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ABSTRACT

Results of a survey of the states to determine state incentive programs for graduate education are presented. Attention is directed to three types of initiatives that are receiving special attention in the states: (1) programs to endow faculty chairs (eminent scholars program); (2) funding for special program initiatives or "centers of excellence"; and (3) initiatives to promote applied research centers or other types of business-university linkages. For each state, efforts in three types of incentive programs are described. The eminent scholars program, which is a relatively new development, is designed to provide permanent sources of funds that can be used to attract and retain outstanding faculty for major state universities. This has been done through incentive programs that usually match private giving dollar for dollar with state funds. Targeted state support for centers of excellence is often aimed at promoting state economic development in certain fields, but has also been targeted to other objectives such as improving teacher education programs. State programs to enhance applied research activities and to strengthen higher education-business linkages have diversity in design and are often tailored to the particular economic structure and climate of the region. (SW)

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**STATE INCENTIVE PROGRAMS
FOR GRADUATE EDUCATION:
A SURVEY OF THE STATES**

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INTRODUCTION

Using higher education as an explicit tool for economic development has become an increasingly popular objective in the states. The wave of entrepreneurial activity in the early 1980s in such fields as electronics, robotics, biogenetics, and bioengineering generated fierce competition among the states to attract these high-technology industries. Appropriately, governors and legislatures looked to their graduate research institutions for leverage in this war to attract employers and private-research support. Public higher education was happy to cooperate as it sought new sources of support to make up for declines in federal support and competition for state resources. The states have not focused exclusively on high technology fields, however. Older, more established state programs have targeted dollars at the humanities, while more recent programs have provided special funding for graduate teacher education.

This survey describes three categories of initiatives that are receiving special attention in the states: 1) programs to endow faculty chairs (eminent scholars program); 2) funding for special program initiatives or "centers of excellence"; and 3) initiatives to promote applied research centers or other types of business-university linkages.

Eminent Scholars Programs

The endowment of faculty chairs by states (often called "eminent scholars programs") is a relatively new development. The objective has been to provide permanent sources of funds that can be used to attract and retain outstanding faculty for major state universities. This has been done through incentive programs that usually match private giving dollar for dollar with state funds. The programs appear to have overcome the principal obstacle faced by public-sector institutions in pursuing private donors - i.e. the fear that contributions will be used as a substitute for state support. One of the largest

programs reported in this survey is in Florida, where 84 endowed chairs are now in various stages of development (32 fully funded).

Centers of Excellence and "Quality Funding"

Targeted state support for "centers of excellence" is a initiative often aimed at promoting state economic development in the fields mentioned above. But the programs have had other objectives as well: to provide some differentiation of mission among institutions whose compulsion is to duplicate and spread resources too thinly among too many programs; and to provide relief from workload formulas that are not responsive enough to new developing fields. Most recently, states have targeted categorical support toward improvement of teacher education programs, especially graduate inservice training as part of the nationwide school reform movement. New Jersey and Ohio report one of the largest and most ambitious of these centers-of-excellence programs in this survey.

Centers of Applied Research and Other Higher Education-Business Linkages

State programs to enhance applied research activities and to provide supportive environments for strengthened higher education-business linkages show more diversity in their design than the eminent scholars and centers-of-excellence initiatives. They are often tailored to the particular economic structure and climate of the region. States such as Kansas have appropriated funds to state technology commissions, which in turn make grants on a competitive basis to joint university-business research ventures. These programs usually require some match from the corporate side - thus stimulating private-sector support for university research similar to the endowed chair programs. Other states, such as Georgia and North Carolina, have concentrated their support on centers of research in particular fields, such as microelectronics, to provide umbrellas for entrepreneurial activities. These programs may provide, in addition to joint university-

business research projects, access to joint facilities for faculty, students, and business entrepreneurs.

It is our hope that this summary and reference to resource documents and persons will serve as a source of new ideas for states just beginning to undertake such initiatives. The examples are meant to illustrate the activity in the states, and do not represent an all-inclusive survey. Our thanks to all of the respondents.

