

# STEM Mentoring — Aspiration to Achievement

By Dr. Al Church, University of Utah

*"I never thought learning science could be interesting and real...and that I could do it" – AMES 11th grade female.*

*"When I saw that applying science to a simple problem (a solar powered water fountain), I realized that this problem could solve many others" – AMES 12th grade minority male.*

*"Learning from real scientists and college students allowed me to be less afraid of asking questions, making mistakes, and trying new ideas about science and me" – AMES 11th grade low SES male.*

In conjunction with an NSF-funded mentoring program that partners University of Utah engineering professors and their undergraduate and graduate students with high school students from several Salt Lake City high schools that have a high percentage of low income and ethnic minority students, the Academy for Math, Engineering, and Science (AMES) students quoted above continued on a journey of self discovery that may, in some small way, help with our national STEM challenge.

Given the multitude of dire predictions about the failing economic competitiveness of the United States in STEM fields, schools with the specific mission of inviting a diverse population to enter STEM coursework face significant challenges. Many interested students come with high hopes of college access and career directions, but often are under-prepared and challenged by a lack of family support.

One AMES senior, desperate to achieve a career in the medical and health fields, spoke of the "push-pull" tension she feels from her family, one that relies on her for help at home as parents struggle with survival in a weak economy. They want her

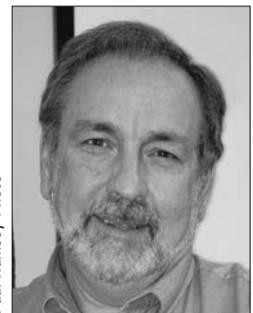
to go on to college, for which she has earned entry and scholarship, but they need her for critical home care support. Split loyalties between home and higher education are common with our low-income families.

AMES is a high-performing Title One STEM early college high school in Salt Lake City. We learned that a key factor in moving students from aspiration to achievement is mentoring. The NSF program and other AMES campus efforts, the required AMES community-based internship program, opportunities with mentors, role models, and supportive adults in STEM fields prove to be turning points and driving forces in the lives of aspiring AMES students. As a result, parents, fearful of losing their hard working students to the world of higher education, become more supportive as they themselves see the promise and potential of their children.

At the Nashville NCSMST Professional Conference Diversity Symposium in March 2010, an AMES college instructor and I heard student graduates eloquently share their stories of college and career success. Mentoring was the positive tide that swirled around the their ankles; we stopped counting the prevalence of the word at 100.

The following quote paraphrases what we were told by successful STEM graduates and professionals representing our growing diverse demographic in the United States.

"I am here today because I had (chose one or more of the following): teacher, counselor, mentor in the community, college professor, principal, who believed in me and opened their (chose one or more of the following): classroom after school/during lunch, research laboratory, work place, to me and



Paul Ramsey Photo

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let me see the real world of learning and science beyond the classroom.”

If each of our successful NCSSSMST schools could cash in on these stories with hard currency, we would not be so short of the necessary funds to operate our programs full bore.

Consider that the oft-repeated call for reform, “Rigor, Relevance and Relationships,” often stops short. With an over-emphasis on rigor (challenging courses, high standards, metrics based on high stakes testing), it trails off as proposals for relevance and relationships are diminished, are more difficult to quantify, and are perhaps even considered frivolous in a STEM urgency driven by numbers.

At AMES, as we seek to encourage every graduate toward college success (hopefully in STEM), in our eight years of operation with five graduating classes, we have learned that it is relationships that matter first. Mentors, supportive staff, and opportunities for access, opportunity, and measured steps for success reach diverse learners.

In my early preparation program to become a reading teaching, a professor told me, “If every child had a lap, every child would be a reader.” In the secondary ranks, mentoring, internships, and community learning opportunities are the new laps for a diverse population of young adults seeking STEM awareness, mastery, and career success.

As President Obama stated in his September 14, 2010 Back to School Speech to America’s Students, “I want you to take away the notion that life is precious, and part of what makes it so wonderful is its diversity, that all of us are different. And we shouldn’t be embarrassed by the things that make us different. We should be proud of them, because it’s the thing that makes us different, that makes us who we are, that makes us unique. And the strength and character of this country has always come from our ability to recognize ....ourselves in each other.”

As our NCSSSMST schools embrace diversity, we take pride in the accomplishments of our diverse students and share a hope for each of our schools and the United States.