall and another two days in the spring; between the sessions they conduct independent projects. During the fall session, they receive information on college programs and teacher-education programs which are especially successful in dealing with issues of women and mathematics, such as the Math Without Fear program at San Francisco State (see entry #226), the precalculus/calculus sequence at Mills College (see entry #052), and Women in Science Workshop at Mills College (see entry #188). They also become acquainted with other curricular innovations, math internship programs, counseling materials, and so on. They receive a binder of resource materials and are requested to start their own binders in conjunction with their projects. The projects may be research oriented, action/intervention programs, or a combination of both. In 1979-80, for example, typical projects dealt with the formation of a regional math-science network in Utah, spatial visualization training, and the creation of a slide-tape presentation on women in mathematics. The spring meeting was devoted to the reports on the projects, and learning how to conduct evaluations, find funding, write proposals, and draft documentation of accomplishments. Dr. Lenore Blum, Department of Mathematics and Computer Science, Mills College, Oakland CA 94613, (415) 632-2700

## FACULTY-EMPLOYEE DEVELOPMENT

334 DEMYSTIFYING MATH, Western Michigan University, Kalamazoo MI 49008 / Western Michigan University / \$1,113 (Western Michigan 100%) / March 3, 1979-April 9, 1979 / Math / Faculty-employee development / 37 F, 3 M / Involved 2% B / V.

This program offered non-math faculty and staff a series of five workshops designed to improve arithmetic and algebraic skills, explore interesting mathematics topics, and use research tools, such as computers and descriptive statistics. Participation was encouraged by the employer. Flyers and a news release sent to the University paper publicized the workshops. The staff reported that response to the computer workshop was overwhelming. "Every participant encouraged repetition of workshop for others." The director observed that "many females wish to learn more mathematics and like to do so in a nonthreatening environment." The workshops were revised and offered again in Fall 1979. Dr. Ruth Ann Meyer, Math Department, Western Michigan University, Kalamazoo MI 49008, (616) 383-6154

305 EDUCATIONAL EQUITY FOR WOMEN IN PROFESSIONAL AGRICULTURE, Colorado State University, Ft. Collins CO 80523 / Women's Educational Equity Program (WEEA), U.S. Department of Education / \$163,155 total (WEEA 100%) / Sept 1976-Nov 1978 / Agr, Psy / Faculty-employee development / 450 F, 815 M / Involved 1% B, 1% A, 1% H, 5% E / V.

The program found participants through direct mail, notices on bulletin boards, and newsletters. This project set two goals for itself. First, it sought to enhance career development for women so they could enter non-traditional areas of agriculture. Second, it sought institutional change--to reduce educational inequity by modifying curricular structures and faculty attitudes. The program accomplished these ends by several means: (1) conducting faculty awareness seminars to reduce the occurrence of sex bias in the educational setting, (2) drafting curriculum structure guidelines which included career development materials free of sex bias, (3) creating a model course which increased student awareness and self-development as preparation for entry into non-traditional careers, and (4) developing strategies to reduce stress among women students. The last item led to the development of several flexible counseling models. Participants benefited greatly from the model course; in particular, the self-confidence of women who took part in the program increased markedly. Faculty members have become demonstrably more aware of the concerns and aspirations of women students. Publication: M.K. Hamilton, J.G. Corazzini and M.D. Young, "Environmental

## FACULTY-EMPLOYEE DEVELOPMENT

Assessment of Perceived Stressors in Women and Men in the College of Agricultural Sciences, A Two-Year Study," Student Development Reports XV No. 1, 1978-9, University Counseling Center, Colorado State University. G.R.J. Law, College of Agricultural Sciences, Colorado State University, Fort Collins CO 80523, (303) 491-6274

306 EQUALS: PROMOTING SEX-FAIR MATHEMATICS INSTRUCTION AND COUNSELING, University of California, Lawrence Hall of Science, Berkeley CA 94720 / Title IV, U.S. Department of Education (ED) / \$234,000 total (U.S. ED 80%; Lawrence Hall of Science 20%) / Aug 1977-July 1980 / Math / Faculty-employee development / 218 F, 72 M / Involved 25% Min; Role models E / V.

The project was designed for teachers, counselors, and administrators working with kindergarten through twelfth grade students; many thousands of students benefit from it because their teachers brought EQUALS training and materials into the classroom. Participants in the training were recruited through mailings to principals, counselors, and math and science departments in forty-five California school districts. The program involved participants in research projects at their schools, which gave direct experience in issues of sex differences in mathematics participation and attitudes. They learned how to introduce activities, role-model speakers, and innovative teaching methods into their classrooms and communities, in order to improve student attitudes toward math and math-related occupations and to enhance student problem-solving skills. Each year the training cycle started with an intensive two-day session at Lawrence Hall of Science, during which enrollees were briefed on issues of mathematics learning, experimented with mathematics activities, and acquired materials on math-related careers. While the participants conducted their research and development project back in their school districts, the Lawrence Hall staff continued to work with them through three workshops that included follow-up leadership training on how to disseminate their findings throughout the district. EQUALS materials are used in classrooms of those who went through the training, and are shared with colleagues via formal inservice presentations and informal distribution. Students of EQUALS teachers have gained better knowledge of the usefulness of math for future career choices, and possess a positive attitude about continuing in math courses. Publications: N. Kreinberg, "EQUALS in Math," Independent School (May 1978), 47-49. N. Kreinberg, "The EQUALS Program: Helping Teachers to Become Researchers and Problem Solvers," Journal of Staff Development 1:1 (May 1980), 19-30. A. Kaseberg, N. Kreinberg, and D. Downie, Use

## FACULTY-EMPLOYEE DEVELOPMENT

EQUALS to Promote the Participation of Women in Mathematics  
(in press), \$5, available from Lawrence Hall of Science.  
Nancy Kreinberg, Lawrence Hall of Science, University of  
California, Berkeley CA 94720, (415) 642-1823

307 IMPROVING MATHEMATICS ABILITY AND ATTITUDES OF TEACHERS  
AND COUNSELORS, University of Washington (UW), Seattle WA  
98195 / Fund for the Improvement of Postsecondary  
Education (FIPSE), U.S. Department of Education / \$50,000  
year, \$75,000 total (FIPSE 67%; UW 33%) / Oct 1978-Nov 1980 /  
Math, Psy, Counseling, Education / Faculty-employee  
development / 70 F, 20 M total / Recruit B, A, H;  
Involved 10% A / V.

This program was designed to improve the general mathematics  
and spatial abilities of teachers and counselors. It was  
further intended to improve their attitudes toward  
mathematics and the teaching of mathematics. Training  
classes in mathematics were coordinated with counseling  
sessions, and consultants visited the classrooms of  
teacher participants. Participation in the program resulted  
in significant improvement in the abilities and attitudes  
addressed during the two-quarter course. The directors  
reported an increased interest in studying mathematics  
among participants. They also noted that teaching styles  
of some participants have shown a change toward promoting  
discovery and alleviating math anxiety. This program was  
publicized in announcements at state math meetings and in  
notices sent to mathematics and counseling coordinators  
and to individual teachers and counselors in Seattle area  
schools. Speeches on the problem were made at state and  
regional mathematics and counseling conferences.

Publication: Nancy Cook and Mildred E. Kersh, "A Manual  
for Training Spatial Ability and Alleviating Mathematics  
Anxiety," September 1979, 485 pages, in revision. Mildred  
E. Kersh and Nancy Cook, 115 Miller Hall DQ-12, College of  
Education, University of Washington, Seattle WA 98195,  
(206) 543-1847

308 MATH ENTHUSIAST WORKSHOPS, Math Learning Center, Salem  
OR 07302 / registration fees / \$145-\$215 per participant /  
1976-present / Math / Faculty-employee development / about  
20 F, about 5 M per workshop / Involved about 5% Min;  
Efforts H / V.

The ten-day summer workshops, led by experienced math  
teachers, introduce teaching styles, strategies, and  
materials which emphasize problem solving skills, active  
learning situations, and independent investigations.  
Besides increasing the math literacy needed for everyday

## FACULTY-EMPLOYEE DEVELOPMENT

life among students in their classrooms, participants learn to "humanize" mathematics during their teaching. The exact content of the workshop varies with the instructor, but typically it will include new ways to stretch children's mathematical abilities and imaginations, the creation (or enrichment) and management of a "math lab" in the schoolroom, the use of innovative educational materials which are math-related, and specific topics such as effective ways to teach metrics. The workshops offer "hands-on" experience with classroom activities, work in small groups at the teacher's specific grade level, and "make and take" projects for bringing back to school in the fall. These workshops are designed for teachers in the kindergarten through junior high school grades, who learn about the sessions through mailings to Oregon schools. Some of the background materials deal with problems of women and math, and the enrollees are mostly female. A number of workshops have been held for teachers of migrant laborers' children, most of whom are Hispanic. Publication: the workshops are often featured in Math Learning Center Reports. Gene Maier, Math Learning Center, P.O. Box 3364, Salem OR 97302, (503) 370-8130

309 MATHEMATICS MINUS ANXIETY EQUALS OPPORTUNITIES, College of Applied Science (CAS), University of Cincinnati (UC), Cincinnati OH 54210; Office of Women's Programs, UC / UC and registration fees / \$1,525.71 (registration fees 81%; UC programming budget and CAS 19%) / Sept 1979 / Math, Psy / Faculty-employee development / 30 F, 6 M / Involved 20% B, 6% A, 10% H, 3% D, 20% E / V.

The two-day workshop was attended by teachers and administrators interested in increasing the number of women electing mathematics oriented careers. The session outlined remedies and solutions to problems of mathematics anxiety and avoidance. Participants were recruited through news releases to television, radio stations, and newspapers. (The crisis in the Cincinnati school system that autumn probably dampened attendance at the seminar.) The program featured nationally known speakers (Sheila Tobias, Stanley Kogelman, and Peter Hilton) on aspects of mathematics anxiety. Local experts conducted work sessions on related topics such as helping students to read mathematics textbooks, non-threatening approaches to instruction in mathematics, and special problems of reentry students. Multi-media resources were available for perusal--videotapes, audiotapes, and printed items. Since the conference, the sponsoring office has noted greater numbers of inquiries about mathematics for women. Audiotape: in editing process. Publication: mimeographed bibliography of materials in the University and town library, 20 pages,

## FACULTY-EMPLOYEE DEVELOPMENT

1979. Mary Ellen Ashley, Associate Vice Provost, Women's Programs and Services, Sander Plaza I, Mail Location 179, University of Cincinnati, Cincinnati OH 45221, (513) 475-4401

310 NON TRADITIONAL CAREERS FOR WOMEN, University of California (UCD), Davis CA 95616; American Society for Engineering Education (ASEE) / American Society for Engineering Education / \$4,318.35 (ASEE 95%; UCD 5%) / July 24-26, 1978 / Math, Phy, Chem, Bio, Engr, Agr, Geol / Faculty-employee development / 36 F, 14 M / V.

This was a program designed to inform high school teachers and counselors about career opportunities in science and engineering. The ultimate objective was to make young women students aware of opportunities in these non-traditional fields and the educational requirements for entry. The strategy was to inform the adults who are in daily contact with these students. This four-day workshop included engineering and science laboratory experiences, distribution of career guidance materials, examination of career oriented audio-visual materials, and social functions, allowing opportunity for interaction among teachers and counselors and the forty-two resource persons and role models who participated. This was a national effort (see also entries #302 and 315). The American Society for Engineering Education project coordinating team did advertisement, recruitment and selection of participants. The director suggested that "it would seem timely to offer a similar program directed toward minority teachers and counselors of disadvantaged students." W.E. Bulski, Assistant to the Dean, College of Engineering, University of California, Davis CA 95616, (916) 752-0553

311 REDUCING MATH AVOIDANCE FOR WOMEN STUDENTS THROUGH THE TRAINING OF FACULTY ADVISERS, Stephens College, Columbia MO 65215 / Fund for the Improvement of Postsecondary Education, U.S. Department of Education (U.S. ED) / \$84,000 total (U.S. ED 100%) / July 1978-June 1980 / Math, Psy, Soc / Faculty-employee development / pilot test approx. 5 F, 5 M per workshop / Efforts Min; Role models Min / V.

Workshop participants were recruited through written invitations to all faculty at Stephens and through discussions of the project with faculty groups. The workshop will be repeated each year for new faculty who wish to enroll, and documentation of the project will be available through journal articles for those at other colleges who want to set up such workshops. The workshop consisted of three two-hour sessions dealing with math as

## FACULTY-EMPLOYEE DEVELOPMENT

a filter for student career and educational options, areas of endeavor which require math training, math socialization of women students in elementary and secondary schools, math avoidance among students and how to overcome it, math anxiety and how students can cope with that, and the math problem at the college. The workshop leaders (a mathematician and a counselor) used role-playing and math autobiographies to supplement usual pedagogical techniques. The workshop staff report that classroom teaching has benefited, that students are asking advisors for more information on math, that faculty are more interested in helping women students, and that collegiality has increased among faculty. They recommend that such workshops be regarded as a complement to, not a substitute for, direct student services on math avoidance and math anxiety. Publications: in draft. Dr. Beverly Prosser Gelwick, Box 2025, Stephens College, Columbia MO 65215, (314) 442-2211, x205

312 SENIOR SEMINAR ON MATH ANXIETY, Washington School of Psychiatry, Washington DC 20009 / Women's Educational Act Program (WEEA), U.S. Department of Education / \$15,000 (WEEA 100%) / June 1979-May 1980 / Math / Faculty-employee development / 7 F, 4 M.

Seminar participants were senior scholars in mathematics, mathematics education, minority education, psychiatry, psychology, and women's studies. They concentrated on two related problems: the mathematics anxiety induced in women and minority students by culture, peers, counselors, teachers, and parents; and the degree to which female and minority students' unwillingness to study mathematics could be attributed to "tracking" them into stereotyped roles. Besides educating themselves on the issues of anxiety and mathematics learning by inviting speakers from various disciplines concerned with these issues, the group cooperated in the compilation of an annotated bibliography for use of counselors and other professionals who advise women and girls. Publication: Resource Catalog: Math Anxiety/Math Avoidance/Reentry Mathematics. Ms. Sheila Tobias and Ms. Elaine Melmed, Washington School of Psychiatry, 1610 New Hampshire Avenue, NW, Washington DC 20009, (202) 667-5291

313 WOMEN AND MATHEMATICS EDUCATION, Education Department of George Mason University, Fairfax VA 22030 / April 1978-present / Math / Teachers and counselors of K-14 grades / Recruit E, Min; Efforts E, Min; Role models Min.

This organization encourages girls and women to pursue the study of mathematics, monitors the mathematics education community for sexist behavior and provides leadership in

## FACULTY-EMPLOYEE DEVELOPMENT

designing non-sexist activities and materials for use by mathematics teachers. The strategy to achieve these goals is networking, National Council of Teachers of Mathematics meetings, and newsletters. The response is reported as overwhelming. Publication: Women and Mathematics Education (newsletter). Judith E. Jacobs, Education Department, George Mason University, 4400 University Drive, Fairfax VA 22030, (703) 323-2421

314 WOMEN IN TECHNOLOGY: PATHWAYS TO THE FUTURE, Wentworth Institute of Technology, Boston MA 02115; The Boston Globe / Wentworth and The Boston Globe / \$8,000 (Globe 70%; Wentworth 30%) / June 1978 / Engineering technology / Faculty-employee development / 300 F / Recruit B, A, H, E; Role models B, A, H, E / V.

This was a conference for guidance counselors, teachers of mathematics and science at junior and senior high schools and those who work with adult women students. Participants were introduced to engineering technology and non-traditional careers requiring less than two years of postsecondary training. They interacted with role models and were encouraged to develop networks for mutual assistance and support. Panel discussions, speakers, workshops, hands-on laboratory experience and information booths were the means by which project goals were achieved. Dr. Diane T. Rudnick, Wentworth Institute of Technology, 550 Huntington Avenue, Boston MA 02115, (617) 442-9010

315 WORKSHOP ON NON-TRADITIONAL CAREERS FOR WOMEN, University of Massachusetts; American Society for Engineering Education (ASEE) / five corporations, through ASEE / \$4,212.29 (corporations, ASEE 17%; U. Mass 83%) / Aug 21, 1977-Aug 24, 1977 / Phy, Chem, Engr, Business / Faculty-employee development / 40 F, 11 M / Efforts B, H.

This workshop was one of thirteen held in different regions of the country over a three-year period (see also entries #302 and 310). The ultimate purpose was to interest more young women in engineering and encourage those interested to pursue engineering as a career. The strategy was to improve the attitudes toward women in engineering and the knowledge and understanding of engineering among high school teachers and counselors. Specifically, the adult participants were told what engineers do, what the curricular requirements are, and what some of the main specialties are within engineering. Similar information about business and other careers non-traditional for women was provided. There were laboratory exercises and tours, group projects, a film on women in engineering, speakers

## FACULTY-EMPLOYEE DEVELOPMENT

and discussion groups. Career guidance literature was distributed. Recruitment and advertising were done by the national office of the project. The project director offered several suggestions for future workshops. He recommended that the sessions cover engineering alone, or that the time be lengthened to three days if other careers continued to be covered. He thought the host institutions would appreciate a greater number of students being selected from the geographic region in which the school draws its enrollments. Follow-up activities and more time for small group discussions were advisable. The workshop was effective in increasing the knowledge and improving the attitudes of participants, most of whom knew little about engineering and technical careers when they started. Joseph S. Marcus, Associate Dean, School of Engineering, University of Massachusetts, Amherst MA 01003, (413) 545-0300

BIBLIOGRAPHY  
ON WOMEN IN SCIENCE, ENGINEERING, AND MATHEMATICS

Listed in an inventory of projects, this section focuses on the United States, omits research on the medical or health professions, and excludes publications before 1966 (with the exception of a few classics such as Bernard or Mattfeld and Van Aken). Citations given in project entries in the inventory (toward the end of each narrative, before the contact person) are usually not listed also in this bibliography. Rather, most of the citations here were compiled by Paula Quick Hall from computer searches done by ERIC (Educational Resources Information Center), SSIE (Smithsonian Science Information Exchange), and NTIS (National Technical Information Service). The staff members of these services were extraordinarily helpful in thinking of keywords which would optimize the searches, and we thank them for their contributions. To the card index of entries from these sources, we added citations gathered from our AAAS bookshelves and files by Mary Jane Tehin during her summer as an intern here. Finally, we added a few publications cited in Phyllis Zweig Chinn, Women in Science and Mathematics Bibliography (1979). Many of the items in the resulting file proved to be inaccurately or incompletely cited; Rachel Warner verified and completed these by checking the works in the Library of Congress or by telephoning authors, publishers, and libraries. To those who cheerfully answered her many questions, we also offer our thanks, especially to the National Federation of Business and Professional Women's Clubs of Washington, DC, most notably to Catherine Selden.

This list is certainly not an exhaustive collation of everything written on the topic. Interested persons should consult other works and commission new searches of computer services while doing research. For example, the list does not replace Phyllis Chinn's second edition of her bibliography, cited in entry #258 of the inventory, as her work includes publications before 1966, work on women outside of the United States, and citations on medical and health fields.

We welcome additional citations for the AAAS files, in case the Association publishes an expanded bibliography at some later date.

## BIBLIOGRAPHY

- Abelson, Philip. "Women in Science - Related Activities." New York Academy of Sciences Annals 323 (1979): 27-34.
- Aiken, Lewis R. "Ability and Creativity in Math." Review of Educational Research 43 (1973): 405-432.
- \_\_\_\_\_. "Affective Variables and Sex Differences in Mathematical Abilities." Paper presented at the American Educational Research Association Annual Convention, 1974, in Chicago.
- \_\_\_\_\_. "Attitudes Toward Mathematics." Review of Educational Research 40 (1970): 551-596.
- \_\_\_\_\_. "Biodata Correlates of Attitudes Towards Mathematics in Three Age and Two Sex Groups." School and Science Mathematics 72 (1972): 386-395.
- \_\_\_\_\_. "Intellective Variables and Mathematics Achievement: Directions for Research." Journal of School Psychology 9 (1971): 201-209.
- Aiken, Lewis R., and Aiken, D.R. "Recent Research on Attitudes Concerning Science." Science Education 53 (1969): 295-305.
- Alden, John. "Engineering and Technology Degrees, 1974-1975." Engineering Education 66 (1976): 749-753.
- \_\_\_\_\_. Engineering and Technician Enrollment - Fall 1967, Detailed Report. New York: Engineers Joint Council, Engineering Manpower Commission, 1968.
- \_\_\_\_\_. "Women and Minorities in Engineering." Engineering Education 64 (1974): 498-501, 533.
- Aldrich, Michele L. "Women in Science." Signs 4:1 (1978): 126-135.
- Almquist, E.M. "Occupational Choice and Career Salience Among College Women." Ph.D. dissertation, University of Kansas, 1969.
- American Association of Immunologists. Committee on the Status of Women. "The Status of Women in Science (With Particular Reference to Immunology): Report and Recommendations." April 1971.
- American Astronomical Society. Working Group on the Status of Women in Astronomy. "Report to the Council of the AAS." American Astronomical Society Bulletin 6 (1974): 412-423.
- American Chemical Society. Retraining Programs for Women Chemists. Washington, D.C.: American Chemical Society, 1971.
- \_\_\_\_\_. Office of Manpower Analysis. "Women." In Professionals in Chemistry: 1975, A Comprehensive Report, pp. 52-68. Washington, D.C.: American Chemical Society, 1976.