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**STATE INCENTIVE PROGRAMS FOR GRADUATE EDUCATION:
A SURVEY OF THE STATES**

I. Eminent Scholars Programs

Arkansas does not have a program to endow faculty chairs from state funds, but institutional efforts to raise funds for endowment of chairs and other purposes is encouraged. For example, state law provides a 33% state income-tax credit for gifts to institutions of higher education.

Connecticut, during the 1985 legislative session, created the Endowed Chair Investment Fund. The legislation permits the University of Connecticut and Connecticut State University to apply for the establishment of an endowed chair to be supported by a minimum grant of \$500,000 from the fund and a matching non-state contribution. Applying institutions will select candidates to fill the endowed chairs and administer the endowment funds and earned interest. The Connecticut Board of Governors is seeking \$1.5 million in state appropriations for the program in FY 1987. This would provide for three endowed chairs.

The state university system of Florida currently has 84 endowed (eminent scholars) chairs in various stages of development: 32 are fully funded, 24 have funds encumbered, and 28 do not yet have funds encumbered. These chairs, funded through a state matching grant program, are distributed at nine different institutions in Florida.

In Georgia, two faculty chairs are endowed at The University of Georgia and Georgia Tech for \$1 million each, 25% to come from state funds, 75% from the institution's foundation. These Eminent Scholars Chairs are the only chairs receiving special state money.

For over 20 years, the Kansas Legislature has funded the "Regents' Distinguished Professors" program to enable "regents' institutions to attract persons whose capabilities will enhance economic development in Kansas through major contributions to the field of knowledge." Currently, the legislature provides \$25,000 annually for supplemental salary and equipment funding for each of five professorships.

The "strategic plan" of the Kentucky Council on Higher Education provides for endowed chairs in the council's budget requests for the 1986-88 biennium. The program calls for a 50-50 match, with the institutional portion coming from private funds.

New Jersey currently contributes to the endowment of five scholarly chairs, with a total appropriation of \$335,000. These are the Einstein Chair for Scholarly Studies at the Institute for Advanced Study; the Richard J. Hughes Chair for Constitutional and Public Law and Service at Seton Hall University; the Alfred E. Driscoll Chair in Pharmaceutical/Chemical Studies at Fairleigh Dickinson University; a chair in Women's Studies at Douglass College of Rutgers, the State University. The Will and Ariel Durant Chair in the Humanities (new in FY 1986) is at St. Peter's College.

The New Mexico legislature established the Higher Education Endowment Act in 1984 to provide funds for permanent endowments for the "Improvement of Educational Excellence." The act provided \$2,775,000 to establish various endowments at each of the six four-year institutions in the state. The act provides \$1,350,000 to establish endowments of at least 20 professorships, \$675,000 to establish endowments of at least 30 lectureships, and \$750,000 to establish endowments of at least 60 graduate fellowships.

In 1964 New York created 10 "Distinguished Regents' Chairs." Chairs are awarded on the basis of competition among New York's public and independent institutions. Of the 10 chairs, five are designated for the humanities and five for the sciences. While the chairs are not endowed, they are supported by annual appropriations by the state legislature. The current level of funding is \$100,000 per year for each chair.

The North Carolina General Assembly in its 1985 session appropriated \$2 million for FY 1985-86 and an additional \$2 million for FY 1986-87 to establish a "Distinguished Professors Endowment Trust Fund" to be maintained by the Board of Governors of The University of North Carolina to provide challenge grants to the constituent institutions. Matching funds will be allocated by the board to the constituent institutions.

Fourteen challenge grants, each for \$167,000, will help create and support \$500,000 endowments at constituent institutions, each of which must provide a match of \$333,000 in donations and interest. Two \$334,000 challenge grants have been allocated for a \$1 million endowment at North Carolina State University at Raleigh and the University of North Carolina at Chapel Hill. Each institution must have \$666,000 in donations and interest to qualify.

The Ohio Board of Regents' eminent scholars program, funded by the Ohio General Assembly as part of the 1983-85 biennial budget, provided \$4.5 million for nine eminent scholars in the state. In November 1985 five eminent scholars were named at three universities: The Ohio State University, University of Cincinnati, and the University of Akron. The remaining four scholars will be appointed at the University of Cincinnati, The Ohio State University, and Ohio University. Funds appropriated in the 1985-87 biennium will continue the eminent scholars program.