## BIBLIOGRAPHY

- \_\_\_\_\_. Office of Manpower Studies. "Remuneration of Women Chemists." In Professionals in Chemistry: 1974, A Comprehensive Report, pp. 25-27. Washington, D.C.: American Chemical Society, 1975.
- \_\_\_\_\_. "Women in Chemistry and Chemical Engineering." In Professionals in Chemistry: 1974, A Comprehensive Report, pp. 9-11. Ibid.
- American Geological Institute. Women Geoscientist Committee. Roster of Women in the Geoscience Professions. Falls Church, Virginia: American Geological Institute, 1977.
- American Institute of Physics. 1973-74 Survey of Physics Bachelor's Degree Recipients. Physics Manpower Report. New York: American Institute of Physics, 1975.
- American Mathematical Society. "Faculty Salaries - 21st Annual 1977 AMS Survey - First Report." American Mathematical Society Notices 24 (October 1977): 336-343.
- \_\_\_\_\_. Committee on Women in Mathematics. Summary Report. 1972.
- American Physical Society. Committee on Women in Physics. "Women in Physics." American Physical Society Bulletin 17 (1972): 740-753.
- American Political Science Association. Women in Political Science. Studies and Reports of the APSA Committee on the Status of Women in the Profession, 1969, 1971. Washington, D.C.: American Political Science Association, 1971.
- Ampola, Mary G. "The Impact of Education." In Kundsins, pp. 145-147.
- Ancker-Johnson, Betsy. "Physicist." In Kundsins, pp. 44-49.
- \_\_\_\_\_. "Women's Lib and Physics." Physics Teacher 10 (1972): 499-508.
- Anderson, Barbara J. "Up To the Drawing Board." Manpower 7 (1975): 31-34.
- Anderson, E.J., and Neeley, M.C. "Attitude of Science Comp Students Towards Various Sciences." Science Education 51 (1967): 273-275.
- Anderson, Jane V. "Psychological Determinants." In Kundsins, pp. 200-207.
- Angrist, S., and Almquist, E.M. Careers and Contingencies: How College Women Juggle With Gender. New York: Dunellan, 1975.
- Anottonen, Ralph. "A Longitudinal Study in Mathematics Attitude." Journal of Educational Research 62 (1969): 467-471.
- Arditti, Rita. "Women in Science: Women Drink Water While Men Drink Wine." Science for the People 8:2 (1976): 24-26.

## BIBLIOGRAPHY

- Arnold, Lois B. "American Women in Geology: A Historical Perspective." Geology 5 (1977): 493-494.
- \_\_\_\_\_. "Florence Bascom and the Exclusion of Women From Earth Science Curriculum Materials." Journal of Geological Education 23 (1975): 110-115.
- \_\_\_\_\_. "Marie Curie Was Great But..." School Science and Mathematics 75 (1975): 577-584.
- \_\_\_\_\_. "Sexism in the Chemistry Curriculum." Curriculum Review 16 (1977): 180-185.
- Aronson, Shepard G. "Marriage with a Successful Woman: A Personal Viewpoint." In Kundsins, pp. 229-237.
- Association for Women in Mathematics (Philadelphia Chapter). "Remarks on Women in Mathematics." American Mathematical Monthly 80 (1973): 903-904.
- Association of American Colleges. Recruiting Women for Traditionally 'Male' Careers: Programs and Resources for Getting Women in the Men's World. Washington, D.C.: Project on the Status and Education of Women, October 1977.
- Astin, Helen S. "Career Development of Girls During the High School Years." Journal of Counseling Psychology 15 (1968): 536-540.
- \_\_\_\_\_. "Career Profiles of Women Doctorates." In Rossi and Calderwood, pp. 139-161.
- \_\_\_\_\_. "Employment and Career Status of Women Psychologists." American Psychologist 27 (1972): 371-385.
- \_\_\_\_\_. "Sex Differences in Mathematical and Scientific Precocity." In Mathematical Talent: Discovery, Description and Development, edited by Julian C. Stanley, Daniel P. Keating, and Lynn H. Fox, pp. 70-86. Baltimore: Johns Hopkins Univ. Press, 1974.
- \_\_\_\_\_. Sex Roles: A Research Bibliography. Washington, D.C.: Center for Human Services, 1975.
- \_\_\_\_\_. The Woman Doctorate in America: Origins, Career, and Family. New York: Russell Sage Foundation, 1969.
- Astin, Helen S., and Bayer, Alan E. "Sex Discrimination in Academe." In Rossi and Calderwood, pp. 353-356.
- Astin, Helen S., and Hirsch, Werner, eds. The Higher Education of Women. New York: Praeger, 1978.
- Astin, Helen S., and Mvint, T. "Career Development of Young Women During the Post-High School Years." Journal of Counseling Psychol-

## BIBLIOGRAPHY

- ogy 18 (1971): 369-393.
- Astin, Helen S., and others. "Report of the Task Force on the Status of Women in Psychology." American Psychologist 28 (1973): 611-616.
- Atomic Energy Commission. Division of Labor Relations. Radiation Protection Enrollments and Degrees. Enrollments Fall 1973. Degrees Granted July 1965-June 1973. Washington, D.C.: Atomic Energy Commission, 1974.
- \_\_\_\_\_. Office of Industrial Relations. Nuclear Engineering: Enrollments and Degrees. Enrollments - Fall 1973. Degrees Granted July 1965-June 1973. Washington, D.C.: Atomic Energy Commission, 1974.
- Bachman, A.M. "The Relationship Between a Seventh-Grade Academic Self-Concept and Achievement in Mathematics." Journal for Research in Mathematics Education 1 (1970): 173-179.
- Bachtold, Louise M., and Werner, Emmy E. "Personality Characteristics of Women Scientists." Psychological Reports 31 (1972): 391-396.
- Baker, Curtis O., and Well, Agnes Q. Associate Degrees and Other Formal Awards Below the Baccalaureate, 1974-1975. Summary Data. Washington, D.C.: National Center for Education Statistics, 1977.
- Ballard, Ernesta Drinker. "Horticulturist." In Kundsins, pp. 53-57.
- Baranger, Elizabeth Urey. "Admission and Attrition of Women in Graduate School." Paper presented at the Annual Meeting of the American Association for the Advancement of Science, February 1976, in Boston.
- Bardwick, Judith M., ed. Readings on the Psychology of Women. New York: Harper & Row, 1972.
- Baruch, G., and Barnett, R. "Implications and Applications of Recent Research on Feminine Development." Psychiatry 38 (1975): 318-327.
- Baruch, Rhoda, and Nagy, Jill. Females and Males in the Potential Scientists Pool: A Study of the Early College Years. Hanover, New Hampshire: Office of Career Development of Dartmouth College, 1977.
- Bayer, Alan E. College and University Faculty: A Statistical Description. Volume 5. Washington, D.C.: American Council on Education, 1970.
- \_\_\_\_\_. Teaching Faculty in Academe: 1972-1973. Volume 8. Washington, D.C.: American Council on Education, 1973.
- Bayer, Alan E., and Astin, Helen S. "Sex Differences in Academic Rank and Salary Among Science Doctorates in Teaching." Journal of Human Resources 3 (1968): 191-200.

## BIBLIOGRAPHY

- \_\_\_\_\_. "Sex Differentials in the Academic Reward System." Science 188 (1975): 796.
- Bearn, Alexander G. "Expanding the Role of Women in the Biomedical Sciences." New York Academy of Sciences Annals 525 (1979): 134-145.
- Bell, Carolyn Shaw. "Definitions and Data for Economic Analysis." In Kundsins, pp. 151-159.
- Bell, Duran; Bikson, Tora K.; Rich, Pamela J.; and Huchitech, Joanne M. The Role of Education in Facilitating Adaptation to Technological Change: An Analytical Framework and Review of the Literature. Santa Monica, California: Rand Corporation, 1976.
- Bell, Trudy E. "What is the Future Outlook for Women in Science?" Editorial in New Directions for Women (Winter 1976-1977).
- Bernard, Jessie. Academic Women. University Park, Pennsylvania: The Pennsylvania State University Press, 1964.
- \_\_\_\_\_. "The Present Situation in the Academic World of Women Trained in Engineering." In Mattfeld and Van Aken, pp. 165-182.
- Bettelheim, Bruno. "The Commitment Required of a Woman Entering a Scientific Profession in Present-Day American Society." In Mattfeld and Van Aken, pp. 3-19.
- Birnbaum, Judith Abelew. "Life Patterns and Self-Esteem in Gifted Family-Oriented and Career-Committed Women." In Women and Achievement: Social and Motivational Analysis, edited by M.S. Mednick and others, pp. 396-419. New York: Halsted Press, 1975.
- Block, R.D., and Kolakowski, D. "Further Evidence of Sex-Linked Major-Gene Influence on Human Spatial Visualizing Ability." American Journal of Human Genetics 26 (1975): 1-14.
- Blum, Lenore. "The New Women in Science Program is Booming with Students." Mills Quarterly 57 (Summer 1975): 14-16.
- Bolt, Richard H. "The Present Situation of Women Scientists and Engineers in Industry and Government." In Mattfeld and Van Aken, pp. 139-162.
- Bowden, George E. III. "Analysis of Sex Differentials Among Ph.D.-Holding Bioscientists: Salary, Academic Rank, and Predoctoral Award." Division of Resources Analysis, Office of Associate Director for Program Planning and Evaluation, National Institutes of Health, U.S. Department of Health, Education, and Welfare, Resources Analysis Memo 16 (May 1975).
- Boyd, Jonathan. Careers: Why Choose Science or Engineering? An Investigation of Social Factors That May Augment the Occupational

## BIBLIOGRAPHY

- Career Choice of Engineering and Science by Women and Minorities. Washington, D.C.: National Aeronautics and Space Administration, 1978.
- Soykan Pour-El, Marian. "Mathematician." In Kundsinn, pp. 36-37.
- Boyle, Charles P. "Women in Space." Journal of Aerospace Education 5 (1978): 8-9.
- Brehman, George E., Jr. A Study of Baccalaureate Engineering Demand and Supply in Pennsylvania: Methodology and Findings. Harrisburg: Pennsylvania State Department of Education, Bureau of Information Systems, 1975.
- Briscoe, Anne M. "Phenomenon of the Seventies: The Women's Caucuses." Signs 4:1 (1978): 152-158.
- \_\_\_\_\_. "Women Pursuing Careers." Science 185 (1974): 1040.
- Briscoe, Anne M., and Pfafflin, Sheila M., eds. "Expanding the Role of Women in the Sciences." New York Academy of Sciences Annals 323 (1979).
- Brooks, Patricia and Lester. "Meet the Industrial Woman." EXXON USA (1978): 8-11.
- Broverman, I.K.; Vogel, R.R.; Broverman, D.M.; Clarkston, F.E.; and Rosenkrantz, P.S. "Sex Role Stereotypes: A Current Appraisal." Journal of Social Issues 28 (1972): 59-78.
- Brown, Lynn Harington. "The Retention of Women in the Science Disciplines." Final report submitted to FIPSE (Fund for Improvement of Post Secondary Education), May 1976.
- Brush, Lorelei R. "A Path Analytic Explanation of the Lower Participation Rates of Women in College Physical Science." Paper presented at the Annual Meeting of the Eastern Psychological Association, April 14, 1977, in Boston.
- Buffery, A.W.H., and Gray, J.A. "Sex Differences in the Development of Spatial and Linguistic Skills." In Gender Differences: Their Ontogeny and Significance, edited by C. Ounsted and D. Taylor. Edinburgh: Churchill Livingstone, 1972.
- Bugliarello, George; Cardwell, Viviane; Salembiar, Olive; and White, Winifred, eds. Women in Engineering: Bridging the Gap Between Society and Technology. Chicago: University of Illinois at Chicago Circle, 1972.
- Bunting, Mary I. "Education: A Nurturant If Not a Determinant of Professional Success." In Kundsinn, pp. 208-213.
- Bunting, Mary I.; McCabe, Rita; Nachmias, Vivianne T.; Rees, Mina;

## BIBLIOGRAPHY

- Simon, Dorothy M.; and Wee, Chien-Shiung. "Panel Discussion: The Commitment Required of a Woman Entering a Scientific Profession." In Mattfeld and Van Aken, pp. 20-48.
- Burrage, H. An Investigation of the Social Situation of Women University Teachers of Natural Science. England: University of Salford, 1973.
- Burstyn, Joan N. "Early Women in Education: The Role of the Anderson School of Natural History." Journal of Education 159:3 (1977): 50-64.
- Burton, Grace M. "The Power of the Raised Eyebrow." ERIC Documentation Reproduction Service (1976). ERIC Document ED 139605 (Microfiche only), 1976. (ERIC Document Reproduction Services, P.O. Box 190, Arlington, VA 22210).
- Campbell, Jean W. "Women Drop Back In: Educational Innovation in the Sixties." In Rossi and Calderwood, pp. 95-124.
- Carnegie Commission on Higher Education. Escape From the Doll's House: Women in Graduate and Professional Schools. Edited by Saul D. Feldman. New York: McGraw-Hill Book Company, 1974.
- \_\_\_\_\_. Opportunities for Women in Higher Education. New York: McGraw-Hill Book Company, 1973.
- Carroll, Constance M. "Three's a Crowd: The Dilemma of the Black Woman in Higher Education." In Rossi and Calderwood, pp. 173-185.
- Cartter, Allan M. "Scientific Manpower for 1970-1985." Science 172 (1971): 131-140.
- Cartter, Allan M., and Ruhter, Wayne E. The Disappearance of Sex Discrimination in First Job Placement of New Ph.D.s. Los Angeles: Higher Education Research Institute, 1975.
- Cartwright, Mary L. "Mathematics and Thinking Mathematically." American Mathematical Monthly 77(1970): 20-28.
- Casserly, P.L. "An Assessment of Factors Affecting Female Participation in Advanced Placement Programs in Mathematics, Chemistry, and Physics." Report of U.S. National Science Foundation Grant GY-11325, July 1975.
- Catalyst Career Option Series for Undergraduate Women. Have You Considered Engineering? Opportunities for Women Are Expanding. New York: Catalyst, 1976.
- Celender, Ivy M. "Careers in Industry for Scientifically Trained Women." New York Academy of Sciences Annals 323 (1979): 179-189.
- Centra, John A. Women, Men, and the Doctorate. Princeton, New Jersey: Educational Testing Service, 1974.

## BIBLIOGRAPHY

- Chaff, Sandra L. Women in Medicine: A Bibliography of the Literature on Women Physicians. Hamden, Connecticut: Scarecrow Press, 1977.
- Champagne, Audrey B., and Klopfer, Leopold E. "A Sixty-Year Perspective on Three Issues in Science Education: I. Whose Ideas are Dominant? II. Representation of Women. III. Reflective Thinking and Problem Solving." Science Education 61 (1977): 431-452.
- Channell, Ruth E. "A Compendium: The Women of Mathematics." Bibliography of Masters Thesis, Emporia State University, Kansas, July 1977.
- Charpentier, Debra. "Women Mathematicians." Two Year College Mathematics Journal 8 (1977): 73-79.
- "Chemistry Faculties Hire Few Women." Chemical and Engineering News 52 (1974): 32.
- "Chemistry Faculties Still Have Few Women." Chemical and Engineering News 52 (1974): 19.
- Cheplinsky, Ana Berta. "Women in Chemistry - Part of the 51% Minority." Science for the People 4:4 (1972): 4-8.
- Clark, Shirley M., and Simon, Rita J. Preliminary Study of Professional Contributions and Productivity of Women with Doctorates. Urbana: University of Illinois, 1966.
- Clarke, Robert. Ellen Swallow: The Woman Who Founded Ecology. Chicago: Follett, 1975.
- Cleveland, Gerald A., and Bosworth, Dorothy L. "A Study of Certain Psychological and Sociological Characteristics as Related to Arithmetic Achievement." Arithmetic Teacher 14 (1967): 383-386.
- Cobb, Jewel Plummer. "Filters for Women in Science." New York Academy of Sciences Annals 323 (1979): 236-248.
- Cole, Jonathan R. "American Men and Women of Science." Paper read at the Annual Meeting of the American Sociological Association, August 31, 1971, in Denver.
- \_\_\_\_\_. Fair Science: Women in the Scientific Community. New York: Free Press, 1979.
- Cole, Jonathan R., and Cole, Stephen. "Discrimination Against Women and Minorities in American Science." In Social Stratification in Science, by Jonathan R. Cole and Stephen Cole, Chapter 5. Chicago: University of Chicago Press, 1973.

## BIBLIOGRAPHY

- Cole, Sandford S. Career Guidance for Women Entering Engineering. Proceedings of an Engineering Foundation Conference. Henniker, New Hampshire, 1973. Edited by Nancy D. Fitzroy. Raleigh and New York: Society of Women Engineers and Engineering Foundation, 1973.
- College Entrance Examination Board. Admission Testing Program. College Bound Seniors, 1977. Princeton, New Jersey: College Board Publication, 1977.
- Connolly, Terry, and Burks, Esther Lee. "Women in Science and Engineering: Characteristics and Experiences of Established Professionals." Engineering Education 68 (1977): 234-240.
- Connolly, Terry; Burks, Esther Lee; and Rogers, J.L. "The Woman Professional in Science and Engineering: An Empirical Study of Key Career Decisions." Final Report on U.S. National Science Foundation Grant GY-11317. Atlanta: Georgia Institute of Technology, 1976.
- Connor, Jane M., and Serbin, Lisa A. "Behaviorally Based Masculine- and Feminine-Activity-Reference Scales for Preschoolers: Correlates with Other Classroom Behaviors and Cognitive Tests." Child Development 48 (1977): 1411-1416.
- Constance, Carter. "Women in the Sciences." Library of Congress Tracer Bulletin (March 1976): TB 76-2.
- Cooley, W.W. "Predicting Career Plan Changes." In Project TALENT: One-Year Follow-Up Studies, edited by J.C. Flanagan and W.W. Cooley. Pittsburgh: University of Pittsburgh, School of Education, 1966.
- Cowin, Roy, and Reyes-Guerra, David. "Science and Engineering." La Luz 6 (1977): 44-48.
- Cowley, A.; Humphreys, R.; Lynds, B.; and Rubin, V. "Report to the Council of the AAS from the Working Group on the Status of Women in Astronomy - 1973." American Astronomical Society Bulletin 6:3 Part II (1974): 412-423.
- Crawford, M.L.; Moody, J.B.; and Tullis, J. "Women in Academia: Students, and Professors." Geology 5 (1977): 502-503.
- Crawford, M.L., and others. "Career Choices for Women - the Geosciences." Journal of Geological Education 24 (1976): 74-77.

## BIBLIOGRAPHY

- Cronkite, Ruth, and Perl, Teri. "Evaluating the Impact of an Intervention Program: Math-Science Career Conferences for Young Women." Paper prepared at Mills College, 1979, in Oakland, California.
- Cropley, A.J., and Feld, T.W. "Intellectual Style and High School Science." Nature 217 (1968): 1211.
- Crosswhite, F.J. "Correlates of Attitudes Toward Mathematics." NLSMA Report No. 20. Abstracted by L.R. Aiken. Investigations in Mathematics Education 8 (1975): 38-40.
- Daniels, Arlene Kaplan. "Development of Feminist Networks in the Professions." New York Academy of Sciences Annals 323 (1979): 215-227.
- Darland, M.G.; Dawkins, S.M.; Lavasich, J.L.; Scott, E.L.; Sherman, M.E.; and Whipple, J.L. "Application of Multivariate Regression to Studies of Salary Differences Between Men and Women Faculty." Paper presented at the Meeting of the American Statistical Association, Social Statistics Section, 1973, in New York.
- 
- \_\_\_\_\_. "Women in Higher Education - The Facts of the Matter." 12th Annual Meeting of the Council of Graduate Schools Proceedings (1972): 55-65.
- David, Deborah. Career Patterns and Values: A Study of Men and Women in Science and Engineering. New York: Bureau of Applied Social Research of Columbia University, 1971.
- Davies, Helen C., and Davies, Robert E. "Redress of Grievances." New York Academy of Sciences Annals 323 (1979): 197-209.
- Davis, Ann. "Women as Minority." American Sociologist 4 (1969): 95-99.
- Davis, Audrey B. Bibliography on Women: With Special Emphasis on Their Roles in Science and Society. New York: Science History Publications, 1974.
- Davis, R.B. Explorations in Mathematics: A Text for Teachers. Menlo Park, California: Addison-Wesley, 1966.
- \_\_\_\_\_. "The Next Few Years." Arithmetic Teacher 12 (1966): 355-362.
- Davis, S.O. "A Researcher's-eye View: Women Students, Technical Majors, and Retention." IEEE Transactions on Education E-18 (1975): 25-29.

## BIBLIOGRAPHY

- Deaux, Kay, and Emswiller, Tim. "Explanations of Successful Performance on Sex-Linked Tasks: What is Skill for the Male is Luck for the Female." Journal of Personality and Social Psychology 29 (1974): 80-85.
- de Meuron-Landolt, Monique. "How a Woman Scientist Deals Professionally with Men." Impact of Science on Society 25 (1975): 147-152.
- Denmark, Florence L. "Women in Psychology in the United States." New York Academy of Sciences Annals 323 (1979): 65-78.
- de Wolf, Virginia A. The 1974 College of Arts and Sciences Survey of Graduating Seniors. Seattle: University of Washington, Educational Assessment Center, April 1975.
- Diamonstein, Barbaralee. Open Secrets: Ninety-Four Women in Touch with Our Time. New York: Viking Press, 1972.
- "Distribution by Sex of Principal Scientific Awards and Membership in Academies of Science." Impact of Science on Society 25 (1975): 154.
- Donady, Bonnie; Kogelman, Stanley; and Tobias, Sheila. "Math Anxiety and Female Mental Health: Some Unexpected Links." Presented at the Meeting of the National Advisory Committee on Mental Health Services and Women, August 1976, at Harvard University.
- Dornsbusch, Sanford. "To Try or Not to Try." Stanford Magazine 2 (1974): 50.
- Dresselhaus, Mildred S. "Electrical Engineer." In Kundsinn, pp. 38-43.
- Droege, Robert. "Sex Differences in Aptitude Maturation During High School." Journal of Counseling Psychology 14 (1967): 407-411.
- Dubreil-Jacotin, Marie Louise. "Women Mathematicians." In Great Currents of Mathematical Thought, edited by F. Le Lionnais. New York: Dover Publications, Inc., 1971.
- Dunwoody, Sharon. "Criteria Utilized by College-Educated Women to Select Newspaper Science News." Paper presented at the Annual Meeting of the Association for Education in Journalism, August 1976, in College Park, Maryland.
- Durchholz, Pat. "Women in a Man's World: The Female Engineers." Engineering Education 68 (1977): 509-520.

## BIBLIOGRAPHY

- Durkin, Glen C. "Engineering - A 'Weird' Field for Women." Journal of College Placement 34:2 (1974): 31-32.
- Duval, Suzanne, and Levine, Milton. American Science Manpower - 1970: A Report of the National Register of Scientific and Technical Personnel. Washington, D.C.: National Science Foundation, Division of Science Resources Studies, 1971.
- Easterday, Lois, and others. "The Making of a Female Researcher: Role Problems in Field World." Urban Life 6 (1977): 333-348.
- Educational Testing Service. "The Prediction of Doctorate Attainment in Psychology, Mathematics, and Chemistry." Princeton, New Jersey: Educational Testing Service Preliminary Report, 1972.
- Ehrman, Lee. "A Career in Science? Plan Your Life!" AAUW Journal 70 (1976): 14-15.
- Ellis, Suzanne D. Annual Graduate Student Surveys, 1964--. New York: Manpower Statistic Division, American Institute of Physics. Annual publication, with numbering beginning with American Institute of Physics Report R.207.1.
- Elton, Charles F., and Rose, Harriet A. "Students Who Leave Engineering." Engineering Education 62 (1971): 30-32.
- Emberlin, Diane. Contributions of Women: Science. Minneapolis, Minnesota: Dillon Press, 1977.
- "Employees Step Up Programs to Expand Jobs for Women and Minorities." Chemical and Engineering News 34 (1976): 38-47.
- Engineering Manpower Commission. Engineers Joint Council. "Engineering Enrollments of Women by School Year and Institution." In Engineering and Technology Enrollments-Fall 1971. New York: Engineers Joint Council, 1972, pp. 62-65.
- 
- \_\_\_\_\_. Engineering and Technology Enrollments - Fall 1977, Part II: Enrollments by Curriculum for Women, Minorities and Foreign Nationals. New York: Engineers Joint Council, 1978.
- 
- \_\_\_\_\_. Enrollments of Women and Minority Students in Engineering. New York: Engineers Joint Council, April 1976.
- 
- \_\_\_\_\_. "Engineering Enrollments of Women by School Year and Institution." In Engineering and Technology Enrollments - Fall 1972. New York: Engineers Joint Council, 1973, pp. 59-61.
- 
- \_\_\_\_\_. Engineering

## BIBLIOGRAPHY

and Technology Degrees, 1974. New York: Engineers Joint Council, January 1975.

---

Engineering and Technology Degrees 1977, Part II - By Minorities. New York: Engineers Joint Council, 1978. (First Edition on Degrees 1976 was published in 1977. Contains detailed data for minority groups, women and foreign students.)

---

"Placement Status of Women...Engineering and Technology Graduates." In The Placement of Engineering and Technology Graduates. New York: Engineers Joint Council, 1977, p. 26.

---

"Placement Status of Women and Minority Engineering and Technology Graduates." In The Placement of Engineering and Technology Graduates. New York: Engineers Joint Council, January 1979, pp. 26-27.

---

Statistics on Women and Minority Students in Engineering, April 1971. New York: Engineers Joint Council, April 1974.

---

Statistics on Women and Minority Students in Engineering, April 1974. New York: Engineers Joint Council, 1974.

---

Statistics on Women and Minority Students in Engineering: A Report. New York: Engineers Joint Council, April 1975.

---

"Technology Enrollments of Women By School Year and Institution." In Engineering and Technology Enrollments - Fall 1972. New York: Engineers Joint Council, 1973, pp. 127-130.

Epstein, Cynthia Fuchs. "Bringing Women In: Rewards, Punishments, and the Structure of Achievement." In Kundsinn, pp. 13-21.

---

"Encountering the Male Establishment: Sex-Status Limits on Women's Careers in the Professions." American Journal of Sociology 75 (1970): 965-982.

---

Woman's Place: Options and Limits in Professional Careers. Berkeley, Los Angeles and London: University of California Press, 1970.

Erikson, Erik H. "Concluding Remarks." In Mattfeld and Van Aiken, pp. 232-245.

Erlick, Arline C., and Le Bold, William K. "Factors Influencing the Science Career Plans of Women and Minorities." Lafayette, Indiana: Purdue Research Foundation, 1977.

## BIBLIOGRAPHY

- Ernest, John. "Is Mathematics a Sexist Discipline?" Summary of paper presented in Special Session on Women and Mathematics, February 18, 1976, at Annual Meeting of American Society for the Advancement of Science.
- \_\_\_\_\_. "Mathematics and Sex." American Math Monthly 83 (1976): 595.
- Falconer, Etta. "Women in Science at Spelman College." Signs 4:1 (1978): 176-177.
- Farley, Sister Mary de Chantal. "A Study of the Mathematical Interests, Attitude and Achievement of Tenth and Eleventh Grade Students." Ph.D. dissertation, University of Michigan, 1968.
- Farmer, Helen S. "Why Women Contribute Less to the Arts, Sciences and Humanities." Paper presented at the Annual Meeting of the American Educational Research Association, April 19-23, 1976, in San Francisco.
- Feldman, Jacqueline. "The Savant and the Midwife." Impact of Science on Society 25 (1975): 125-136.
- Fennema, Elizabeth. "Mathematics Learning and the Sexes: A Review." Journal for Research in Mathematics Education 5 (1974): 126-139.
- \_\_\_\_\_. "Mathematics, Spatial Ability and the Sexes." In Mathematics: What Research Says About Sex Differences, edited by Elizabeth Fennema. Columbus, Ohio: ERIC Science, Mathematics and Environmental Education Clearinghouse in Cooperation with Center for Science and Mathematics Education, 1975.
- \_\_\_\_\_. "Sex-Related Differences in Mathematics Achievements: Myths, Realities, and Related Factors." Prepared at the University of Wisconsin, Department of Mathematics, 1977, in Madison.
- Fennema, Elizabeth, and Sherman, Julia. "Fennema-Sherman Mathematics Attitudes Scales." JSAS Catalog of Selected Documents in Psychology 6 (1976): 31.
- \_\_\_\_\_. "Sex-Related Differences in Mathematics Achievement, Spatial Visualization and Affective Factors." Journal for Research in Mathematics Education 9 (1978): 189-203. Includes bibliography of other related works.
- \_\_\_\_\_. "Sexual Stereotyping and Mathematics Learning." Arithmetic Teacher 24 (1977): 369-372.

## BIBLIOGRAPHY

- Ferguson, L.R., and Maccoby, E.E. "Interpersonal Correlates of Differential Ability." Child Development 37 (1966): 549-557.
- Ferriman, Annabel. "Women Academics 'Publish Less Than Men'". Impact of Science on Society 25:2 (1975): 153.
- Fetter, Jean. "Caught in the Network." Association of Women in Science Newsletter 6 (September/October 1977): 4-5.
- Fidell, L.S. "Empirical Verification of Sex Discrimination in Hiring Practices in Psychology." American Psychologist 25 (1970): 1094-1098.
- Fields, Cheryl M. "Women in Science: Breaking the Barriers." Chronicle of Higher Education 15:9 (1977): 7-8.
- Fitzgibbons, Alicia. "Getting Women Into Science." Report for the Portland State Women in Science Career Workshop, 1977.
- Fitzroy, Nancy D. "My Career as a Heat Transfer Engineer." Report No. 1 of a series. In Women in Engineering - As Told By Women Engineers, edited by John B. Parrish. Urbana, Illinois: John B. Parrish at the University of Illinois, 1976.
- Folger, John K.; Astin, Helen S.; and Bayer, Alan E. Human Resources in Higher Education. New York: Russell Sage Foundation, 1970.
- Fowler, Jo Ann V. "Panorama: Women to Top Science Posts." Bioscience 25 (1975): 180-181.
- Fox, G.L. "Some Observations and Data on the Availability of Same-Sex Models as a Factor in Undergraduate Career Choice." Sociological Focus 7 (1974): 15-30.
- Fox, Lynn. "Career Interests and Mathematical Acceleration for Girls." Paper presented at the Annual Meeting of the American Psychological Association, August 31, 1975, in Chicago.
- \_\_\_\_\_. "Changing Behaviors and Attitudes of Gifted Girls." Paper presented at the Annual Meeting of the American Psychological Association, September 7, 1976, in Washington, D.C.
- \_\_\_\_\_. "The Effects of Sex Role Socialization on Mathematics Participation and Achievement." Paper prepared for Education and Work Group, Career Awareness Division, National Institute of Education Institute, University of Denver, 1977.
- \_\_\_\_\_. "Facilitating the Development of Mathematical Talent in Young Women." Ph.D. dissertation, Department of Psychology, Johns Hopkins University, 1974.
- \_\_\_\_\_. "Gifted Girls: Scientists and Mathematicians of the Future." Paper presented at the Annual Meeting of the National Association for Gifted Children, October 14, 1976, in Kansas City, Missouri.

## BIBLIOGRAPHY

- \_\_\_\_\_. "Sex Differences: Implications for Program Planning." Paper presented at the 1975 meeting of the American Educational Research Association, April 1975, Washington, D.C.
- \_\_\_\_\_. "Sex Differences in Mathematical Precocity: Bridging the Gap." In Intellectual Talent: Research and Development, edited by Daniel P. Keating, pp. 183-214. Baltimore: Johns Hopkins University Press, 1976.
- \_\_\_\_\_. "Women and the Career Relevance of Mathematics and Science." School and Science Mathematics 76 (1976): 347-353.
- Fox, Lynn; Fennema, Elizabeth; and Sherman, Julia. "Women and Mathematics: Research Perspectives for Change." Papers in Education and Work 8 (November 1977). (National Institute of Education Publication.)
- Frazier, Kendrick. "Women Scientists in a Male Dominated Land." Science News 105 (1974): 110.
- Freeman, Jo. "Women on the Move: The Roots of Revolt." In Rossi and Calderwood, pp. 1-32.
- Frithiof, Patricia. Women in Science. Lund, Sweden: University of Lund, 1967.
- Gardner, Robert E. "Women in Engineering: The Impact of Attitudinal Differences on Education Institutions." Engineering Education 67 (1976): 233-240.
- Garman, L., and Plant, W. "Personality, Academic Performance and Educational Aspirations of Very Bright Women and Men Versus Those of Average Intelligence." Journal of Genetic Psychology 126 (1975): 163-167.
- George, Yolanda Scott. "The Status of Black Women in Science." Black Collegian 9:1 (1978): 64-72. 114.
- George, Yolanda S., and Williams, Joanne. Career Guide: To Future Minority/Women Scientists. Livermore, California: Lawrence Livermore Laboratory, 1977.
- Ghosh, Dolly. "Comment." Impact of Science on Society 25 (1975): 99-104.
- Gilbreth, Lillian M. "Closing the Gap." In Mattfeld and Van Aken, pp. 217-231.
- Gilford, Dorothy M., and Snyder, Joan. Women and Minority Ph.D.'s in the 1970's: A Data Book. Washington, D.C.: National Research Council, 1977.

## BIBLIOGRAPHY

- Gilford, Dorothy M., and Syverson, P.D. Doctorate Recipients From United States Universities. Summary Report 1976. Washington, D.C.: National Academy of Sciences, National Research Council, Commission on Human Resources, 1976.
- Gilmarten, Kevin J.; McLaughlin, Donald H.; Wise, Lauress L.; and Rossi, Robert J. Development of Scientific Careers: The High School Years. Final Report to the National Science Foundation on Grant No. EPF74-11549. Palo Alto: American Institute of Research, 1976.
- Glazer-Malkin; Wachrer; and Goringelsan, eds. Women in a Man Made World. Chicago: Rand-McNally and Co., 1972.
- Golde, Peggy. Women in the Field, Anthropological Experiences. Chicago: Aldine Publishing Company, 1970.
- Goldhor, Susan. "How to Get a Job." Amherst, Massachusetts: Hampshire College for Women in Cell Biology, 1976.
- Goldman, R.D., and Hewitt, B.N. "The Scholastic Aptitude Test 'Explains' Why College Men Major in Science More Often Than College Women." Journal of Counseling Psychology 23 (1976): 50-54.
- Gough, H. "Vocational Interest Blank Profiles of Women in Mathematics, Medicine and Psychology." Psychological Reports 37 (1975): 127-135.
- Grady, Susan K., and Fry, Bill J. "The Female As Technician." Community College Review 5 (1978): 11-16.
- Graham, Patricia A. "Status Transitions of Women Students, Faculty, and Administrators." In Rossi and Calderwood, pp. 163-172.
- \_\_\_\_\_. "Women in Academia." Science 169 (1970): 1284-1290.
- \_\_\_\_\_. "Women in Academic Life." In Kundsinn, pp. 238-247.
- Granrose, Cherry S., and Kammer, Ann E. "Encouraging Women in Science." Signs 4:1 (1978): 174-175.
- Gray, Mary. "The Mathematical Education of Women." American Mathematical Monthly 84 (1977): 374-377.
- \_\_\_\_\_. "Women in Mathematics." American Mathematical Monthly 79 (1972): 475-479.
- Graybill, L. "Sex Differences in Problem Solving Ability." Journal of Research in Science Teaching 12 (1975): 341-346.
- Green, Agnes Ann. Women on the Chemistry Faculties of Institutions Granting the Ph.D. in Chemistry. Washington, D.C.: American Chemical Society, 1976.

## BIBLIOGRAPHY

- Green, Judy. "American Women in Mathematics - The First Ph.D.s." Paper presented at the Special Session on History of Mathematics at the American Mathematics Society, January 1978, in Atlanta, Georgia.
- \_\_\_\_\_. "4th Annual Report on Employment of Women in Mathematics Departments." Association for Women in Mathematics Newsletter 7:6 (1977): 3.
- Greenberg, Gilda M. "Enlarging the Career Aspirations for Women Students By Alleviating Math and Science Anxiety." Paper presented at a regional conference of the Great Lakes Women's Studies Association, January 20-21, 1978, at Northeastern Illinois University, Chicago.
- Greenfield, Lois B. "Women in Engineering Education." Contemporary Education 43 (1972): 224-226.
- Grinstein, Louise. "Anna Johnson Pell Wheeler." Association for Women in Mathematics Newsletter 8:3 (1978): 14-16 (Part I); 8:4 (1978): 8-12 (Part II).
- \_\_\_\_\_. "Some 'Forgotten' Women of Math: A Who Was Who." Philosophia Mathematica 13-14 (1976-77): 73-78.
- Grinstein, Louise, and Campbell, Paul J. "Women in Mathematics: A Preliminary Selected Bibliography." Philosophia Mathematica 13-14 (1976-77): 171-203.
- Gruber, Mary; Frances, Susan; Gale, Deborah; and Friel, Merle. "Psychological Contributions to Building Women's Confidence in Mathematics." Paper presented at the American Psychological Association Convention Symposium on the Psychology of Women, August 31, 1978, in Toronto, Ontario.
- Gussett, James C. "College Entrance Examination Board Scholastic Aptitude Test Scores as a Predictor for College Freshman Mathematics Grades." Educational and Psychological Measurement 34 (1974): 953-959.
- Gysbers, N.; Johnston, J.; and Gust, T. "Characteristics of Homemaker and Career-Oriented Women." Journal of Counseling Psychology 15 (1968): 541-546.
- Hager, W.R., and Thompson, W.J. "Recruiting Women Engineering Students: Participation is Convincing." Engineering Education 66 (1976): 756-758.
- Hall, Diana Long. "Academics, Blue-Stockings, and Biologists: Women at the University of Chicago, 1892-1932." New York Academy of Sciences Annals 323 (1979): 300-320.
- Hall, Paula Quick, and others. "Conference on Minority Women in Science."

## BIBLIOGRAPHY

Science 191 (1976): 457.

Hansen, Richard A., and Neujahr, James L. "Career Development of Males and Females Gifted in Science." Journal of Educational Research 68 (1974): 43-45.

Hardin, Joy, and Dede, Christopher J. "Discrimination Against Women in Science Education." Science Teacher 40 (1973): 18-21.

Hardy, Kenneth R. "Social Origins of American Scientists and Scholars." Science 185 (1974): 487-506.

Harmon, Lenore W. "The Predictive Power Over Ten Years of Measured Social Service and Scientific Interests Among College Women." Journal of Applied Psychology 53 (1969): 193-198.

Harmon, Lindsey R. Career Achievements of NSF Graduate Fellows: The Awardees of 1952-1972. Washington, D.C.: National Research Council, Commission on Human Resources, 1977.

\_\_\_\_\_. A Century of Doctorates. Washington, D.C.: National Research Council, Commission on Human Resources, 1978.

Harrison, Anna J. "Implications of Equality." New York Academy of Sciences Annals 323 (1979): 190-196.

Hasan, E. "An Investigation into Factors Affecting Science Interest of Secondary School Students." Journal of Research in Science Teaching 12 (1975): 255-261.

Havens, E.W. Factors Associated with the Selection of Advanced Academic Mathematics Courses by Girls in High School. Princeton, New Jersey: Educational Testing Service, March 1972.

Hayrup, E. "Women and Mathematics, Physics, and Technology?" Association for Women in Mathematics Newsletter 5 (1975): 7.

Heckert, Bonnie L., and others. "A Model Research Program to Provide Equity for Women Entering Engineering." Paper presented at the Annual Meeting of the American Educational Research Association, March 1978, in Toronto, Ontario.

Hedges, L., and Majer, K. "Female and Minority Representation in College Majors as a Function of Mathematics Requirements." Report Number OASIS-RR-2, University of California-San Diego, January 1976.

Helson, Ravenna. "Personality Characteristics and Development History of Creative College Women." Genetic Psychology Monographs 76 (1967): 205-256.

\_\_\_\_\_. "Personality Characteristics and Sex in Science." Paper presented at a workshop on Research Issues in the Employment of

## BIBLIOGRAPHY

- Women, September 23-24, 1974, in Washington, D.C.  
Available from the Institute of Personality Assessment and Research,  
University of California-Berkeley.
- \_\_\_\_\_. "Sex Differences in Creative Style." Journal of Personality 35 (1967): 214-233.
- \_\_\_\_\_. "Women Mathematicians and the Creative Personality." Journal of Consulting and Clinical Psychology 36-37 (1971): 210-218.
- Henderson, Bonnie C. "Manpower." Geotimes 19 (January 1974): 24-25.
- \_\_\_\_\_. "State and Society--Discrimination Against Women in Physics." Physics Today 25:7 (1972): 61-72.
- \_\_\_\_\_. "Student Enrollment Rises Somewhat and Recruiting Intensifies." Geotimes 19 (November 1974): 20-21.
- \_\_\_\_\_. "The U.S. Chemical Industry, the People It Employs." Chemical and Engineering News 50 (June 1972): 39-40.
- \_\_\_\_\_. "Women and Other Minorities Counted." Geotimes 19 (December 1974): 21-23.
- \_\_\_\_\_. "Women in Geoscience." Geotimes 17 (September 1972): 24-25.
- Hewitt, Gloria C. "The Status of Women in Mathematics." New York Academy of Sciences Annals 323 (1979): 100-109.
- Hill, W. Scott. "Women Engineers in Industry." In Mattfeld and Van Aken, pp. 195-200.
- Hilton, Thomas L., and Berglund, Costa W. "Sex Differences in Mathematics Achievement: A Longitudinal Study." Journal of Educational Research 67 (1974): 231-236.
- Hoagland, K. Elaine. "Women in Science Seek Equal Opportunities." Bioscience 27 (1977): 830-831.
- Hochschild, Arlie. "Making It: Marginality and Obstacles to Minority Consciousness." In Kundsins, pp. 194-199.
- Hodgdon, Roaria Flores. "Factors in the Career Choices of Women in Environmental Design." Eugene, Oregon: School of Architecture and Allied Arts, Center for Environmental Research, University of Oregon, Fall 1977.
- Hoffman, Lois Wladis. "The Employment of Women, Education and Fertility." Merrill-Palmer Quarterly 20 (1974): 99-118.
- \_\_\_\_\_. "The Professional Woman As Mother." In Kundsins, pp. 222-228.