Using lottery funds, the Oregon legislature has funded two endowed chairs; however, there is no ongoing program.

In South Carolina, the Commission on Higher Education has requested funds for endowed chairs for 1986-87. A similar request was not funded in 1985-86.

As part of an approved set of system goals and objectives, the South Dakota Board of Regents has established three endowed chairs from non-state appropriated funds at three institutions. For its FY 1987 budget, the Board of Regents requested one-time funds of \$1 million in a special bill, to use as challenge funds to establish new endowed chairs at all six schools in the system. The money would be provided from a central pool and matched with donated dollars in a perpetual endowment fund. Universities would be entitled to a full endorsement of about \$750,000; colleges could claim \$600,000. The endowment earnings could be used when the total reaches \$200,000.

Tennessee has a "Chairs of Excellence" program currently funded at a level of \$20 million (\$10 million for each of the last two fiscal years). This program requires an institutional matching fund of \$20 million to endow the chairs at the university campuses. The Tennessee Commission on Higher Education has recommended a third year of funding (\$10 million) for 1986-87.

Virginia has an eminent scholars program that matches funds from endowment income with state dollars. The program is supported by about \$2.5 million each year from the general fund.

The West Virginia Eminent Scholars Endowment Trust Fund is a public corporation, authorized to receive appropriations of public monies and public or private grants, gifts or bequests. The board of directors of the corporation "shall use any state monies appropriated to the fund solely for the purpose of establishing endowed chairs at state colleges and universities," allocating one dollar of state appropriation for every two dollars of private money allocated. The board designates the endowed chairs and may designate specific chairs or specific areas of academic study as subjects of challenge grants. A specific chair or a chair in a designated academic area is established when the principal and interest dedicated to it reach \$150,000 with at least one half of the principal being from private sources. Each college and university may solicit monies for the endowment of chairs.

II. Centers of Excellence and Other "Quality" Funding Initiatives

Arkansas has appropriated institutional development funds, \$3.4 million per year, since the 1983 special session. Currently the funds are for economic development purposes and several institutions have expanded research activities in their plans. Virtually all of the institutions plan for projects for business-industry centers, which are contract points where institutional resources and business-industry needs can be matched.

In 1983, the Connecticut state legislature approved the establishment of a "Fund for Excellence" within the Department of Higher Education budget. The fund will provide grants for distinctive academic research and public service programs in the public higher education system which have achieved, or have the potential to achieve, regional or national recognition. Although the program is not geared necessarily to graduate education, many of the proposals submitted for funding have been research-oriented or related to graduate academic programs. The legislation provides for annual program funding up to 1% of the total state appropriation to higher education in the preceding fiscal year. At current appropriation levels, full funding would provide more than \$2.5 million annually. However, for the first two years of its existence, the program has received only \$250,000 annually. Program changes are expected to generate greater support from the executive and legislative branches.

Florida has most recently emphasized high technology graduate education through its Florida Graduate Scholars Fund, which provides scholarships to full-time students in the fields of engineering, information technology, biomedical technology or sciences, material sciences, or "other such areas identified by the Florida High Technology and Industry Council."

In addition, the Florida Postsecondary Education Planning Commission completed a study in 1983 on "Engineering Education in Florida" which made recommendations regarding the delivery of engineering education statewide.

Three centers of excellence in Kansas were first funded by the 1983 legislature at \$130,000 each for FY 1984. For FY 1986 each center of excellence has an appropriation of \$168,000, of which each institution is able to spend \$84,000 without matching funds; a dollar-for-dollar match is required for expenditures beyond \$84,000 (for a total 50% match). Each of the three institutions has an unrestricted center-of-excellence matching fund. Unexpended balances in both the state fund and the matching fund are reappropriated each year. The centers include the Center for Bioanalytical Research at Kansas University; the Center for Productivity Enhancement at Wichita State University; and the Center for Artificial Intelligence and Automated Control Systems at Kansas State. Pittsburgh State University plans to seek approval for a Center of Excellence in Applied Technology.