## BIBLIOGRAPHY

- Hoffman, R.L., and Maier, N.R. "Social Factors Influencing Problem-Solving in Women." Journal of Personal and Social Psychology 4 (1966): 382-390.
- Hogan, Marion G. "Self-Employment." In Mattfeld and Van Aken, pp. 191-194.
- Hollander, M., and Parker, J. "Occupational Stereotypes and Needs: Their Relationship to Vocational Choice." Vocational Guidance Quarterly 13 (1969): 91-98.
- Holmstrum, Engin Inel; Knepper, Paula R.; and Kent, Laura. Women and Minorities in Health Fields: A Trend Analysis of College Freshmen. Washington, D.C.: Policy Analysis Service of the American Council on Education, 1976-1977. (Three volumes.)
- Hopkins, Esther A.H. "A Certain Restlessness." New York Academy of Sciences Annals 323 (1979): 173-178.
- Horn, Joseph M., and Turner, Robert G. "Personality Correlates of Differential Abilities in a Sample of Lower Than Average Ability." Psychological Reports 35 (1974): 1211-1220.
- Horner, Matina S. "Toward an Understanding of Achievement-Related Conflicts in Women." Journal of Social Issues 28:2 (1972): 157-175.
- Horner, Matina S., and Walsh, Mary R. "Psychological Barriers to Success in Women." In Kundson, pp. 138-144.
- Hornig, Lilli S. "Scientific Sexism." New York Academy of Sciences Annals 323 (1979): 125-133.
- \_\_\_\_\_. "Women and Science: Research and Practice in Science Education." Paper presented at the National Institute of Education, October 17, 1979. Available from Wellesley College, Higher Education Resource Services.
- Houlihan, S., and Wotiz, J.H. "Women in Chemistry Before 1900." Journal of Chemical Education 52 (1975): 362-369.
- Howe, Florence. "Sexual Stereotypes and the Public Schools." In Kundsin, pp. 123-128.
- Howe, Florence, and Ahlum, Carol. "Women's Studies and Social Change." In Rossi and Calderwood, pp. 395-425.
- Hoyt, Mary Finch. American Women of the Space Age. New York: Atheneum, 1966.
- Hubbard, Ruth. "Feminism in Academia: Its Problematic and Problems." New York Academy of Sciences Annals 323 (1979): 249-256.
- Hubbard, Ruth; Henifin, Mary Sue; and Fried, Barbara. eds. women Look

## BIBLIOGRAPHY

- at Biology Looking at Women. Boston: G.K. Hall, Inc.; Cambridge: Schenkman Publishing Company, May 1979.
- Huber, Joan. Changing Women in a Changing Society. Chicago: University of Chicago Press, 1973.
- \_\_\_\_\_. "From Sugar and Spice to Professor." In Rossi and Calderwood, pp. 125-135.
- Hughes, Helen E. "Creativity in Women." AAUW Journal 38 (November 1976): 6-9.
- Humphreys, Sheila, ed. Effective Strategies for Promoting Participation of Women and Minorities in Science. Boulder, Colorado: Westview Press, 1980. Forthcoming in the AAAS Selected Symposia Series.
- Husen, T., ed. International Study of Achievement in Mathematics: A Comparison of Twelve Countries. Volumes I and II. New York: John Wiley and Sons, 1967.
- Hutchings, D. "Girls' Attitudes to Science." New Society 267 (1967): 671.
- Hypatia's Sisters: Biographies of Women Scientists Past and Present. Prepared by the class in "Women and Science", University of Washington Women Studies Program, Summer 1975. Seattle, Washington: Feminist Northwest, 1976.
- Iacobacci, Rora F. "Women of Mathematics." Mathematics Teacher 63 (1970): 329-337.
- International Conference of Women Engineers and Scientists. Proceedings of the Second Conference. Cambridge, 1967.
- \_\_\_\_\_. Proceedings of the Third Conference. Turin, Italy, 1971.
- International Labor Office. "Women in the Workforce - the General Picture." Impact of Science on Society 25:2 (1975): 137-146.
- Jackson, Shirley A. "From Clerk-Typist to Research Physicist." New York Academy of Sciences Annals 323 (1979): 296-299.
- Jay, Winifred, and Schminke, Clarence. "Sex Bias in Elementary School Mathematics Texts." Arithmetic Teacher 22 (1975): 242-246.
- Jenkins, E.W. "The Scientific Education of Girls Since 1902." Durham Research Review 32 (1974): 873-885.
- Johnson, Diane. "Women in Meteorology: A Glimpse at the Large-Scale Pattern." Weatherwise 28:3 (1975): 108-115.
- Johnson, George E., and Stafford, Frank P. "The Earnings and Promotion

## BIBLIOGRAPHY

- of Women Faculty." American Economic Review 64 (1974): 888-903.
- Johnson, Virginia G. "Comparing Attitudes Toward Mathematics of Female Elementary Education Students with Other Female Students." College Student Journal 10 (Fall 1976): 213-216.
- Jones, Julie. "Women in Cereal Chemistry." Foods World 21 (1976): 206-208.
- Joyce, Nancy Cahill, and Hall, Paula Quick. "Women Researchers Analyze Education, Job Barriers." Science 198 (1977): 917-918.
- Juillard, Jacqueline. "The Popularization of Science: A New Profession Being Developed by Both Men and Women." Impact of Science on Society 25:2 (1975): 159-168.
- Kaczala, Caroline, and others. "Developmental Shifts in Expectancies and Attributions for Performance in Mathematics." Paper presented to American Educational Research Association, 1979, San Francisco.
- Kadar, Agnes, and Shupe, Barbara. "Science: A History of Women's Work." Science Teacher 44 (1977): 39-41.
- Kahne, Hilda. "Employment Prospects and Academic Policies." In Kundsins, pp. 160-170.
- \_\_\_\_\_. "Women in Physics." American Physical Society Bulletin 17 (1977): 740-751.
- \_\_\_\_\_. "Women in Science: Employment Prospects and Academic Policies." New York Academy of Sciences Annals 208 (1975): 143-153.
- Kaminski, Donna M., and others. "Why Females Don't Like Mathematics: The Effect of Parental Expectations." Paper presented at the Annual Meeting of the American Sociological Association, August 30-September 2, 1976, in New York City.
- Karle, Isabelle L. "Crystallographer." In Kundsins, pp. 32-35.
- Kashket, Eva Ruth; Robbins, Mary Louise; Leive, Loretta; and Huang, Alice S. "Status of Women Microbiologists." Science 183 (1974): 488-494.
- Katzenmeyer, Conrad, and Lawrenz, Frances. On-Site Assessment of the Women in Science Career Facilitation Program. Final Report. Washington, D.C.: National Science Foundation, Directorate for Science Education, 1978.
- Kaufman, Debra Renee. "Associational Ties in Academe: Some Male and Female Differences." Sex Roles 4 (1978): 9-21.
- Kaufman, Harold G. "Young Women in Engineering a Little Bit Better Than Men." New Engineer 4 (February 1975): 31-36.
- Keeves, J.P. "Differences Between the Sexes in Mathematics and Science Courses." International Review of Education 19 (1973): 47-62.

## BIBLIOGRAPHY

- Keller, Evelyn Fox. "Women in Science: An Analysis of a Social Problem." Harvard Magazine 77 (October 1974): 14-19.
- Kelly, Alison. "Science for Men Only?" New Scientist 29 (1974): 538-540.
- \_\_\_\_\_. "Why Do Girls Study Biology?" School Science Review 56 (1975): 628-632.
- \_\_\_\_\_. "Women in Physics and Physics Education." In New Trends in Physics Teaching, edited by J. Lewis. UNESCO, 1976.
- \_\_\_\_\_. "Women in Science: A Bibliographical Review." Durham Research Review 7 (1976): 1092-1108.
- Kelly, Alison, and others. Girls and Science Education - Cause for Concern? London: Nuffield Foundation, 1975.
- Kennedy, Hubert. "The Witch of Agnesi - Exorcised." Mathematics Teacher 62 (1969): 480-482.
- Kepner, Harry S. Jr., and Koehn, Lilane R. "Sex Roles in Mathematics: A Study of the Status of Sex Stereotypes in Elementary Mathematics Texts." Arithmetic Teacher 24 (1977): 379-385.
- Kerby-Miller, Wilma A. "Academic Employment." In Mattfeld and Van Aken, pp. 185-190.
- Killian, James R., Jr. "Enhancing the Role of Women in Science, Engineering, and the Social Sciences." In Mattfeld and Van Aken, pp. 128-138.
- Kirk, Barbara. Factors Affecting Young Women's Direction Toward Science-Technology-Mathematics. Berkeley: Management Technology Career Projects, 1975.
- Kistiakowsky, Vera. "Affirmative Action." Presented at the Washington, D.C. Meeting of the American Physical Society, 1975.
- \_\_\_\_\_. Women Doctoral Scientists in the United States. Cambridge, Massachusetts: Massachusetts Institute of Technology, 1976.
- \_\_\_\_\_. "Women in Engineering, Medicine, and Science." Demographic paper prepared for the Conference on Women in Science and Engineering, National Research Council, June 1973.
- \_\_\_\_\_. "Women in Physics and Astronomy." New York Academy of Sciences Annals 323 (1979): 35-47.
- Klotzburger, Kay. "Political Action by Academic Women." In Rossi and Calderwood, pp. 359-392.

## BIBLIOGRAPHY

- Koelsche, L. "A Study of the Relationship Between Certain Variables and the Science Interests of Children." Journal of Research in Science Teaching 8 (1971): 237-241.
- Kohlstedt, Sally G. "In From the Periphery: American Women in Science, 1830-1880." Signs 4:1 (1978): 81-96.
- \_\_\_\_\_. "Maria Mitchell: The Advancement of Women in Science." New England Quarterly 51 (March 1978): 39-63.
- Konsin, M.A. Enrollment in Wisconsin High School Mathematics Classes by Sex During 1975-1976. Madison, Wisconsin: University of Wisconsin, 1977.
- Krause, Richard M. "Research Challenges and Opportunities." New York Academy of Sciences Annals 323 (1979): 6-13.
- Kreinberg, Nancy. "Equals in Math." Independent School 37 (May 1978): 47-49.
- \_\_\_\_\_. "Furthering the Mathematical Competence of Women." Public Affairs Report 17:6 (December 1976): 1-7.
- \_\_\_\_\_. I'm Madly in Love with Electricity and Other Comments About Their Work by Women in Science and Engineering. Berkeley, California: Lawrence Hall of Science, 1977.
- \_\_\_\_\_. "Math for Girls." Mathematics Teacher 70 (November 1977).
- \_\_\_\_\_. "What a Great Idea! Astronomy Comes Down to Earth." Association of Science and Technology Centers Newsletter 3 (July 1976).
- \_\_\_\_\_. "Women Encouraged to Participate in Mathematics and Science." Mathematics Teacher 70 (October 1977).
- Kreinberg, Nancy; Liff, Rita; and Blum, Lenore. "Educating Women in Science and Mathematics: A Consortium Model." Association for Women in Mathematics Newsletter 7 (Summer 1976).
- Kuhnke, Helen. "Update on Sex-Role Stereotyping in Elementary Mathematics Textbooks." Arithmetic Teacher 23-24 (1977): 373-376.
- Kundsinn, Ruth B. "Testimony Concerning the NIH Peer Review System: A Critical Assessment." Physiology, Chemistry, and Physics 8 (1976): 193-196.

## BIBLIOGRAPHY

- \_\_\_\_\_, ed. Women and Success; the Anatomy of Achievement. New York: Morrow, 1974. Originally published as "Successful Women in the Sciences: An Analysis of Determinants." New York Academy of Sciences Annals 208 (1973).
- Lantz, Alma, and others. The Evaluation of the Career Facilitation Program Executive Summary. Report prepared under National Science Foundation Grant Number SPI178-09546.
- \_\_\_\_\_. An Impact Analysis of Sponsored Projects to Increase the Participation of Women in Careers in Science and Technology. Interim Technical Report to the National Science Foundation. Denver, Colorado: Denver Research Institute, 1976.
- Lantz, Alma, and West, Anita S. An Impact Analysis of Sponsored Projects to Increase the Participation of Women in Careers in Science and Technology. (Abbreviated version). Final Technical Report to the National Science Foundation. Denver, Colorado: Denver Research Institute, 1977.
- \_\_\_\_\_. An Impact Analysis of Sponsored Projects to Increase the Participation of Women in Careers in Science and Technology. (Full Report). Final Technical Report to the National Science Foundation. Denver, Colorado: Denver Research Institute, 1977.
- Larney, Violet H. "Female Mathematicians, Where Are You?" American Mathematical Monthly 80 (1973): 310-313.
- Law, Margaret. "Goals for Women in Science." Technology Review 25 (1973): 48-57.
- \_\_\_\_\_, ed. Goals for Women in Science. Boston: Women in Science and Engineering, 1972.
- Lazarus, Mitchell. "Mathophobia: Some Personal Speculations." National Elementary Principal 53:2 (1974): 16.
- Lefcourt, Susan. "Women in Engineering - Revisited." Chemical Engineering 76 (November 1969): 92-98.
- Leive, Loretta. "Status of Women Microbiologists: A Further Report, Including Preliminary Analysis of Reasons for the Lower Status of Women." American Society of Microbiology News 37 (August 1971): 57-62.
- Le Mone, Margaret. "The Role of Women in Atmospheric Science." Report of the 55th Annual Meeting. American Meteorological Society Bulletin 56 (1975): 875-878.
- Leonard, R.; Fein, Jay S.; and Fein, Sara B. "Recruiting Women

## BIBLIOGRAPHY

to Engineering Careers: Description and Evaluation of a Summer Program." Paper presented at the 11th Annual Midwest Regional Conference of the American Society for Engineering Education, March 1976, in Norman, Oklahoma.

Leopold, A.C. "Games Scientists Play." Bioscience 23 (1973): 590-594.

Levine, Maita, and Rolwing, Raymond. "Reasons Why Qualified Women Do Not Pursue Mathematical Careers." Delta Kappa Gamma Bulletin 43 (Winter 1977): 40-48.

---

Women in Mathematics: Past Barriers, Future Hope. Cincinnati, Ohio: University of Cincinnati, Mathematics Department, 1976.

Levine, Milton, and others. American Science Manpower, 1964--A Report of the National Register of Scientific and Technical Personnel. Washington, D.C.: National Science Foundation, 1966.

Leviton, H. "The Implications of the Relationship Between Self-Concept and Academic Achievement." Child Study Journal 5 (1975): 25-36.

Lewin, Arie Y., and Duchan, Linda. "Women in Academia." Science 173 (1971): 892-895.

Lipman-Blumen, Jean. "How Ideology Shapes Women's Lives." Scientific American 226 (1972): 34-42.

Lobonc, S. "Sex-Role Stereotyping by High School Females in the Biological and Physical Sciences." Master's thesis, Purdue University, Lafayette, Indiana, 1976.

Loeb, Jane W., and Ferber, Marianne A. "Representation, Performance and Status of Women on the Faculty at the Urbana-Champaign Campus of the University of Illinois." In Rossi and Calderwood, pp. 239-254.

Long, Barbara H. Acceleration in Science for Achieving High School Women. Final Report. Washington, D.C.: National Science Foundation Grant Number GY-11547, 1973.

Lonsdale, Kathleen. "Women in Science: Reminiscences and Reflections." Impact of Science on Society 20 (1970): 45-59.

Looft, W.R. "Vocational Aspirations of Second Grade Girls." Psychological Reports 23 (1971): 241-242.

"Low Salaries of Women Chemists Probed." Chemical and Engineering News 54 (1976): 33.

Lowery, Lawrence F. "An Experimental Investigation into the Attitudes

## BIBLIOGRAPHY

- of Fifth Grade Students Toward Science." School Science and Mathematics 67 (1967): 569-579.
- Lubkin, Gloria. "Women in Physics." Physics Today 24 (April 1971): 23-27.
- Luchins, Edith H. "Women Mathematicians: A Contemporary Appraisal." Paper presented at the Meeting of the American Association for the Advancement of Science, February 1976, in Boston.
- \_\_\_\_\_. Women in Mathematics: Problems of Orientation and Reorientation. Final Report. Troy, New York: Rensselaer Polytechnic Institute, January 1976.
- \_\_\_\_\_. "Women Mathematicians: Why So Few?" American Mathematical Society Notices 23:5 (1976): A-557. (Abstract #737-99-1).
- Lurie, Nancy O. "Women in Early American Anthropology." In Pioneers of American Anthropology: The Uses of Biography, edited by June MacNeish, pp. 29-81. Seattle: University of Washington Press, 1966.
- McAfee, Naomi J. "Brighter Prospects for Women in Engineering." Engineering Education 64 (1974): 502-504.
- \_\_\_\_\_. "Women in Engineering Revisited." New York Academy of Sciences Annals 323 (1979): 94-99.
- McCarthy, Joseph L., and Wolfle, Dael. "Doctorates Granted to Women and Minority Group Members." Science 189 (1975): 856-859.
- Maccoby, Eleanor E., ed. The Development of Sex Differences. Stanford, California: Stanford University Press, 1966.
- \_\_\_\_\_. "Feminine Intellect and the Demands of Science." Impact of Science on Society 20 (1970): 13-28.
- Maccoby, Eleanor E., and Jacklin, Carol N. The Psychology of Sex Differences. Stanford, California: Stanford University Press, 1974.
- \_\_\_\_\_. Sex Differences in Intellectual Functioning. Assessment in a Pluralistic Society. Proceedings of the 1972 Invitational Conference on Testing Problems. Princeton, New Jersey: Education Testing Service, 1973.
- McLure, Gail Thomas, and Piel, Ellen. "College-Bound Girls and Science Careers: Perceptions of Barriers and Facilitating Factors." Journal of Vocational Behavior 12 (1978): 172-182.
- McLure, Gail Thomas, and McLure, John W. Women's Studies. Developments in Classroom Instruction Series. Washington, D.C.: National Education Association, 1977.
- McLure, Gail Thomas, and others. Women in Science and Technology

## BIBLIOGRAPHY

- Careers for Today and Tomorrow. Iowa City, Iowa: American College Testing Program, 1976.
- McDonald, Carolyn. "Increasing Participation in the Sciences: An Experiment in Mathematics Education." Abridged version presented at the American Association for the Advancement of Science, February 1976, in Boston, Massachusetts.
- McDonald, Carolyn, and Currier, Barbara S. "An Experimental Mathematics Project for Women." American Mathematical Monthly 84 (1977): 484-486.
- McIntosh, Millicent C. "Educator." In Kundsinn, pp. 50-52.
- McKnight, Diane. "Sexism in Advertising: What's a Nice Girl Like You..." Technology Review 76:6 (1974): 20-21.
- Magner, Lois N. "Women and the Scientific Idiom: Textual Episodes From Wollstonecraft, Fuller, Gilman, and Firestone." Signs 4:1 (1978): 61-80.
- Malcom, Shirley Mahaley; Hall, Paula Quick; and Brown, Janet Welsh. The Double Bind: The Price of Being a Minority Woman in Science. Washington, D.C.: American Association for the Advancement of Science, April 1976.
- "Males Still Better in Science." Science News 106 (October 1975): 108.
- Mamrak, Sandra A., and Montanelli, Richard G. "Computer Science Faculties: The Current Status of Minorities and Women." Survey conducted by the Department of Computer and Information Science of the Ohio State University and the Department of Computer Science at the University of Illinois at Urbana-Champaign, Fall 1975.
- Marcus, Gail H. Report on the Survey of Radiation Exposure Experience of Women in the American Nuclear Society. Arlington, Virginia: Analytic Services, 1979.
- \_\_\_\_\_. "The Status of Women in the Nuclear Industry." Bulletin of the Atomic Scientists 32:4 (1976): 34-39.
- Marinez, Diane I. "Innovative Approaches: Meeting the Needs of Women Faculty in the Eighties." New York Academy of Sciences Annals 323 (1979): 268-275.
- Martin, Nancy. Bibliography on Women in Science and a List of Some Women Scientists. Preliminary version. Albuquerque: Nancy Martin, University of New Mexico, 1977.
- Marvin, Ursula, ed. Space for Women: Perspectives on Careers in Science. Cambridge, Massachusetts: Center for Astrophysics, 1976.
- Mathias, Mildred E. "Attributes of a Scientist: Barriers for Women Entering Science." Text of an address given at California State

## BIBLIOGRAPHY

- University, October 21-22, 1977, in Fresno, California.
- \_\_\_\_\_. "Women in Science." Paper given at California State University, October 12, 1978, in Fresno, California.
- Mattfeld, Jacquelyn, and Van Aken, Carol G., eds. Women and the Scientific Professions: The M.I.T. Symposium on American Women in Science and Engineering. Cambridge, Massachusetts: Massachusetts Institute of Technology Press, 1965.
- Matthews, Esther. "Recognizing and Nurturing Scientific Potential in Female Children and Adolescents." Paper presented to the Committee on the Status of Women in Physics, Joint Annual Meeting of the American Physical Society and the American Association of Physics Teachers, January 29, 1975, in Anaheim, California.
- Mayfield, B., and Nash, W.R. "Career Attitudes of Female Professors." Psychological Reports 39 (1976): 631-634.
- Mead, Margaret. Blackberry Winter: My Earlier Years. New York: Morrow, 1972.
- Mello, Robert F. "Government Interest in the Employment of Women." In Mattfeld and Van Aken, pp. 206-213.
- Merriam, Eve. "Maria Mitchell." In Growing Up Female in America: Ten Lives, pp. 75-92. New York: Doubleday, 1971.
- Milesko-Pytel, Diana. "Changing the Specifications for Engineers." American Education 13 (January/February 1977): 27-31.
- Milton, G.A. "The Effects of Sex-Role Identification Upon Problem-Solving Skills." Journal of Abnormal and Social Psychology 55 (1975): 208-212.
- Minor, Barbara. "Engineering--A Career for 330 Women at Boeing." Journal of Aerospace Education 1 (1974): 10-11.
- Moche, Dinah L. "Development of Educational Materials to Recruit Women into Scientific Careers." American Journal of Physics 44 (1976): 390-391.
- Money, John, and Ehrhardt, Anka. Men and Women, Boy and Girl: The Differentiation and Dimorphism of Gender Identity from Conception to Maturity. Baltimore: Johns Hopkins University Press, 1972.
- "Monsanto's Designer 'Extraordinaire'." Ebony 28 (October 1973): 135-140.
- Moody, Judith, and others. "Professionalism Among Women and Men in the Geosciences." Journal of Geological Education 24 (1976): 166-171.
- Morawetz, Cathleen S. "Women in Mathematics." American Mathematical

## BIBLIOGRAPHY

- Society Notices 20:3 (1973): 131-132.
- Morlock, Laura. "Discipline Variation in the Status of Academic Women." In Rossi and Calderwood, pp. 255-312.
- Morris, Stephanie. "The Franklin Institute: Women and Technology." Signs 4:1 (1978): 173-174.
- Mott, Charles J. "Achievement of Women in a Self-Paced Earth Science Course." Community College Frontiers 6 (1978): 4-5.
- Moulton, Ruth. "Psychological Challenges Confronting Women in the Sciences." New York Academy of Sciences Annals 323 (1979): 321-335.
- "The MS Factor in ASME." Mechanical Engineering 95 (1975): 9-21.
- Mullis, Ina V.S. Educational Achievement and Sex Discrimination. Denver, Colorado: National Assessment of Educational Progress, 1975.
- Nash, June. "A Critique of Social Science Models of Contemporary Society: A Feminine Perspective." New York Academy of Sciences Annals 260 (1975): 84-100.
- National Academy of Sciences. National Research Council. Science, Engineering and Humanities Doctorates: the United States: Profile. Biennial publication begun in 1975. Washington, D.C.: National Academy of Sciences.
- National Assessment of Educational Progress. Mathematic Technical Summary: Report 04-MA-21. Denver, Colorado: NAEP, 1976.
- \_\_\_\_\_. Science Technical Report, Summary Volume: Report 04-S-21. Denver, Colorado: NAEP, 1976.
- National Science Foundation. "Brief Descriptions of 22 Studies and Experimental Projects Related to Careers in Science for Women Funded by the National Science Foundation in Fiscal Year 1974." Washington, D.C.: National Science Foundation, 1974.
- \_\_\_\_\_. Women and Minorities in Science and Engineering. Washington, D.C.: National Science Foundation 77-304, January 1977.
- \_\_\_\_\_. Division of Science Resources Studies. American Science Manpower 1970: A Report of the National Register of Scientific and Technical Personnel. Washington, D.C.: National Science Foundation, 1971.
- \_\_\_\_\_. Characteristics of the National Sample of Scientists and Engineers,

## BIBLIOGRAPHY

1974. Part II. Employment. Washington, D.C.: National Science Foundation, 1976.
- Nemeth, S.E. "Women at General Motors Institute." IEEE Transactions on Education E-18 (1975): 36-37.
- Neustadt, Sara Jane. Women Engineers. New York: Engineers Council for Professional Development, 1974.
- Nichols, Roberta. "Women in Science and Engineering: Are Jobs Really Sexless?" Technology Review 75 (1973): 43-47.
- "1973 Salaries Generally Up But Some Down." Chemical and Engineering News 51 (1973): 13-16.
- Nixon, Alan C. "Changing Attitudes Toward Women in the Profession of Chemistry." New York Academy of Sciences Annals 323 (1979): 146-172.
- Norman, R.D. "Sex Differences in Attitudes Toward Arithmetic - Mathematics From Early Elementary School to College Levels." Journal of Psychology 97 (1977): 247-256.
- Notman, Malkah T. "Pregnancy and Abortion: Implications for Career Development of Professional Women." In Kunds, pp. 216-221.
- O'Brien, J. Edwin. "Opportunities and Challenges for Women Engineers in Industry." Paper presented at the American Society for Engineering Education Annual Conference on Opportunities for Women in Engineering, June 1974, in Troy, New York.
- O'Donnell, Jo Anne, and Anderson, Dale G. "Decision Factors Among Women Talented in Math and Science." College Student Journal 11 (Summer 1977): 165-168.
- "Office of Opportunities in Science: The Professional Associations and Equal Opportunity." Science 188 (1975): 439-440.
- O'Hern, Elizabeth M. "Women in the Biological Sciences." Paper prepared for the Institute of General Medical Sciences, National Institutes of Health, April 20, 1979.
- \_\_\_\_\_. "Women Scientists in Microbiology." Bioscience 25 (1973): 539-543.
- O'Kelly, Elizabeth. "Appropriate Technology for Women." AAUW Journal 70 (1976): 539-543.
- Osen, Lynn M. Women in Mathematics. Cambridge: Massachusetts Institute

## BIBLIOGRAPHY

of Technology Press, 1974.

Oshima, Eugene Akio. Changes in Attitudes Toward Science and Confidence in Teaching Science of Prospective Elementary Teachers. Stillwater: Oklahoma State University, 1966.

Ott, Mary D. "Analysis of Doctor's Degrees Awarded to Men and Women, 1970-71 Through 1974-75." U.S. Department of Health, Education, and Welfare, DHEW Pub. No. (NCES) 77-333. Washington, D.C.: U.S. Government Printing Office, 1977.

\_\_\_\_\_. "A Comparison of Black Women and White Women Engineering Freshmen." Engineering Education 68 (1978): 758-760.

\_\_\_\_\_. "Experiences, Aspirations, and Attitudes of Male and Female Freshmen Engineers." Engineering Education 68 (1978): 326-333, 338.

\_\_\_\_\_. "Female Engineering Students--Attitudes, Characteristics, Expectations, Responses to Engineering Education." Ithaca, New York: Final Report NSF Grant No. SM175-18013 A01, June 1978.

\_\_\_\_\_. "The Men and Women of the Class of '79." Engineering Education 67 (1976): 226-232.

\_\_\_\_\_. Results of Fall 1975 Survey of Engineering Freshmen. Washington, D.C.: National Science Foundation, 1976.

\_\_\_\_\_. "Results of Fall 1975 Survey of Engineering Freshmen." Revised. April 1977. (ERIC Document 141 231.)

\_\_\_\_\_. "Results of Fall 1976 Survey of Engineering Freshmen." May 1977. (ERIC Document 141 131.)

\_\_\_\_\_. "Retention of Men and Women Engineering Students." Research in Higher Education 9 (1978): 137-150.

\_\_\_\_\_. "Differences Between Male and Female Freshmen Engineers." Journal of College Student Personnel 19 (1978): 552-557.

\_\_\_\_\_. "Sex Differences in Experiences and Career Plans of Freshmen Engineering Students." IEEE Transactions on Education E-21 (1978): 230-233.

\_\_\_\_\_. "Women Students' Plans for Careers in Engineering." Proceedings of the 1978 College Industry Education Conference (1978) 62-64.

\_\_\_\_\_. "Women's Representation Among Recipients of Doctor's and First-Professional Degrees, 1970-71 Through 1974-75." U.S. Department of Health, Education, and Welfare, DHEW Pub. No. (NCES) 76-022. Washington, D.C.: U.S. Government Printing Office, 1976.

## BIBLIOGRAPHY

- Ott, Mary D., and Reese, Nancy A., eds. Women in Engineering - Beyond Recruitment. Ithaca, New York: Cornell University, College of Engineering, 1975.
- Parker, A. "Career and Marriage Orientation in Vocational Development of College Women." Journal of Applied Psychology 50 (1966): 232-235.
- Parrish, J.B., and Block, J.S. "The Future of Women in Science and Engineering." Bulletin of the Atomic Scientists 24 (1968): 46-49.
- Parsons, Jacquelynn, and others. "Parental Influences on Junior High School Girls' Mathematical Expectancies and Course Plans." Paper presented to the American Psychological Association, 1979, in New York.
- Patterson, Michelle. "Sex and Specialization in Academe and the Professions." In Rossi and Calderwood, pp. 313-331.
- Patterson, Michelle, and Sells, Lucy. "Women Dropouts from Higher Education." In Rossi and Calderwood, pp. 79-91.
- Pendleton, Deedee. "Women in Science: Reshaping the Stereotypes." Science News 107 (1975): 171.
- Perl, Teri. Math Equals: Biographies of Women Mathematicians and Related Activities. Menlo Park, California: Addison-Wesley Publishing Company, 1978.
- Perucci, Carolyn Cummings. The Female Engineer and Scientist: Factors Associated with the Pursuit of a Professional Career. Lafayette, Indiana: Purdue University, 1968.
- \_\_\_\_\_. "Minority Status and the Pursuit of Professional Careers: Women in Science and Engineering." Social Forces 49 (1970): 245-259.
- Pfafflin, Sheila M. "Equal Opportunity for Women in Science." New York Academy of Sciences Annals 323 (1979): 341-344.
- Phelan, Mary Kay. Probing the Unknown: The Story of Dr. Florence Sabin. New York: Thomas Crowell, 1969.
- Pinson, C.B. "Self-Acceptance in Females as a Function of Academic Achievement." Psychological Reports 38 (1976): 853-854.
- Pollack, B.L., and Little, L.K. "Experimental Project in Physics Education or New Avenues for Women." Physics Teacher 11 (1973): 391-399.
- Powell, Gloria Johnson. "Minority-Group Women in Science and Research."

## BIBLIOGRAPHY

- Psychiatric Annals 7:4 (1977): 27,31,35-37.
- Psathes, G. "Toward a Theory of Occupational Choice for Women." Sociology and Social Research 52 (1967-68): 253-268.
- Ramaley, Judith A., ed. Covert Discrimination and Women in Science. Boulder, Colorado: Westview Press, 1978.
- \_\_\_\_\_. "Strategies for Change." New York Academy of Sciences Annals 325 (1979): 228-233.
- Ramey, Estelle. "An Interview With Mrs. Estelle Ramey." Perspectives in Biology and Medicine 14 (1971): 424-431.
- \_\_\_\_\_. "Sex Hormones and Executive Ability." In Kundsinn, pp. 248-256.
- Rappaport, Karen D. "Sexual Roles and Mathematical Expectations." Matyc Journal 12:3 (1978): 1.
- Raskin, B.L. "The Relative Effect of Occupational and Socio-Occupational Information on High School Girls' Expressed Opinions of Women Scientists." Ph.D. Dissertation, Department of Education, Johns Hopkins University, 1968.
- Rauscher, Elizabeth. "Status of Women." Publication from class in Women and Society, Sociology 151, University of California-Berkeley, May 1971.
- \_\_\_\_\_. "Where are the Women in Astronomy? The Role of Education." Paper presented at the Astronomical Society of the Pacific Meeting, May 1976, in Berkeley, California.
- Reskin, Barbara F. "Academic Sponsorship and Scientific Careers." Paper read at the Second Annual Meeting of the Society for the Social Studies of Science, October 1977, in Boston.
- \_\_\_\_\_. "Scientific Productivity and the Reward Structure of Science." American Sociological Review 42 (1977): 491-504.
- \_\_\_\_\_. "Scientific Productivity, Sex and Location in the Institution of Science." American Journal of Sociology 85 (1979): 1235-1243.
- \_\_\_\_\_. "Sex Differences in Status-Attainment in Sciences: The Case of the Postdoctoral Fellowship." American Sociological Review 41 (1976): 597-612.
- \_\_\_\_\_. "Women Chemists." Master's thesis, University of Washington-Seattle, 1973.
- Reskin, Barbara F., and Hargens, Lowell L. "Scientific Advancement of

## BIBLIOGRAPHY

- Male and Female Chemists." In Discrimination in Organizations, edited by Rodolfo Alvarez, Kenneth Lutterman and Associates, pp. 100-122. San Francisco: Jossey-Bass, Inc., 1979.
- Rever, Philip. Scientific and Technical Careers: Factors Influencing Development During the Educational Years. Iowa City: American College Testing Program, 1973.
- Risch, Constance, and Beymer, Lawrence. "A Framework for Investigating Career Choice of Women." Vocational Guidance Quarterly 16 (December 1967): 87-92.
- Robbins, Mary Louise. "Another Look at the Profile of the Member with Special Emphasis on the Status of the Woman Member." American Society for Microbiology News 38 (1972): 527-535.
- \_\_\_\_\_. "Salaries of Microbiologists, 1971 (With Special Emphasis on a Comparison of Men's and Women's Salaries)." American Society for Microbiology News 38 (1972): 651-661.
- \_\_\_\_\_. "What is the Committee on the Status of Women Microbiologists Doing for You?" American Society for Microbiology News 41 (1975): 2-4.
- Robinson, Lora H. "Institutional Variation in the Status of Academic Women." In Rossi and Calderwood, pp. 199-238.
- Roby, Pamela. "Institutional Barriers to Women Students in Higher Education." In Rossi and Calderwood, pp. 37-56.
- Roe, Anne. "Women in Science." Personnel and Guidance Journal 44 (1966): 784-787.
- Rose, Clare; Menninger, Sally Ann; and Nyre, Glenn F. The Study of the Academic Employment and Graduate Enrollment Patterns and Trends of Women in Science and Engineering. Los Angeles, California: Evaluation and Training Institute, 1978. Report from National Science Foundation Grants Nos. SRS76-82705 and SRS77-16927.
- Rosen, R.A. Hudson. "Occupational Role Innovators and Sex Role Attitudes." Journal of Medical Education 49 (1974): 554-561.
- Rosenthal, Robert, and Jacobson, Lenore. Pygmalion in the Classroom; Teacher Expectation and Pupils' Intellectual Development. New York: Holt, Rinehart and Winston, 1968.
- Ross, George G., and Chitayat, Deanna. "Reentry Women in Science." In Returning Women: Policy Issues and Programs, edited by Carol Kerr

## BIBLIOGRAPHY

- Tittle and Elenor Denker, Chapter 5. New York: Praeger, 1980. in press.
- Ross, Pat, ed. Young and Female: First Person Accounts of Turning Points in the Lives of Eight American Women. New York: Random House, 1972.
- Rossi, Alice S. "Barriers to the Career Choice of Engineering, Medicine, or Science Among American Women." In Mattfeld and Van Aken, pp. 51-127.
- Rossi, Alice, and Calderwood, Ann, eds. Academic Women on the Move. New York: Russell Sage Foundation, 1973.
- Rossiter, Margaret. "The Development of 'Women's Work' in Science, 1880-1910." Isis 71 (September 1980): forthcoming.
- \_\_\_\_\_. "Sexual Segregation in the Sciences: Some Data and a Model." Signs 4:1 (1978): 146-151.
- \_\_\_\_\_. "Women Scientists in America Before 1920." American Scientist 62 (1974): 312-325.
- "Roster of Women in the History of Science." Report of the Committee on Women in the History of Science in the 1971 Isis Directory, 1974, C. Iltis, Collegiate Seminar Program, University of California-Berkeley.
- Roth, Laura M., and O'Fallon, Nancy M. Women in Physics. New York: American Physical Society, Committee on the Status of Women, 1976.
- Rowell, J.A. "Sex Differences in Achievement in Science and the Expectations of Teachers." Australian Journal of Education 15:1 (1971): 16-29.
- Roysdon, Christy. "Women in Engineering. A Bibliography on Their Progress and Prospects." Council of Planning Librarians Exchange Bibliography 878 (1975).
- Ruddick, Sara, and Daniels, Pamela, eds. Working It Out, 23 Women Writers, Artists, Scientists, and Scholars Talk About Their Lives and Work. New York: Pantheon Books, 1977.
- Rudnick, Diane Tarmy. "Women in Technology: A Challenge to the Technical Institute." Engineering Education 68 (1978): 816-819.
- Ruina, Edith, ed. Women in Science and Technology. Workshop Report, Women in Science and Technology. Cambridge: Massachusetts Institute of Technology, 1973.
- Russell, Diane H. "How a Scientist Who Happens to Be Female Can Succeed in Academia." New York Academy of Sciences Annals 325 (1979): 285-295.

## BIBLIOGRAPHY

- Russell, W.M.A. "Women as Innovators." Biology and Human Affairs 40 (1974): 21-36.
- Ruth, Sheila, and Richards, Rosanda. "Intellect vs. Femininity or Men Seldom Make Passes at Girls Who Wear Glasses." Gifted Child Quarterly 18 (1974): 182-187.
- Rutherford, F. James. "The Role of the National Science Foundation." New York Academy of Sciences Annals 315 (1979): 276-282.
- Savada, D. "Attitudes Toward Science of Non-Science Major Undergraduates: Comparison with the General Public and Effect of a Science Course." Journal of Research in Science Teaching 13 (1976): 79-84.
- Safilios-Rothschild, Constantina, ed. Toward a Sociology of Women. Lexington, Massachusetts: Xerox College Publishing, 1972.
- Sandler, Bernice R. "Women in Academe: Why it Still Hurts to Be a Woman in Labor." New York Academy of Sciences Annals 323 (1979): 14-26.
- Sargent, Pamela. "Women in Science Fiction." Futures 7 (1975): 433-441.
- Sawicz, Anna. "International Conference of Women Engineers and Scientists in Year of Women 1975." Przemyst Chemiczny 55:1 (1976): 13-15. (In Polish)
- Sayre, Anne. Rosalind Franklin and DNA. New York: W.W. Norton and Company, 1975.
- Schilling, Gerhard F., and Hunt, Kathleen M. Women in Science and Technology: U.S./U.S.S.R. Comparisons. The Rand Paper Series. Santa Monica: Rand Corporation, 1974.
- Schwartz, Felice N. "Women and Employers: Their Related Needs and Attitudes." In Kundsins, pp. 178-182.
- Schwartz, Pepper, and Lever, Janet. "Women in the Male World of Higher Education." In Rossi and Calderwood, pp. 57-77.
- Schwarzer, Theresa F. "The Changing Status of Women in the Geosciences." New York Academy of Sciences Annals 323 (1979): 48-64.
- \_\_\_\_\_. "Women Geoscientists Have Been Under-represented, Under-employed and Under-paid at All Levels of Experience in Scientific Professions." Geotimes 22 (April 1977): 20-23.
- "Science and the Citizen: Women in Science." Editorial. Scientific

## BIBLIOGRAPHY

American 237:2 (1977): 52.

Scientific Manpower Commission. Salaries of Scientists, Engineers and Technicians: A Summary of Salary Surveys. 9 Volumes. Washington, D.C.: Scientific Manpower Commission, 1964-1979.

\_\_\_\_\_. Supply and Demand for Scientists and Engineers: A Review of Selected Fields. Washington, D.C.: Scientific Manpower Commission, 1977.

Scientific Manpower Commission and Manpower Analysis and Planning Society. The Impact of Federal Programs and Policies on Manpower Planning for Scientists and Engineers: Problems and Progress. Report of Workshop held on March 31-April 1, 1977, at Arlington, Virginia. Washington, D.C.: Scientific Manpower Commission, 1977.

Scopino, John A.; Barker, Gayle F.; and Conlon, Nancy M. "Characteristics of Doctoral Scientists and Engineers in the United States, 1975." Surveys of Science Resources Series, National Science Foundation NSF 77-309, 1977.

Scott, Jacqueline M. "Early Childhood Influences." In Kundsinn, pp. 121-122.

Sells, Lucy W. "The Forum: Mathematics--A Critical Filter." Science Teacher 45:2 (1978): 28-29.

\_\_\_\_\_. "High School Mathematics as the Critical Filter in the Job Market." In Developing Opportunities for Minorities in Graduate Education. Berkeley, California: Proceedings of the Conference on Minority Graduate Education at University of California at Berkeley, May 1973.

\_\_\_\_\_. "The Mathematical Filter and the Education of Women and Minorities." Paper presented at the Annual Meeting of the American Association for the Advancement of Science, February 1976, in Boston.

\_\_\_\_\_. "Sex, Ethnic, and Field Differences in Doctoral Outcomes." Ph.D. dissertation, University of California at Berkeley, Department of Sociology, 1975.

\_\_\_\_\_, Issue Editor. "Toward Affirmative Action." In New Directions for Institutional Research, Volume 1, Number 3. San Francisco: Jossey-Bass, 1974.

Sgueros, Peter L. "Women in American Microbiology--A Report of Progress." American Society for Microbiology News 39 (1973): 639-648.

Shapley, Deborah. "Obstacles to Women in Science." Impact of Science on Society 25 (1975): 115-124.