Centers of Excellence are included in the strategic plan of the Kentucky Council on Higher Education, but they are not restricted to graduate programs. A combination of new state appropriations (to be requested for the 1986-88 biennium) and institutional funds will support the centers. The grants program will be competitive and recipients, to be chosen by an outside panel, must propose a program that will enhance quality in an outstanding area or group of disciplines.

In his FY 1986 budget message, Governor Thomas H. Kean issued a "Challenge to Excellence" to create a New Jersey one of the nation's preeminent systems of higher education. Although focused primarily on undergraduate education, challenge funding will be used also to promote graduate education. The FY 1987 budget recommendations for the New Jersey Institute of Technology, for example, include \$6.2 million for programs to expand the excellence initiative begun in FY 1986. This will include the establishment of additional "high technology chairs," and the upgrade of equipment, library acquisitions, and other support services.

New Mexico has established five "Centers of Technical Excellence" for the 1984-85 biennium. They are the Center for Non-Invasive Diagnostics (\$790,000); Center for High Tech Materials (\$1.76 million); Center for Explosive Technology Research (\$1.3 million); a Computer Research Lab (\$1.35 million); and the Plant Genetic Engineering Lab (\$830,000).

In 1984, New York established a program of 400 "Empire State Mathematics and Science Teacher Fellowships" as part of a strategy to deal with a shortage of certified teachers of mathematics and the sciences in the public schools. The fellowships are awarded on the basis of a statewide competition for study in appropriate registered programs at New York degree-granting institutions. The fellowships are divided into three different categories, each dependent upon the teacher's certification and tenure status in the school system. Two of the fellowship awards are \$4,000 for one year of full-time study, and one part-time fellowship provides \$1,000 a year for a maximum of two years of part-time graduate study.

North Carolina has recently funded five separate graduate programs totalling over \$10 million. The general assembly appropriated \$8.5 million for the construction of a computer science building at UNC Chapel Hill, and \$710,000 for program development in computer science. The facility is expected to be operational in the 1986-87 fiscal year. The North Carolina Center for the Advancement of Teaching at Western Carolina University is to provide career teachers with opportunities to study advanced topics in the sciences, arts and humanities. Two million dollars have been appropriated for the center for 1986-87. In addition, the Board of Governors of the University of North Carolina has authorized changes in educational missions at Fayetteville State University and UNC Wilmington, to include a broad range of master's levels programs. Funding for the new programs totals \$737,112.

The Mathematics and Science Education Network in North Carolina includes eight centers to serve the educational needs of middle school and high school mathematics and science teachers in North Carolina. Each center is a partnership between a constituent institution and one or more public school systems in its region. Resources for the operation come from state funds, regular instructional resources of each participating institution, and other public and/or private funds for teacher scholarship aid and scientific instructional equipment. The goals of the centers are to improve the qualifications of present math and science teachers, and increase the number of qualified math and science teachers in high schools in the state.

The scientific equipment needs of university science and engineering laboratories have also been given high-priority attention in North Carolina. Nearly \$1.6 million has been allocated to four institutions for equipment in engineering and the sciences.

The Ohio Board of Regents has developed a comprehensive program entitled "Selective Excellence," which is an interrelated series of challenge grants supported by \$61.7 million in state appropriations. Included is an "Academic Challenge Program" (\$21.7 million), which provides incentives for institutions to build centers of excellence which serve the state's interest. A "Research Challenge Program" (\$28 million) offers a partial state match of funding secured from external resources for basic research.

The Oregon legislature has appropriated lottery funds in the past for centers of excellence at three universities. The centers are all related to economic development.

The South Carolina Commission on Higher Education has requested funds for Centers of Excellence for 1986-87. (A similar request was denied by the legislature in 1985-86.) South Carolina does provide targeted graduate fellowships as part of its desegregation. In 1985-86, this program was supported by \$500,000 in state funds with approximately 80 recipients at seven institutions.

While the South Dakota Board of Regents does not currently include centers of excellence funding in its budget, it will be a target for the FY 1988 budget.