## BIBLIOGRAPHY

- Sherman, Julia. "Effects of Biological Factors on Sex-Related Differences in Mathematics Achievement." Paper presented at the Annual Meeting of the American Educational Research Association, April 1977, in New York.
- \_\_\_\_\_. "Girls' Attitudes Toward Mathematics: Implications for Counseling." Paper presented at the Meeting of the American Psychological Association, September 1976, in Washington, D.C.
- \_\_\_\_\_. "Problem of Sex Differences in Space Perception and Aspects of Intellectual Functioning." Psychological Review 44 (1967): 290-299.
- \_\_\_\_\_. "Social Values, Femininity, and the Development of Female Competence." Journal of Social Issues 32 (1976): 181-195.
- \_\_\_\_\_. Women and Mathematics: Summary of Research from 1977-1979. ERIC Document, forthcoming. Available from ERIC Document Reproduction Services, P.O. Box 190, Arlington, Virginia 22210.
- Sherman, Julia, and Fennema, Elizabeth. "The Study of Mathematics by High School Girls and Boys: Related Variables." American Educational Research Journal 14 (1977): 159-168.
- Shinedling, M., and Pderson, D.M. "Effects of Sex of Teacher and Student on Children's Gain in Quantitative and Verbal Performance." Journal of Psychology 76 (1970): 79-84.
- Siegel, C.L. "Sex Differences in the Occupational Choices of Second Graders." Journal of Vocational Behavior 3 (1973): 15-19.
- Simmons, Jean E. "Report of the Committee for the Investigation of an Association with Other Women in Science." Graduate Women in Science Bulletin (Spring 1973): 2-6.
- \_\_\_\_\_. "Sex Discrimination in Botany and the Biological Sciences." Plant Science Bulletin 22:4 (1976): 38-39.
- \_\_\_\_\_. "Utilization of Women in Scientific Administration, U.S.A." Graduate Women in Science Bulletin (Fall 1973): 7-8.
- \_\_\_\_\_. "Women in Science." Science 170 (1970): 201.
- Simon, Rita J.; Clark, Shirley Merritt; and Galway, Kathleen. "The Women Ph.D.: A Recent Profile." Social Problems 15 (1967-1968): 221-237.
- Simpson, Beryl. "Women in Botany." Plant Science Bulletin 19 (1973): 22-24.
- Simpson, Joanne. "Meteorologist." In Kundsins, pp. 62-67.

## BIBLIOGRAPHY

- Simpson, Joanne, and Le Mone, Margaret. "Women in Meteorology." American Meteorological Society Bulletin 55 (1974): 186-189.
- Skypek, Dora Helen B.; Lee, Eugene C.; and Cox, M. Katherine. A Study of Factors That Influence Women and Blacks in Science Career Choice and Stability. Atlanta: Division of Educational Studies, Emory University, 1975.
- Smith, Caryl K.; Smith, Walter A.; and Stroup, Kala M. Counseling Women for Nontraditional Careers. Ann Arbor, Michigan: ERIC Counseling and Personnel Services Information Center, 1977.
- Smith, Christine D., and Takehara, Joann M. "Cooperative Engineering Programs: Do They Work for Women?" Engineering Education 68 (1978): 803-806.
- Smith, Walter Scott. "Increasing the Participation of Women in Science Careers." Paper presented at the National Convention of National Science Teachers Association, March 15-19, 1974, in Chicago.
- \_\_\_\_\_. "Science Education in the Affective Domain: The Effect of a Self-Awareness Treatment on Career Choice of Talented High School Women." Paper presented at the Annual Meeting of the National Association for Research in Science Teaching, April 23-24, 1976, in San Francisco.
- Smith, Walter Scott, and Stroup, Kala M. Science Career Exploration for Women. Washington, D.C.: National Science Teachers Association, 1978.
- Smith, Walter Scott; Stroup, Kala M.; and Coffman, Barbara M. Career Exploration Project for High School Senior Women. Lawrence: University of Kansas, 1975.
- Snider, Patricia J.; Royer, Jeannie T.; and Baytos, Fredericka J. Human Resources Planning: A Guide to Data. Washington, D.C.: Equal Employment Advisory Council, 1976.
- Society of Women Engineers. A Profile of the Woman Engineer. New York: Society of Women Engineers. (Updated annually; first published 1977.)
- \_\_\_\_\_. Society of Women Engineers Achievement Award Winners. (Printed annually; first published in 1952.)
- Solomon, Barbara M. "Historical Determinants and Successful Professional Women." In Kundsinn, pp. 185-193.
- Solomon, Lewis C. Male and Female Graduate Students: The Question of Equal Opportunity. New York: Praeger, 1976.
- Sophie, Joan. "Women as Scholars." American Psychologist 29 (1974): 529-532.

## BIBLIOGRAPHY

- Splaver, Sarah. "Nontraditional Careers for Women." In Women in Math and Science, Chapter 6, pp. 105-127. New York: Julian Messner, 1973.
- Sproule, Betty, and Mathias, Harold F. "Recruiting and Keeping Women Engineering Students: An Agenda for Action." Engineering Education 66 (1976): 745-748.
- Stanford University, California Center for Teaching and Learning. "Educating Women for Science: A Continuous Spectrum." Proceedings of a Conference on Educating Women for Science, April 24, 1976, at Mills College, Oakland, California.
- Stanley, Julian C.; Keating, Daniel P.; and Fox, Lynn H., eds. Mathematical Talent: Discovery, Description, and Development. Proceedings of the Third Annual Hyman Blumberg Symposium on Research in Early Childhood Education. Baltimore: Johns Hopkins University Press, 1974.
- Star, Susan Leigh. "Sex Differences and the Dichotomization of the Brain: Methods, Limits, and Problems in Research on Consciousness." San Francisco: University of California, Program in Human Development and Aging, 1978.
- "State and Society - Discrimination Against Women in Physics." Physics Today 25 (1972): 61-62.
- Stein, Aletha Huston, and Bailey, Margaret M. "The Socialization of Achievement Orientation in Females." Psychological Bulletin 80 (1973): 345-367.
- Stephenson, Marylee. "Sexism in Popular Science Books." Signs 4:1 (1978): 171-173.
- Sterling, Phillip. Sea and Earth: The Life of Rachel Carson. New York: Crowell, 1970.
- "Still Many Barriers to Women in Science." Science News 112 (1975): 279.
- Stone, Thomas H., and Athelton, Gary T. "The SVIB for Women and Demographic Variables in the Prediction of Occupational Tenure." Journal of Applied Psychology 53 (1969): 408-412.
- Strauss, Mary Jo Boehm. "Wanted: More Women in Science." American Biology Teacher 40 (1978): 181-185, 188.
- Strong, J.D. "A World for Women in Engineering." Engineering Education

## BIBLIOGRAPHY

- 67 (1977): 346.
- Stroup, Kala M., and Jasnoski, M.L. "Do Talented Women Fear Math?" Lawrence: University of Kansas, 1977.
- Tangri, Sandra S., and Strasburg, Georgia L. "Can Research on Women Be More Effective in Shaping Policy?" Paper presented at the 85th Annual Convention of the American Psychological Association, August 27, 1977, in San Francisco.
- Teitz, Joyce. "Oceanographer: Sylvia A. Earle." In What's A Nice Girl Like You Doing in a Place Like This?, Chapter 4, pp. 100-123. New York: Coward, McCann, and Geoghegan, Inc., 1972.
- \_\_\_\_\_. "Physicist: Devrie S. Intriligator." In What's A Nice Girl Like You Doing in a Place Like This?, Chapter 5, pp. 124-144. New York: Coward, McCann, and Geoghegan, Inc., 1972.
- Temple, Diane M. "Women and the Alternate Culture: Science." Refractory Girl 15 (September 1977).
- Theodore, Athena. The Professional Woman. Cambridge, Massachusetts: Schenkman Publishing Company, 1971.
- Thieme, F.P. "Science and Affirmative Action." Science 190 (1975): 1661.
- Thinking About Engineering - Purdue Women Engineers Speak Out. Lafayette, Indiana: Purdue University, Schools of Engineering, August 1977.
- Thomas, A.H., and Stewart, N.R. "Counselor Response to Female Clients With Deviant and Conforming Career Goals." Journal of Counseling Psychology 18 (1971): 352-357.
- Thompson, Donald, and Levin, Hilda. Increasing Women in Science Through Reshaping Role Perception: Final Report to the National Science Foundation. Staunton, Virginia: Mary Baldwin College, 1977.
- Thompson, R.S.H.G. "Careers for Women Graduates in Mathematics." Mathematical Spectrum 3 (Fall 1970): 24-26.
- Tidball, Elizabeth M. "Perspective on Academic Women and Affirmative Action." Educational Record 54 (Spring 1973): 130-135.
- Tidball, Elizabeth M., and Kistiakowky, Vera. "Baccalaureate Origins of American Scientists and Scholars." Science 193 (1976): 646-652.
- Tinker, Irene. "Nonacademic Professional Political Scientists." American Behavioral Scientists 15 (1971): 206-212.
- Tobach, Ethel. "An Agenda to Further Expand the Role of Women in Science and Technology." New York Academy of Sciences Annals 323 (1979): 336-340.

## BIBLIOGRAPHY

- Tobias, Sheila. "Math Anxiety. Why is a Smart Girl Like You Counting on Your Fingers?" Ms 5:3 (September 1976): 56-59, 92.
- \_\_\_\_\_. Overcoming Math Anxiety. New York: W.W. Norton and Company, Inc., 1978. (Also available in paperback from Houghton Mifflin Company.)
- \_\_\_\_\_. "Who's Afraid of Math...and Why?" Atlantic Monthly (September 1978): 63-65.
- Tobias, Sheila, and Donady, Bonnie. "Counseling the Math Anxious." National Association of Women Deans, Administrators, and Counselors Journal 41 (1977): 13-16.
- Tobias, Sheila, and Weissbrod, Carol. "Anxiety and Mathematics: An Update." Harvard Educational Review 2 (February 1980): forthcoming. (Includes extensive bibliography).
- Tobin, Dianne; Brody, Linda; and Fox, Lynn H. "The Effects of Sex Role Socialization on Mathematics Participation and Achievement: Annotations." Paper prepared for Education and Work Group, Career Awareness Division, National Institute of Education, 1976, in Washington, D.C.
- Torge, Herman. "A Fast-Track Late-Entry Program for Women in Engineering." Paper presented at the Annual Meeting of the American Education Research Association, March 27-31, 1978, in Toronto, Ontario.
- Tosi, Lucia. "Woman's Scientific Creativity." Impact of Science on Society 25 (1975): 105-114.
- Trescott, Martha M. "Julia B. Hall and Aluminum." Journal of Chemical Education 54 (January 1977): 24.
- Trotter, Virginia Y. "The Future for Women in Science and Engineering." Paper presented at the Annual Meeting of the American Association for the Advancement of Science, February 1976, in Boston.
- Trumbull, Richard. "The Biologist Census." Bioscience 27 (1977): 192-195.
- Ukens, L.L., and Merrifield, P.R. "The Structure-of-Intellect Model Applied to a COPES Learning Sequence." Journal of Research in Science Teaching 13 (1976): 221-226.
- "The U.S. Chemical Industry: The People It Employs." Chemical and Engineering News 50 (1972): 23.
- Unkel, Esther. "A Study of the Interaction of Socioeconomic Groups and Sex Factors with the Discrepancy Between Anticipated Achievement and Actual Achievement in Elementary School Mathematics." Arithmetic Teacher 13 (1966): 662-670.

## BIBLIOGRAPHY

- Uprichard, Elizabeth. "Women in Information Science." American Society for Information Sciences Proceedings 13 (1976): 15.
- Vance, Carole. "Sexual Stratification in Academic Anthropology 1974-75." American Anthropological Association Newsletter 16 (April 1975): 10-11.
- Verheyden-Hilliard, Mary Ellen. "Cinderella and Science: Career Counseling and Girls." Paper presented at the Annual Meeting of the American Association for the Advancement of Science, February 1976, in Boston.
- Very, P.S. "Differential Factor Structures in Mathematical Ability." Genetic Psychology Monographs 75 (1967): 169-207.
- Vetter, Betty M. "The Outlook for Women in Science." Science Teacher 40:9 (1973): 22-24.
- \_\_\_\_\_. "Recent Changes in Opportunities for Women in Science and Engineering." Paper presented at the Annual Meeting of the American Association for the Advancement of Science, February 22-23, 1976, in Boston.
- \_\_\_\_\_. "Women and Minority Scientists." Science 189 (1975): 751.
- \_\_\_\_\_. "Women in the Natural Sciences." Signs 1 (1976): 715-720.
- Vetter, Betty M., and Babco, Eleanor L. Professional Women and Minorities: A Manpower Data Resource Service. Second Edition. Washington, D.C.: Scientific Manpower Commission, 1978. (First edition published in 1975.)
- Walberg, H.J. "Dimensions of Scientific Interest in Boys and Girls Studying Physics." Science Education 51 (1967): 111-116.
- \_\_\_\_\_. "Physics, Femininity, and Creativity." Developmental Psychology 1 (1969): 47-54.
- Walstedt, Joyce Jennings. The Psychology of Women: A Partially Annotated Bibliography. Pittsburgh: Know, Inc., 1973.
- Warner, Deborah. Graceanna Lewis. Washington, D.C.: Smithsonian Institution Press, 1979.
- \_\_\_\_\_. "Science Education for Women in Antebellum America." Isis 69 (March 1978): 58-67.

## BIBLIOGRAPHY

- \_\_\_\_\_. Women in Science in Nineteenth-Century America. Catalogue from the Exhibit at the National Museum of History and Technology, Smithsonian Institution, September 1978 - February 1979. in Washington, D.C.
- Warren, Carol A., and Rasmussen, Paul R. "Sex and Gender in Field Research." Urban Life 6 (1977): 349-369.
- Weaver, Ellen C. "Implications of Giving Women a Greater Share of Academic Decision-Making." New York Academy of Sciences Annals 323 (1979): 257-267.
- Weaver, J.F. "Seductive Shibboleths." Arithmetic Teacher 18 (1971): 263-264.
- Weber, Richard E., and Gilchrist, Bruce. "Discrimination in the Employment of Women in the Computer Industry." Association for Computing Machinery Communications 18 (1975): 416-418.
- Webster, Eleanor. "Retraining for Employment." In Mattfeld and Van Aken, pp. 201-205.
- Weeks, Dorothy W. "Women - Who Extends Scientific Knowledge." Wellesley Alumnae Magazine 55:4 (1971): 1-2.
- Weiner, Ruth. "Chemist and 'Eco-Freak'." In Kundsln, pp. 73-77.
- Weiss, Iris R.; Place, Carol; and Conaway, Larry E. The Visiting Women Scientists Pilot Program 1978. Highlights Report. Research Triangle Park, North Carolina: Research Triangle Institute, 1978.
- \_\_\_\_\_. The Visiting Women Scientists Pilot Program 1978. Final Report to the National Science Foundation. Research Triangle Park, North Carolina: Research Triangle Institute, 1978.
- Weisstein, Naomi. "Adventures of a Woman in Science." Federation of American Societies for Experimental Biology Proceedings 75 (1976): 222-223.
- Weitzman, Lenore J. "Sex-Role Socialization in Picture Books for Preschool Children." American Journal of Sociology 77 (1972): 1125-1149.
- Werdelin, I. The Geometrical Ability and Space Factor in Boys and Girls. Lund, Sweden: University of Lund, 1971.
- Wexler, Henrietta. "Ellen Swallow Richards: First Lady of Science." AALW Journal 76 (November 1976): 11.
- "What Barriers Impede Women's Science Careers?" Physics Today 29 (1976): 63.

## BIBLIOGRAPHY

- Wheat, Valerie. Equals, An Annotated Bibliography to Assist Elementary and Secondary School Teachers in Sex Fair Counseling and Instruction. Berkeley, California: Lawrence Hall of Science, 1977.
- Wheatley, Grayson H. "The Right Hemisphere's Role in Problem Solving." Arithmetic Teacher 25:2 (1977): 36-38.
- White, Martha. "Psychological and Social Barriers to Women in Science." Science 170 (1970): 413-416.
- Willie, Charles V., and Edmonds, R.R., eds. Black Colleges in America. New York: Columbia University Press, 1978. Includes "Black Students in the Sciences: A Look at Spelman College," by Shirley McBay, pp. 216-228.
- Wilson, Joan Hoff. "Dancing Dogs of the Colonial Period: Women Scientists." Early American Literature 7 (1973): 225-235.
- Wineman, J.H. "Sex Differences on the Hidden Figures Tests." Experimental Publication System 11 (1971): 416-420.
- Wirtenberg, Jeana. "A Case Study of Title XI Implementation: Some Unexpected Effects." Paper read at the Annual Convention of the American Psychological Association, September 2, 1979, in New York.
- \_\_\_\_\_. "Expanding Girls' Occupational Potential: A Case Study of the Implementation of Title IX's Anti Sex-Segregation Provision in Seventh Grade Practical Arts." Ph.D. dissertation, Department of Psychology, University of California at Los Angeles, 1979.
- Wirtenberg, Jeana; Strasburg, Georgia; and Alspektor, Rose Ann. "Educational Trends for Expanding Women's Occupational Lives." Psychology of Women Quarterly, Special issue entitled "Women and the Future", edited by Sandra S. Tangri and Jeana Wirtenberg, in press.
- Wise, Laress L.; Steel, Lauri; and MacDonald, Charlotte. Origins and Career Consequences of Sex Differences in High School Mathematics Achievement. Palo Alto, California: American Institutes for Research, July 1979.
- Witelson, Sandra T. "Sex and the Single Hemisphere: Specialization of the Right Hemisphere for Spatial Processing." Science 193 (1976): 425-427.
- Witkin, Herman A., and Berry, John W. "Psychological Differentiation in Cross-Cultural Perspective." Journal of Cross-Cultural Psychology 6:1 (1975): 4-87.
- Witkin, H.A.; Moore, C.A.; Goodenough, D.R.; and Cox, P.W. "Field-Dependent and Field-Independent Cognitive Styles and Their Educational Implications." Review of Educational Research 47:1 (1977): 1-64.

## BIBLIOGRAPHY

- Witkin, H.A.; Moore, C.A.; Oltman, P.K.; Goodenough, D.R.; and Friedman, F. "Role of the Field-Dependent and Field-Independent Cognitive Styles in Academic Evolution: A Longitudinal Study." Journal of Education Psychology 69 (1977): 197-211.
- Wockenfuss, William A., and Cox, Elbert L. Research on the Utility of an Armed Forces Orientation to Engineering Careers. College Park, Maryland: University of Maryland, College of Engineering, 1978. Final report under Air Force Grant #AFOSR-TR-78-1136.
- "Women and Minorities in Chemistry '75." Chemical and Engineering News 52 (October 1974): 34-35.
- "Women Astronomers Face Obstacles in Profession." Physics Today 28 (1975): 119.
- "Women Engineers Study Environmental Techniques." Science Teacher 42 (February 1975): 26.
- Women in Engineering Progress Report. Lafayette, Indiana: Purdue University, Schools of Engineering, 1977.
- "Women in Science." Trends in Biochemical Sciences 1 (1976): N108.
- "Women in Science." Science Teacher 40 (December 1973): 14-17.
- "Women in Science." Physics Teacher 13 (December 1975): 531.
- "Women in Science Education." Science Teacher 41 (October 1974): 33.
- Women in Science and Engineering. "Goals for Women in Science." Technology Review 75 (June 1973): 48-57.
- "Women in Science. 'Growth Under Difficult Conditions'." Creative Woman Quarterly 1:4 (1978): entire issue.
- "Women in Science: Overcoming Barriers to Participation." Mosaic 6:6 (1975): 8-13.
- "Women in Science: Still a Struggle." Chemical and Engineering News 56 (March 1978): 6.
- "Women in Science: Where They Stand Today." AAUW Journal 70:3 (1976): 10.
- "Women, Minorities Underutilized in Science." Chemical and Engineering

## BIBLIOGRAPHY

News 55 (April 1977): 15-22.

"Women's Biology in a Man's World." Science for the People 5 (1973): 39-42.

"Women's Toehold on Chemistry: Chemists Still Just That." Chemical and Engineering News 54 (November 1976): 47-48.

Work, Clyde E., and Sloan, Martha E. "The Awareness and Attitudes of Junior High School Girls Toward Engineering and Experiments with Methods of Increasing Their Awareness and Interest in Engineering." Final Report NSF Grant GY-11548, September 1976. Paper first presented at the Annual Meeting of the American Society for Engineering Education, June 16-19, 1975, at Fort Collins, Colorado.

Yevick, Miriam L. "Some Thoughts on Women in Science." Technology Review 72 (1970): 42-46.

Zelinsky, Wilbur. "The Strange Case of the Missing Female Geographer." Professional Geographer 25 (1973): 151-165.

Zinberg, Dorothy. "College: When the Future Becomes the Present." In Kundsinn, pp. 129-237.

\_\_\_\_\_. "The Past Decade for Women Scientists - Win, Lose, or Draw?" Trends in Biochemical Sciences 2 (1977): 123-126.

Zinn, Mary F. "Women in Science: Why Not?" Journal of College Science Teaching 5-6 (1977): 143-148.

Zuckerman, Harriet A. "Patterns of Name Ordering Among Authors of Scientific Papers: A Study of Social Symbolism and Its Ambiguity." American Journal of Sociology 74 (1968): 276-291.

Zuckerman, Harriet, and Cole, Jonathan. "Women in American Science." Minerva 13 (1975): 82-102.