In the three-year budget plan for higher education, the governor of Tennessee proposed funding the centers of excellence program at a level of \$20 million for 1986-87. These funds are not restricted to graduate level education. A few adjustments on the program led to a projected 1986-87 funding level of \$21,666,000. The Tennessee Higher Education Commission will make final funding recommendations for this program in January, 1986.

The Utah legislature appropriated \$2.5 million through the Utah Science Council to create centers of excellence. Thus far, most proposals for funding have been related to engineering activities.

Virginia has a "Funds for Excellence" program that makes grants to activities that are demonstrably excellent or have the potential to become so. Much of the money has gone to research projects supporting graduate programs. Annual funding is about \$2 million.

West Virginia University has undertaken research, teaching and service activities that continue to contribute to economic development. A state appropriation totalling \$500,000 is being sought for five specific projects: a Center for Economic Analysis and Statistics; Agriculture and Forestry Marketing; Labor-Management Cooperation; International Trade Research; a Water Resources Research Program; and an Institute for Public Affairs.

The West Virginia University College of Human Resources and Education has begun to examine and revise the content of all its teacher education programs, particularly to improve the clinical in-school experience of undergraduate and graduate education students. To meet this need, the university has proposed that the College of Human Resources and Education enter into partnerships with school districts to provide field experiences for prospective teachers, first-year teachers, and continuing teachers. Overall, the \$225,000 proposal is aimed at enhancing the quality of teaching and learning in public schools of West Virginia, and improving the economic and social development of the state.

III. Centers of Applied Research and Other Higher Education-Business Linkages

Nearly all of the research centers at the University of Connecticut are supported at least partially by state appropriations. This is not a new initiative, but a result of historical funding patterns. Through programs such as the Fund for Excellence and two capital budget programs entitled, "High Technology Project and Program Grants" and "Cooperative Research Grants" (funded at a combined amount of \$3.5 million in FY 1985), Connecticut has provided state support for research-oriented projects having relevance to the business and industrial sector (the latter program requires private matching funds). In addition to the \$2.7 million being sought in the operating budget for the Fund for Excellence, the Connecticut Board of Governors is asking the general assembly to provide \$5 million in the capital budget for the high tech and cooperative research grant programs.

The Georgia Board of Regents reports that Georgia Tech recently received \$15 million in special state funds, to be matched by private funds, to establish a center for microelectronics research. A similar arrangement for bio-technical research is in the planning stage at the University of Georgia.

Since 1984, the Kansas Legislature has appropriated \$610,000 annually to fund applied research projects at four of the state's universities. The "Research Match Grants Program" administered by the Kansas Advanced Technology Commission (KATC) is designed to stimulate high-tech developments by utilizing university research expertise to meet industrial needs and potentials. State funds are invested in projects at four institutions with matching support from the sponsoring industrial firms (150% match). In FY 1985, KATC made 20 grants, totalling \$387,000 (with industrial matching support

totaling \$615,000).

Kentucky currently is not allocating funds to stimulate applied research centers. However, business-industry partnerships with higher education are stressed in the Kentucky Council's Strategic Plan. In addition, an independent group of businessmen is promoting higher education and the linkage with higher education. Ashland Oil is leading this effort and is a strong supporter of the partnership, contributing large amounts of money to various institutions and sponsoring public service announcements on the benefits of higher education.

In Michigan a "Research Excellence and Economic Development Fund" of \$21.7 million will encourage research in applied areas that can demonstrate a tangible, direct benefit to the economy of the state.

Montana reports that some state funds are utilized by the Bureau of Business and Economic Research at the University of Montana.

Business-higher education linkages are central to the ongoing work of the New Jersey Commission on Science and Technology. As recommended by the commission, advanced technology centers (ATCs) for cooperative academic-industrial research in four priority fields will be constructed. The Jobs, Science, and Technology Bond Act of 1984 will provide \$57 million for these centers. Financing for a fifth center has been deferred. The ATCs are important vehicles for industrial interaction with academic research, in

terms of both sponsorship of the research and recruitment of outstanding graduate students. Another commission program that supports and promotes graduate-level research is "Innovation Partnerships." About \$2 million was appropriated in fiscal year 1985 for these grants to academic researchers in emerging technological fields.