Zytowsky, D.G. "Toward a Theory of Career Development for Women." Personnel and Guidance Journal 47 (1969): 660-664.

ASSOCIATIONS OF WOMEN SCIENTISTS, ENGINEERS AND  
MATHEMATICIANS  
COMMITTEES ON OR FOR WOMEN IN SCIENTIFIC, ENGINEERING, AND  
MATHEMATICAL ASSOCIATIONS

These lists were compiled from several sources:

American Association of University Women, Professional Women's Groups (AAUW, November 1979), 8 pages.

Anne M. Briscoe, "Phenomenon of the Seventies: The Women's Caucuses," Signs 4 (Autumn 1978), 152-158.

Jana G. Everett, "Professional Organizations and Women's Committees," in Alma Lantz and Sara Moore, Planning for Reentry Programs: Information from the projects (Denver: Denver Research Institute, March 1980), F1-F6.

Paula Quick Hall, Anne Schwartz, and Roger Long, Associations Of/For Women Scientists (AAAS, November 1979), 8 pages.

Paula Quick Hall, Anne Schwartz, and Roger Long, Committees Of/For Women Within Associations of Scientists (AAAS, December 1979), 5 pages.

"Women's Units in 69 Organizations," Chronicle of Higher Education, September 2, 1980, pages 8 and 10.

In compiling the information below, we have relied mainly on the two lists by Hall et al. Where we have taken information from another source, we have verified it by telephone. Users should be aware that the addresses and names of persons listed for contact change frequently. It is advisable to update the information periodically if one does periodic mailings to these groups.

The following list, do not include women's caucuses; for these, see the citations above other than Hall et al. The Everett, AAUW, and Chronicle lists include several women's groups not exclusively devoted to science, mathematics, and engineering; we have omitted those.

## ASSOCIATIONS

(Each association is listed with the name of the association followed by the name and/or address of the contact person.)

### COMPUTER SCIENCE

#### ASSOCIATION FOR WOMEN IN COMPUTING

Nancy Mae Bonney  
E G & G Mason Research  
Institute  
1530 E. Jefferson Street  
Rockville, MD 20852

#### SOCIETY FOR WOMEN IN COMPUTING

Carma L. McClure  
Planmetrics, Inc.  
5320 Sears Tower  
233 South Wacker Drive  
Chicago, IL 60606

### DENTISTRY

#### AMERICAN ASSOCIATION OF WOMEN DENTISTS

Eric Bishop, Executive Director  
Eric Bishop & Associates  
211 E. Chicago Ave., Rm. 1636  
Chicago, IL 60611

### ENGINEERING

#### SOCIETY OF WOMEN ENGINEERS

Mary Lou Barnas  
Executive Secretary  
United Engineering Center,  
Room 305  
345 East 47th Street  
New York, NY 10017

#### WISE (WOMEN IN SCIENCE AND ENGINEERING)

Miriam Schweber  
22 Turning Hill Road  
Lexington, MA 02171

### FORESTRY

#### WOMEN IN FORESTRY

Andrea Warner  
Civil Rights Specialist  
PNW Research Station  
809 N.E. 6th Avenue  
Portland, OR 97232

### GEOSCIENCE

#### ASSOCIATION OF WOMEN GEOSCIENTISTS

Association of Women Geo-  
Scientists  
P.O. Box 1005  
Menlo Park, CA 94025

### MATHEMATICS

#### ASSOCIATION FOR WOMEN IN MATHEMATICS

Association for Women in  
Mathematics  
Center for Research on Women  
in Higher Education and the  
Professions  
Wellesley College  
828 Washington Street  
Wellesley, MA 02181

#### WOMEN AND MATHEMATICS EDUCATION

Women and Mathematics  
Education  
Education Department  
George Mason University  
4400 University Drive  
Fairfax, VA 22030

### MEDICINE

#### AMERICAN MEDICAL WOMEN'S ASSOCIATION

Lorraine Loesel  
Executive Director  
American Medical Women's  
Association  
1740 Broadway  
New York, NY 10019

### MINING

#### WOMEN IN MINING

Patricia Petty  
Colorado School of Mines  
Alumni Association,  
Guggenheim Hall  
Golden, CO 80401

## ASSOCIATIONS

### PHYSIOLOGY

AMERICAN PHYSIOLOGICAL  
SOCIETY  
Marie Cassidy  
Department of Physiology  
George Washington University  
Medical Center  
2300 Eye Street, N.W.  
Washington, DC 20037

SIGMA DELTA EPSILON, GRADUATE  
WOMEN IN SCIENCE, INC.  
Headquarters Office  
Sigma Delta Epsilon, Graduate  
Women in Science, Inc.  
1346 Connecticut Ave., N.W.  
Room 1102  
Washington, DC 20036

### PSYCHOLOGY

ASSOCIATION FOR WOMEN IN  
PSYCHOLOGY  
P. Kay Coleman, Harrier  
225 S. 18th Street, #PH-S  
Philadelphia, PA 19103

### SOCIOLOGY

SOCIOLOGISTS FOR WOMEN IN  
SOCIETY  
(Women's Caucus of the Amer-  
ican Sociological Association)  
Judith Lorber  
City University of New York  
Brooklyn College  
Department of Sociology  
Brooklyn, NY 11210

### SCIENCE

ASSOCIATION FOR WOMEN IN  
SCIENCE, INC.  
E. Baizer  
Executive Secretary  
1346 Connecticut Ave., N.W.  
Suite 1122  
Washington, DC 20036

### SPEECH

SPEECH COMMUNICATION  
ASSOCIATION  
Ellen Reid Gold  
3090 Wescoe Hall  
University of Kansas  
Lawrence, KS 66045

NATIONAL NETWORK OF MINORITY  
WOMEN IN SCIENCE  
Paula Quick Hall  
American Association for the  
Advancement of Science  
1776 Massachusetts Ave, N.W.  
Washington, DC 20036

## COMMITTEES

(Each committee is listed with the name of the association from which it stems; followed by the name of the committee and the name and/or address of the contact person.)

### ANTHROPOLOGY

AMERICAN ANTHROPOLOGICAL  
ASSOCIATION  
Committee on the Status of  
Women in Anthropology  
Jane Buikstra  
Department of Anthropology  
Northwestern University  
Evanston, IL 60201

### ASTRONOMY

AMERICAN ASTRONOMICAL SOCIETY  
Committee on the Status of  
Women  
Dr. A.P. Cowley  
Astronomy Department  
University of Michigan  
Ann Arbor, MI 48109

## COMMITTEES

### BIOLOGICAL SCIENCES

AMERICAN ASSOCIATION OF  
IMMUNOLOGISTS  
Committee on Women's Affairs  
Blanche Reines  
American Association of  
Immunologists  
9650 Rockville Pike  
Bethesda, M. 20014

AMERICAN SOCIETY FOR CELL  
BIOLOGY  
Women in Cell Biology  
Elizabeth Harris  
Department of Botany  
Duke University  
Durham, NC 27706

AMERICAN SOCIETY FOR  
MICROBIOLOGY  
Committee on the Status of  
Women Microbiologists  
Janet L. Shoemaker  
American Society for Micro-  
biology  
1913 Eye Street, N.W.  
Washington, DC 20006  
or  
Viola Mae Young  
Baltimore Cancer Research  
Program  
National Cancer Institute  
655 W. Baltimore Street  
Baltimore, MD 21201

AMERICAN SOCIETY OF BIOLOGI-  
CAL CHEMISTS  
Committee on Equal Opportun-  
ities for Women  
Elizabeth Maxwell  
National Institutes of  
Health, Building #2, Rm. 222  
Bethesda, MD 20205  
or  
Elizabeth Anderson  
National Cancer Institute  
Landow Building, Rm. 4A06  
National Institutes of Health  
Bethesda, MD 20205

BIOPHYSICAL SOCIETY  
Committee on Professional  
Opportunities for Women  
Barbara Brodsky  
Department of Biochemistry  
Rutgers School of Medicine  
Piscataway, NJ 08854

### CHEMISTRY

AMERICAN CHEMICAL SOCIETY  
Women Chemists Committee  
Wanda Brown  
212 Brightwood Place  
San Antonio, TX 78209

AMERICAN SOCIETY OF BIOLOGICAL  
CHEMISTS  
Committee on Equal Opportuni-  
ties for Women  
See Biological Sciences

### COMMUNICATION

INTERNATIONAL COMMUNICATION  
ASSOCIATION  
Committee on the Status of  
Women  
Carol Lee Hilewick  
Office of International  
Communication Policy  
International Communication  
Agency  
1750 Pennsylvania Ave., N.W.  
Washington, DC 20547

THE LINGUISTIC SOCIETY OF  
AMERICA  
Committee on the Status of  
Women  
Suzette Elgin  
Linguistics Department  
San Diego State University  
San Diego, CA 92182

### ECONOMICS

AMERICAN ECONOMIC ASSOCIATION  
Committee on the Status of  
Women in the Economic  
Profession

## COMMITTEES

Elizabeth Bailey  
Civil Aeronautics Board  
1825 Connecticut Ave., N.W.  
Room 1015  
Washington, DC 20428

### ENERGY

ATOMIC INDUSTRIAL FORUM, INC.  
Nuclear Energy Women  
Ruth Faulkner  
Salt River Project  
P.O. Box 1980  
Phoenix, AZ 85001

### GEOSCIENCES

ASSOCIATION OF AMERICAN  
GEOGRAPHERS  
Committee on the Status of  
Women Geographers  
Clare M. Stapleton  
Department of Geography  
University of Wisconsin  
Madison, WI 53706

AMERICAN GEOLOGICAL INSTITUTE  
Women Geoscientists Committee  
Louise Levien  
American Geological Institute  
5205 Leesburg Pike  
Falls Church, VA 22041

AMERICAN GEOPHYSICAL UNION  
Committee on Education and  
Human Resources  
Chris Russell  
American Geophysical Union  
2000 Florida Ave., N.W.  
Washington, DC 20009

SOCIETY OF EXPLORATION  
GEOPHYSICISTS  
Committee for Women in  
Geophysics  
Katherine R. Daues  
3922 W. Alabama, #2  
Houston, TX 77027

### HISTORY

HISTORY OF SCIENCE SOCIETY  
Committee on Women

Sally Gregory Kohlstedt  
Secretary, H.S.S.  
311 Maxwell Hall  
Syracuse University  
Syracuse, NY 13210

SOCIETY FOR THE HISTORY OF  
TECHNOLOGY  
Women in Technological History  
Elizabeth Hitz  
Old Bethpage Village Restora-  
tion  
Round Swamp Road  
Old Bethpage, NY 11804

### LINGUISTICS

LINGUISTIC SOCIETY OF AMERICA  
Committee on the Status of  
Women in Linguistics  
Linguistic Society of America  
3520 Prospect Street, N.W.  
Washington, DC 20007

### MATHEMATICS

SOCIETY FOR INDUSTRIAL AND  
APPLIED MATHEMATICS  
MATHEMATICAL ASSOCIATION OF  
AMERICA, AMERICAN MATHEMAT-  
ICAL SOCIETY  
Committee on Women in  
Mathematics  
Alice T. Schafer  
Department of Mathematics  
Wellesley College  
Wellesley, MA 02181

### MEDICINE

AMERICAN PSYCHIATRIC  
ASSOCIATION  
Committee on Women  
Bren C. Solomon  
150 Park Avenue  
Glencoe, IL 60022

### METEOROLOGY

AMERICAN METEOROLOGICAL  
SOCIETY  
Board on Women and Minorities

## COMMITTEES

Cecilia G. Griffith  
Climate and Satellite Group  
RX-9, National Oceanic and  
Atmospheric Administration  
Sussex One, Room 212  
Boulder, CO 80303

### PSYCHIATRY

AMERICAN PSYCHIATRIC  
ASSOCIATION  
Committee on Women  
See Medicine

### PHYSICS

THE AMERICAN PHYSICAL SOCIETY  
Committee on the Status of  
Women in Physics  
Carol Jo Crannell  
Goddard Space Flight Center  
NASA Code 684  
Greenbelt, MD 20771

### PSYCHOLOGY

AMERICAN PSYCHOLOGICAL  
ASSOCIATION  
Committee on Women in  
Psychology  
Nancy Felipe Russo  
Staff Liaison  
Committee on Women in Psychol-  
ogy  
American Psychological  
Association  
1200 17th Street, N.W.  
Washington, DC 20036

BIOPHYSICAL SOCIETY  
Committee on Professional  
Opportunities for Women  
See Biological Sciences

SOCIETY OF EXPLORATION  
GEOPHYSICISTS  
Committee on Women in Geo-  
physics  
See Geosciences

### SCIENCE

AMERICAN ASSOCIATION FOR THE  
ADVANCEMENT OF SCIENCE  
Committee on Opportunities  
in Science  
Shirley Mahaley Malcom, Head  
Office of Opportunities in  
Science  
American Association for the  
Advancement of Science  
1776 Massachusetts Ave., N.W.  
Washington, DC 20036

### POLITICAL SCIENCE

AMERICAN POLITICAL SCIENCE  
ASSOCIATION  
Committee on the Status of  
Women in the Profession  
Susan Woodward  
American Political Science  
Association  
1527 New Hampshire Ave., N.W.  
Washington, DC 20036

### SOCIOLOGY

AMERICAN SOCIOLOGICAL  
ASSOCIATION  
Committee on the Status of  
Women  
Office of Careers, Minorities  
and Women  
The American Sociological  
Association  
1722 N Street, N.W.  
Washington, DC 20036

INTERNATIONAL POLITICAL  
SCIENCE ASSOCIATION  
The Sex Roles and Politics  
Research Committee  
Jeanne Col  
Graduate School of Public  
Affairs, State University  
of New York at Albany  
Albany, NY 12222

COMMITTEES

INTERNATIONAL SOCIOLOGICAL  
ASSOCIATION

Research Committee on Sex  
Roles in Society

Hanna Papanek  
2 Mason Street  
Lexington, MA 02173

SOCIOLOGISTS FOR WOMEN IN  
SOCIETY

(Women's Caucus of the  
American Sociological Assoc-  
iation)

See Associations listing

SPEECH

AMERICAN SPEECH-LANGUAGE-  
HEARING ASSOCIATION

Committee on the Equality of  
the Sexes

Margaret A. McKibben  
2819 Brentwood Ave.  
Pittsburgh, PA 15227

STATISTICS

AMERICAN STATISTICAL  
ASSOCIATION

Committee on Women in  
Statistics

Jane F. Gentlemen  
Committee on Women in  
Statistics

American Statistical  
Association

800 15th St., N.W.  
Washington, DC 20005

## STATE INDEX

Alabama	183
Arizona	049, 139, 158, 168, 277
Arkansas	130
California	007, 008, 012, 017, 021, 022, 023, 025, 034, 037, 043, 052, 055, 069, 071, 075, 077, 081, 103, 117, 131, 133, 136, 148, 150, 163, 167, 188, 190, 194, 196, 201, 213, 214, 215, 221, 226, 231, 235, 239, 243, 258, 263, 267, 279, 291, 293, 295, 299, 306, 310
Colorado	001, 002, 108, 114, 193, 244, 305
Connecticut	177, 210, 219, 225, 236, 264, 289, 298
District of Columbia	003, 010, 041, 097, 232, 290, 303, 312
Florida	006
Georgia	085, 127, 128, 134, 137, 144, 184, 198
Hawaii	156
Idaho	102
Illinois	004, 019, 028, 044, 099, 121, 155, 176, 208, 262, 285
Indiana	046, 078, 100, 106, 172, 199, 211, 238, 241, 268, 300
Iowa	020, 032, 074, 146, 169, 180
Kansas	056, 125, 234, 251
Kentucky	126
Louisiana	115
Maine	070, 178
Maryland	005, 016, 038, 059, 084, 109, 122, 272
Massachusetts	018, 036, 042, 048, 050, 057, 062, 116, 138, 212, 223, 228, 253, 281, 284, 296, 314, 315
Michigan	064, 087, 111, 160, 205, 216, 255, 304
Minnesota	053, 080, 095, 151, 154, 159, 274

## STATE INDEX

Mississippi	152, 266
Missouri	027, 124, 192, 207, 311
Montana	256
Nebraska	179, 297
New Hampshire	045, 257
New Jersey	063, 068, 083, 089, 110, 129, 147, 149, 206, 242, 245, 250, 259, 302
New Mexico	013, 035, 195, 282
New York	011, 031, 082, 093, 107, 113, 118, 120, 123, 132, 135, 157, 166, 174, 187, 185, 227, 246, 249, 252, 270, 287, 292
North Carolina	009, 060, 076, 096
North Dakota	065, 145, 224
Ohio	086, 088, 090, 092, 101, 105, 161, 189, 197, 222, 229, 233, 254, 260, 265, 271, 300
Oklahoma	026, 140, 162, 217, 240
Oregon	181, 308
Pennsylvania	014, 015, 030, 170, 200, 209, 220, 248, 273, 278, 288, 301
South Carolina	058, 067, 119
Tennessee	141, 175, 186, 187
Texas	040, 061, 066, 091, 104, 142, 164, 191, 230, 247, 269, 286, 294
Vermont	202, 203
Virginia	039, 051, 153, 165, 204, 218, 237, 280, 285, 313
Washington	024, 047, 053, 072, 079, 094, 143, 275, 307
Washington, D.C. (See District of Columbia)	
Wisconsin	029, 054, 073, 098, 112, 171, 173, 261, 276

## DISCIPLINES

(Underlining indicates entries with special emphasis on a discipline)

- GENERAL SCIENCE** (entries which covered six or more fields)  
 001, 002, 003, 005, 007, 008, 009, 011, 014, 015, 016,  
 021, 022, 031, 032, 034, 035, 036, 037, 047, 048, 049,  
 052, 053, 054, 056, 059, 063, 074, 075, 077, 086, 087,  
 094, 095, 096, 101, 107, 113, 115, 129, 131, 133, 137,  
 139, 147 to 164, 166, 167, 168, 170 to 196, 210, 212,  
 213, 218, 219, 229, 234, 235, 239, 243, 253, 255, 256,  
 258, 260, 261, 262, 265, 276, 277, 280, 283, 286, 294,  
 295, 297, 299, 302, 310
- ASTRONOMY:** 038, 051, 069, 118, 138, 244
- BIOLOGICAL AND AGRICULTURAL SCIENCES:** 004, 006, 028, 030,  
 034, 054, 069, 076, 079, 083, 084, 085, 090, 106, 108,  
 112, 116, 120, 127, 128, 134, 169, 200, 202, 203, 206,  
 236, 238, 242, 245, 252, 259, 266, 268, 288, 293, 300,  
 305 (agriculture)
- CHEMISTRY:** 001, 023, 028, 030, 041, 044, 050, 067, 068,  
 069, 070, 076, 079, 080, 081, 083, 084, 085, 088, 090,  
 091, 092, 102, 104, 106, 112, 116, 120, 127, 134, 140,  
143, 165, 197, 200, 202, 203, 206, 207, 211, 220, 222,  
236, 238, 242, 244, 245, 248, 249, 250, 252, 259, 264,  
266, 268, 273, 274, 278, 279, 280, 284, 285, 288, 290,  
292, 295, 296, 298, 315
- ENGINEERING AND TECHNOLOGY:** 004, 013, 017, 018, 019, 020,  
024, 028, 030, 035, 038, 039, 042, 043, 044, 045, 046,  
047, 049, 050, 051, 055, 057, 058, 060, 061, 062, 064,  
065, 066, 067, 068, 069, 070, 071, 072, 073, 079, 080,  
081, 087, 089, 090, 095, 098, 100, 101, 102, 103, 104,  
105, 108, 109, 110, 111, 114, 116, 118, 119, 120, 121,  
126, 132, 135, 136, 141, 142, 143, 144, 145, 146, 199,  
200, 205, 210, 211, 212, 214, 215, 221, 231, 233, 240,  
241, 243, 244, 247, 248, 249, 251, 252, 254, 257, 263,  
264, 267, 268, 269, 271, 279, 287, 291, 292, 298, 302,  
 314, 315
- GEOLOGICAL AND MARINE SCIENCES:** 001, 040, 106, 116, 117,  
 128, 204, 236, 238, 268
- MATHEMATICS AND COMPUTER SCIENCE:** 001, 010, 012, 015, 016,  
017, 024, 025, 026, 027, 028, 029, 030, 031, 033, 038,  
041, 050, 051, 053, 063, 065, 066, 068, 069, 070, 075,  
076, 079, 080, 081, 083, 084, 085, 091, 097, 104, 108,  
112, 119, 120, 122, 123, 124, 125, 127, 128, 130, 132,  
 134, 136, 143, 165, 180, 198, 200, 201, 202, 203, 206,  
 209, 217, 216, 219, 221, 223, 224, 225, 226, 228, 230,  
237, 238, 244, 245, 246, 248, 249, 252, 259, 263, 264,  
 268, 270, 275, 279, 281, 285, 288, 289, 293, 298, 300,  
 303, 304, 306, 307, 308, 309, 311, 312, 315
- MEDICINE:** 006, 011, 014, 021, 022, 035, 106, 108, 112, 127,  
 128, 137, 189, 191, 222, 238, 242
- PHYSICS:** 004, 028, 030, 038, 044, 050, 051, 068, 069, 070,  
 079, 080, 081, 083, 085, 090, 104, 106, 112, 118, 127,  
 143, 145, 200, 208, 211, 217, 244, 249, 252, 266, 293,  
 298, 315