In 1982, New York began a program to identify and fund centers for advanced technology (CATs) — cooperative research centers in identified technological fields. The centers draw together research and teaching expertise and the needs and interests of New York's industries. Seven CATs have been established at the major public and independent research universities in the state — three of them are actually consortia of from three to 14 institutions. Fields of the centers include biotechnology/agriculture, medical diagnosis and therapy, and telecommunications. Currently, each CAT is supported by \$1 million in state appropriations, which must be matched at least dollar-for-dollar from other sources.

The North Carolina General Assembly has established reserves of \$16,729,000 for fiscal year 1985-86 and \$12,226,000 for 1986-87 to fund the activities of the Microelectronics Center for North Carolina. The purpose of the center is to assist in the development of such instructional and research activity in microelectronics as will establish North Carolina as a national center in this rapidly advancing field. Six state institutions are part of the center.

The North Carolina Biotechnology Center was established to catalog and develop biotechnology resources in the state. The center works to match the state's research capabilities and other resources to the needs of firms working in technology.

Appropriations include \$1.2 million for building improvements and \$1.5 million operating budgets for each of FY 1985-86 and FY 1986-87, plus a non-reverting reserve appropriation of \$5 million.

Other major areas of university-industry cooperation in North Carolina are in communications and signal processing, engineering, forestry, biotechnology, and pharmaceuticals.

In Oregon, the state college and university system established a center in the Portland area: the Oregon Center for Advanced Technology in Education. The legislature has approved funding for this center.

The governor of Rhode Island has set aside funds to underwrite a project called "Rhode Island Partnership." The funds available under this program help to make expert advice available from a consortium between the University of Rhode Island and Brown University and to provide venture capital for companies developing products in high-technology areas.

The research function of the Tennessee funding formula, which includes bureaus, institutes and special projects, comprises 1% of total state expenditures for higher education. One half of an institution's allocation is based upon historical expenditures.

The remaining allocation is based upon the institution's ability to attract sponsored research funds. State appropriations totalling over \$19 million have been recommended for five special units of applied research centers, including an Agriculture Extension Service, a County Technical Assistance Service, a Municipal Technical Advisory Service, and an Institute for Public Service.

In Utah, the purposes of the University of Utah Research Park are to attract and promote industrial technology, to foster economic growth and development by providing an environment conducive to the interaction of the university and industrial communities, and to encourage the transfer of University research and technology to the private sector for the creation of jobs and state revenues. Forty-four firms and 11 university departments are housed in Research Park facilities. The level of annual economic activity now exceeds \$220 million and represents a payroll of approximately \$100 million for the Park employees.

Interaction between the companies in the Park and the University has benefitted both parties. Nearly 90% of the companies report using faculty as consultants. Over 60% have contributed financially to the university. Fifty percent report having participated in joint research proposals, and 60% use faculty or students in research activities. Many companies have also allowed University departments to use specialized research equipment and several encourage continuing education by offering to pay all schooling costs of employees who take classes. About 20% of the Park employees are University of Utah graduates.

Virginia has created a "Center for Innovative Technology," with involvement by the five major research institutions. The center is funded in 1984-86 with \$8 million capital outlay and a \$22 million operating budget, most of which goes to support applied research projects carried out by the universities with or on behalf of industry.

In March 1985, the West Virginia Board of Regents established the Center for Education and Research with Industry (CERI), headquartered at Marshall University. The Center promotes campus-business linkages through a statewide network and encourages the utilization of higher education's considerable resources to further the state's economic development. Center programs emphasize the direct provision of faculty expertise to specific problems, basic and applied research, and employee training. The total budget for CERI is \$500,000.

Also at Marshall University is the Center for Regional Progress, which links the resources of the university to economic and community development needs. The center was established in January 1984 with a \$38,000 start-up grant from the employment and training division of the governor's office of economic and community development. The objective of the center is assisting organizations and individuals in the business, public, and private sectors. Faculty expertise is utilized in technical, scientific and management areas. The center consists of six major divisions: business and industry, community and government, education, arts and culture, health, and family and consumer. The current budget is \$150,000.

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