## DISCIPLINES

PSYCHOLOGY AND BEHAVIORAL SCIENCES: 010, 013, 084, 206, 216, 225, 245, 259, 272, 305, 307, 309, 311  
SOCIAL SCIENCES: 026, 053, 045, 083, 084, 116, 165, 172, 202, 216, 227, 232, 234, 257, 300, 301, 311  
OTHER FIELDS: Accounting (093, 302), Architecture (072, 080, 093, 095), Business (022, 262, 302, 315), Communications: Journalism, Information Sciences (030, 031, 059, 093, 189, 262, 285), Communicative Disorders (191), Counseling (307), Criminal Justice (093), Education (172, 262, 307), Environmental Protection (183), Finance (093), Forestry (169), Humanities and Arts (202), Industrial Distribution (093, 120), Landscape Architecture (095), Law (022), Management (072, 093, 227), Marketing (093), Paper Science (171), Photography (057), Polymer Science (284), Science Museum Work (059), Technology (031, 042, 065, 069, 105, 132, 136, 180, 264, 281, 314), Urban Planning (302)

## FUNDING SOURCES

(Sponsors also provided funds for most projects; see next index)

<u>ASSOCIATIONS AND ORGANIZATIONS</u>	082, 090, 093, 097, 100, 102, 105, 106, 109, 117, 120, 126, 133, 139, 142, 143, 146, 148, 168, 181, 196, 205, 207, 214, 236, 241, 251, 254, 295, 315
General, Unspecified: 093	Allied Chemical: 076
American Society for Engineering Education: 020, 302, 310, 315	American Telephone and Telegraph: 110
Association for Women in Science: 094	Atlantic Richfield: 019
Association of American Geographers: 232	Bank of America: 263
Association of Women Geoscientists: 117	Bell Laboratories: 110
Bay Area Math-Science Network: 022	Bendix: 078
History of Science Soc: 301	Boston Globe: 314
Morehead Parent-Teachers Assoc, Greensboro Public School System, NC: 009	Brockway Glass: 233
Sigma Delta Epsilon-Graduate Women in Science: 034, 054, 239, 276	Celanese: 020
Soc of Women Engineers: 023, 061, 068, 069, 087, 104, 120, 121, 215, 252	Chrysler: 233
Women in Mining: 001	CPC International: 019
<u>CORPORATIONS AND INDUSTRY</u>	Delco Air Division of General Motors: 233
General, Unspecified: 023, 024, 030, 044, 046, 052, 061, 066, 072, 079, 081,	Dow Chemical: 020
	E.I. Dupont & Nemours & Co: 018, 062, 073, 114
	EXXON: 089
	Ford Motor: 036, 048, 055, 064, 071, 080, 116, 263
	General Motors: 080, 089, 098, 233
	Goodyear Atomic: 233

## FUNDING SOURCES

- Greeley and Hansen: 019  
International Business  
Machines: 052, 055, 071,  
080, 097, 280  
Mead: 233  
New Hampshire Public Service: 005  
New Jersey Bell: 110  
Overcoming Math Anxiety: 010  
Pacific Telephone: 043  
P. Platypus Publications:  
006  
Procter & Gamble: 019, 062  
Raytheon: 045, 212  
RCA: 212  
Rochester Industries: 031  
Sanders: 045  
Schering-Plough: 147  
Standard Oil of Calif: 022  
Standard Oil of Ohio: 101  
Toms River Chemical: 250  
TRW: 243  
Union Carbide: 062  
United States Steel: 280  
Upjohn: 140  
Western Electric: 052  
Weyerhaeuser: 275  
Xerox: 052
- FOUNDATIONS  
General, Unspecified: 030  
Carnegie Corporation of  
New York: 008, 253, 279  
Robert Sterling Clark Fdn:  
016  
Danforth Fdn: 213  
William H. Donner Fdn: 206  
Educational Fdn of America:  
052  
General Electric Fdn: 212,  
296  
Josiah Macy, Jr. Fdn: 134  
George A. and Grace L. Long  
Fdn: 289  
Andrew W. Mellon Fdn: 229  
Merck Fdn at Rahway: 245, 259  
Michigan Tech Fund: 111  
Mobil Fdn, Inc: 089  
National Science Foundation  
(see Federal Government)  
NL Industries Fdn: 130  
North Carolina State Univ  
Engineering Fdn: 060
- Noyes Fdn: 134  
Pfizer Fdn, Inc: 089  
Polaroid Fdn: 042, 050  
Robert Sterling Clark Fdn:  
016  
Rockefeller Fdn: 134  
Winthrop Rockefeller Fdn:  
130  
Rowland Fdn: 085  
San Francisco Fdn: 052  
Shell Fdn: 212  
Sloan Fdn: 028, 030, 208,  
228  
Southern Education Fdn:  
127, 128, 137  
Univ of Arizona Fdn: 139  
Univ of Maine Pulp and Paper  
Fdn: 070  
Winthrop Rockefeller Fdn:  
130  
Wisconsin Fdn: 073  
Zellerback Family Fund:  
055, 071
- GOVERNMENT: FEDERAL  
General, Unspecified: 236  
Department of Defense-  
Army Research Office: 074  
Wright-Patterson Air  
Force Base: 090, 233  
Department of Education -  
General: 011, 012, 041  
Fund for the Improvement  
of Postsecondary Educa-  
tion: 123, 198, 225, 227,  
228, 238, 281, 307, 311  
National Institute of  
Education: 027, 300  
Office of Career Educ: 119  
Title IV: 005, 007, 306  
Women's Educational Equity  
Act Program (WEEA): 002,  
013, 021, 026, 029, 047,  
052, 083, 199, 232, 234,  
246, 305, 312  
Department of Energy: 081,  
082, 231, 233, 235  
National Air and Space  
Administration -  
Ames: 022, 279  
Goddard: 038  
Langley: 237  
National Institute of

## FUNDING SOURCES

Mental Health: 272	Department: 135
National Science Foundation: 025, 032, 035, 052, 056, 084, 086, 090, 091, 092, 096, 099, 107, 115, 118, 131, 138, 149 to 196, 217, 218, 219, 220, 222, 236, 244, 265 to 271, 273, 274, 275, 277, 278, 282 to 288, 290 to 297, 299, 303	Pennsylvania Department of Education: 014, 015
National Sea Grant Program: 040	South Carolina Appalachian Council of Governments: 058
Smithsonian Institution (U.S. National Museum): 003	South Carolina Dept of Vocational Educ: 067, 119
<u>GOVERNMENT: STATE AND LOCAL</u>	<u>STUDENT FEES AND TUITION</u>
California State Department of Education: 021	017, 022, 036, 057, 063, 089, 100, 116, 117, 124, 125, 136, 207, 210, 211, 224, 235, 247, 261, 276, 289, 308, 309
Chancellor's Fund for Innovation of the Calif State University System: 226	<u>OTHER</u>
Connecticut Board of Higher Education: 264, 298	Center for Environmental Research: 129
Greensboro Public School System: 009	Forestry Club Alumni, Iowa State University: 169
Maryland State Department of Education: 005	Lawrence Livermore Laboratory, Office of Equal Opportunity: 075
Minnesota Council on Quality Education: 033	Math Learning Center: 308
Missouri: 207	Montana Committee for the Humanities: 256
New York State Education	New Hampshire Coll and Univ Consortium: 257
	Private Contributions (Unspecified): 037, 038, 077, 094, 158, 285
	Vocational Education Amendments: 132

## SPONSORS

### ASSOCIATIONS

American Assoc for the Advancement of Science: 303  
American Geological Institute: 204  
American Soc for Engineering Education: 310, 315  
Assoc for Women in Science: 004  
Assoc of American Geographers: 232  
Assoc of Women Geoscientists: 117  
History of Science Soc: 301  
Mathematical Assoc of America: 097

Sigma Delta Epsilon-Graduate Women in Science: 034, 239, 276  
Soc of Women Engineers: 023, 039, 057, 061, 068, 069, 087, 104, 120, 121, 215, 231, 241, 252, 263  
Women in Computer Science: 263  
Women in Mining: 001

### RESEARCH AND PROGRAM

### ORGANIZATIONS

American College Testing Program, Iowa City: 032  
Bay Area Math-Science Network: 022

## SPONSORS

Boston Globe, MA: 314  
DC Commission on Women: 041  
Franklin Institute Research Labs, Philadelphia: 030  
Industrial Management Council, Rochester NY: 031  
Lawrence Livermore Laboratory, CA: 075  
Maria Mitchell Observatory, Nantucket MA: 138  
Maryland Academy of Sciences: 059  
Math Learning Center, Salem OR 308  
National Center for Atmospheric Research, Boulder CO: 244  
National Air and Space Administration - Ames: 279  
Goddard: 033  
New Hampshire College and University Consortium: 257  
Overcoming Math Anxiety, Washington DC: 010  
Pacific Telephone Co: 043  
Pennsylvania Department of Education, Harrisburg: 014, 015  
Polaroid Corporation: 050  
P. Platypus Publications, Inc. Miami FL: 006  
Project MEGSSS, St. Louis MO: 027  
Project SEED, Berkeley CA: 012  
Research Triangle Institute, NC: 096  
Sharon L. Menard, Lafayette CO: 002  
Smithsonian Institution: 003  
Southwest Center for Human Relations Studies, Norman OK: 026  
TRW, Redondo Beach, CA: 243  
Verheyden & Associates, Washington DC: 041  
Washington School of Psychiatry, DC: 312  
Women Educators, Red Bank NJ: 083  
Women's Enterprises of Boston: 281

SCHOOLS (PRE-COLLEGE)  
Columbia High School, Richland WA: 047  
Kent Denver Country Day School, Denver CO: 108  
Montgomery County Public Schools, Rockville MD: 005  
Morehead Primary School, Greensboro NC: 009  
Novato Unified School District, CA: 007  
School District Eleven, Bronx NY: 011  
Spring Lake Park High School, Minneapolis MN: 033  
Westridge School, Pasadena CA: 077  
William Cullen Bryant High School, Long Island City NY: 107

UNIVERSITIES AND COLLEGES  
Alcorn State Univ, MS: 266  
Alverno Coll, WI: 112  
American Univ, DC: 290  
Arizona, Univ of: 049, 139, 158, 168, 277  
Arkansas, Univ of, Fayetteville: 130  
Bergen Community Coll, NJ: 149  
Boston Coll, MA: 253  
Bowie State Coll, MD: 038  
Brandeis Univ, MA: 253  
Cabrillo Coll, CA: 194  
Caldwell Coll, NJ: 242  
California Institute of Technology: 037  
California State Univ - Fresno: 150, 201  
Fullerton: 133  
Los Angeles: 214  
Northridge: 069, 148, 267  
San Bernardino: 163  
California, Univ of - Berkeley: 017, 023, 231, 235, 263, 299, 306  
Davis: 291, 310  
Los Angeles: 167, 295  
Santa Barbara: 221  
Carnegie-Mellon Univ, PA: 200  
Case Western Reserve Univ,

## SPONSORS

PA: 101  
Cerritos Coll, CA: 131, 136  
Chatham Coll, PA: 273  
Chestnut Hill Coll, PA: 288  
Christian Brothers Coll,  
TN: 186  
Cincinnati, Univ of, OH:  
254, 309  
City Univ of New York: 157,  
246, 270  
Clark Coll, GA: 085  
Clarke Coll, IA: 180  
Clarkson Coll, NY: 093, 120,  
252  
Clemson Univ, SC: 058  
Coll of St. Catherine, MN:  
274  
Colorado State Univ: 305  
Colorado, Univ of -  
Boulder: 114  
Denver: 193  
Creighton Univ, NE: 297  
Cuyahoga Community Coll,  
OH: 222  
Dayton, Univ of, OH: 090,  
105, 233, 265, 271  
Delaware, Univ of: 204  
Denison Univ, OH: 229  
Douglass Coll (see Rutgers)  
Dutchess Community Coll,  
NY: 174  
East Tennessee State Univ:  
187  
Foothill-DeAnza Community  
Coll, CA: 279  
George Mason Univ, VA: 051,  
283, 313  
George Peabody Coll, TN: 175  
George Washington Univ, DC:  
210  
Georgia Institute of Tech-  
nology: 144  
Georgia State Univ: 083  
Georgian Court Coll, NJ: 250  
Goucher Coll, MD: 059, 084  
Greenville Technical Coll,  
SC: 067  
Gustavus Adolphus Coll, MN:  
154, 159  
Hampshire Coll, MA: 253  
Hartford Coll for Women  
CT: 264, 289, 298  
Hartford State Technical  
Coll, CT: 264, 298  
Hartford, Univ of, CT: 177  
Hawaii, Univ of, Honolulu:  
156  
Hollins Coll, VA: 218  
Houston, Univ of, TX: 142,  
269  
Humboldt State Univ, CA:  
103, 258  
Huston-Tillotson Coll, TX:  
247  
Idaho, Univ of: 102  
Illinois Institute of  
Technology: 028  
Illinois, Univ of,  
Urbana: 044, 121, 262  
Indiana Univ: 172  
Iowa State Univ: 020, 169  
Iowa, Univ of: 074, 146  
Jackson State Univ, MS: 152  
James Madison Univ, VA: 153  
Jersey City State Coll, NJ:  
147  
Johns Hopkins Univ, MD: 016,  
272  
Kansas State Univ: 234  
Kansas, Univ of: 056, 251  
Kean Coll of New Jersey: 063  
Knox Coll, IL: 208  
Louisville, Univ of, KY: 126  
Lowell, Univ of, MA: 284  
Maine, Univ of, Orono: 070,  
178  
Mary Baldwin Coll, VA: 218,  
237  
Maryland, Univ of, College  
Park: 038, 109, 122  
Massachusetts Institute of  
Technology: 036, 116, 123,  
253  
Massachusetts, Univ of -  
Amherst: 057, 212, 253, 315  
Boston: 253  
Meredith Coll, NC: 076  
Mesabi Community Coll, MN:  
151  
Michigan State Univ, East  
Lansing: 087, 160, 205  
Michigan Technological  
Univ: 111  
Michigan, Univ of: 255

## SPONSORS

Mills College, CA: 008, 021,  
025, 052, 188, 213  
Minnesota, Univ of, Minnea-  
polis: 080, 095  
Missouri, Univ of, Kansas  
City: 124  
Montana, Univ of: 256  
Morris Brown Coll, GA: 127,  
128, 137  
Mount Holyoke Coll, MA: 296  
Mount St. Mary's Coll, CA:  
293  
Nebraska, Univ of, Lincoln:  
179  
New Hampshire, Univ of,  
Durham: 045, 257  
New Mexico Institute of  
Mining and Technology: 035  
New Mexico, Univ of,  
Albuquerque: 013, 195, 282  
Norfolk State Coll, VA: 165  
North Carolina State Univ:  
060  
North Dakota, Univ of,  
Grand Forks: 065, 145, 224  
Northern Illinois Univ: 176  
Northrop Univ, CA: 081  
Northwestern Univ, IL: 019,  
028  
Notre Dame Coll, OH: 086,  
088, 092, 161  
Notre Dame, Univ of, IN:  
211, 268  
Oberlin Coll, OH: 189, 260  
Oklahoma State Univ: 140,  
240  
Oklahoma, Univ of, Norman:  
026, 217  
Pacific, Univ of, CA: 022  
Pennsylvania, Univ of: 301  
Polytechnic Institute of  
New York: 227, 292  
Pomona Coll, CA: 190  
Portland State Univ, OR: 181  
Purdue Univ, IN: 046, 199,  
238, 241, 300  
Queens Coll of the City  
Univ of New York: 246  
Queensborough Community  
Coll, NY: 118  
Radcliffe Coll, MA: 036,  
048, 050, 116  
Randolph-Macon Women's  
Coll, VA: 218  
Rensselaer Polytechnic  
Institute, NY: 082, 249  
Rochester Institute of  
Technology, NY: 113  
Rosemont Coll, PA: 278  
Russell Sage Coll, NY: 249  
Rutgers Univ, NJ: 068, 206,  
245  
St. Joseph Coll, CT: 210,  
219, 236  
St. Louis Community Coll at  
Florissant Valley, MO: 207  
Saint Mary's Coll, IN: 078,  
211  
San Diego State Univ, CA:  
196, 239  
San Francisco State Univ,  
CA: 215, 226  
Sangamon State Univ, IL:  
099, 155  
Santa Clara, Univ of, CA:  
055, 071  
S.D. Bishop State Junior  
Coll, AL: 183  
Seton Hill Coll, PA: 248  
Smith Coll, MA: 212  
Southern Illinois Univ: 285  
Southern Methodist Univ, TX:  
230  
Spelman Coll, GA: 134, 184, 198  
Spring Garden Coll, PA: 209  
Stanford Univ, CA: 213  
State Univ of New York -  
Alfred: 135  
Buffalo: 182  
New Paltz: 123, 166  
Stony Brook: 287  
Stephens Coll, MO: 311  
Stevens Institute of  
Technology, NJ: 089, 110,  
302  
Stockton State Coll, NJ: 129  
Sweet Briar Coll, VA: 218  
Temple Univ, PA: 170  
Tennessee Technological  
Univ: 141  
Texas A&M Univ: 040, 061,  
164  
Texas Southern Univ: 191  
Texas Tech Univ: 104

## SPONSORS

Texas, Univ of -  
Arlington: 286  
Austin: 247, 294  
El Paso: 066  
Texas Women's Univ: 091  
Tompkins Cortland Community  
Coll, NY: 132  
Trident Technical Coll, SC:  
119  
Trinity Coll, VT: 202, 203  
Tri-State Univ, IN: 100,  
106  
Tulane Univ, LA: 115  
Tulsa, Univ of, OK: 162  
University - See rest of  
title, e.g. "California,  
Univ of - Berkeley" or  
"Dayton, Univ of"  
Ursuline Coll, OH: 197  
Virginia, Univ of, Char-  
lottesville: 039, 280  
Washington State Univ: 072,  
275  
Washington Univ, MO: 192  
Washington, Univ of, Seattle:  
024, 053, 079, 094, 143, 307  
Wellesley Coll, MA: 036, 228  
Wells Coll, NY: 185  
Wentworth Institute of Tech-  
nology, MA: 042, 314  
Wesleyan Univ, CT: 225  
Western Michigan Univ: 064,  
216, 304  
Westminster Coll, PA: 220  
Wheaton Coll, MA: 223  
Wichita State Univ, KS: 125  
Wisconsin, Univ of -  
Madison: 029, 054, 073,  
098, 261, 276  
Milwaukee: 173  
Stevens Point: 171  
Worcester Polytechnic Insti-  
tute, MA: 018, 062

# AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



Founded in 1848, AAAS is the world's leading general scientific society with 130,000 individual members. It is also the world's largest federation of scientific organizations, with nearly 300 affiliated societies and academies covering the entire spectrum of the natural and social sciences, engineering, and medicine. Despite its size and complexity, AAAS offers its individual members a voice in the larger scientific community through programs for the expansion and interchange of ideas in science and engineering and in the public understanding and appreciation of science. AAAS membership includes the weekly journal **SCIENCE** and the opportunity to participate in one of the twenty-one AAAS Sections of the Association that embrace the basic fields of science and engineering. Members also take part in programs that contribute toward the solution of problems affecting not only the scientific community but society as a whole.

For further information about AAAS, write

AAAS  
Membership Department  
1515 Massachusetts Ave., N.W.  
Washington, D.C. 20005

AAAS provides for the interchange of information of concern to scientists and to the public through

- **SCIENCE**, the weekly magazine which carries definitive articles and up-to-date reports on topics and issues in and about the scientific world.
- the Annual National Meeting and Exhibit which provides a forum for the presentation of symposia and lectures on recent developments in science; informed discussions on policy issues that affect society as a whole; and exhibitions of books, journals, instruments, services, and other products of interest to the scientific community.
- **SCIENCE 80**, a new, well-illustrated magazine of science designed for an educated popular audience, which includes feature articles, columns, and news items on science, technology, medicine, as well as on the human and social dimensions of science and its impact on people as consumers and concerned citizens.
- **SCIENCE BOOKS AND FILMS**, a critical review journal, and the AAAS Sourcebook Series (compiled from SB&F) which review or annotate and list the best science books and films currently available.
- other publications such as the **SCIENCE Compendia** which deal with critical topics (energy, food, population, materials, electronics, health, advanced technologies, the future of science); the AAAS Selected Symposium Volumes, and the AAAS Audiotapes (both from the Annual National Meetings), which offer a broad perspective in the fields of science and technology; and **SCIENCE Report Series** and other books on special topics (such as heart research, solar energy, scientific freedom and responsibility, and a series of books on research funding in the public and private sectors).

AAAS supports programs and activities on national and international science policy, education, and employment opportunities by

- giving national and regional policymakers the science facts they need through special seminars and the Congressional Fellows Program.
- providing forums on such problems as scientific freedom and responsibility; the legal, scientific, and technical aspects of public policy decision-making; the implications of new knowledge and technologies in energy development; and more.
- relaying reliable science information to the news media.
- promoting public understanding of science and improving science curricula in the schools.
- improving international cooperation among scientists through innovative ventures like the inter-American trilingual journal **INTERCIENCIA**.
- expanding the opportunities available to minorities, women, and the handicapped in all fields of science.