UNIVERSITY *of* NEW HAMPSHIRE

"Excellence in Outreach Scholarship"

Outreach Scholars Academy

Project Information

1. **PROJECT TITLE: <u>Building a Student Scholarship Program in the STEM Disciplines at UNH Manchester</u>**

2. **PROJECT DESCRIPTION**

The Division of Science and Technology at UNH Manchester is interested in applying for an NSF grant that supports a scholarship program for students pursuing bachelor's degrees in science, technology, engineering, and mathematics (STEM) disciplines. Faculty in the Biology, Computer Information Systems, Engineering Technology, and Mathematics programs will work closely with the UNH Manchester admissions, financial aid, and student services offices to establish a partnership with other local stakeholders in STEM education. The external partners will represent secondary and two-year community college institutions, business and industry community members, non-profit organizations, professional associations, and state government programs, all of which recognize the importance of educating scientists and engineers for the economic growth of the state of New Hampshire.

The project team will prepare and submit a grant proposal to the *NSF Scholarships in Science, Technology, Engineering, and Mathematics (NSF S-STEM)* program. This project responds directly to the college 2007-2012 strategic plan objectives to (1) strengthen the science and technology programs and to (2) enhance outreach efforts. Faculty involved in this project will apply relevant knowledge in the effectiveness of teaching in STEM disciplines to design activities and structures that will enable student scholars to achieve their best academic performance. External partners will inform the NSF S-STEM proposal of their expectations about the student selection process and criteria and the quality of educational opportunities in the proposed program. They will also contribute to identifying and making available resources to support students through degree completion and facilitate student career placement in the state's STEM workforce.

3. **BACKGROUND INFORMATION/STATEMENT OF THE ISSUES/PROBLEM**

The American Competitiveness and Workforce Improvement Act (of 1998 and as modified in 2004) signals the critical national need for increasing the number of American scientists and engineers. The NSF National Science Board report on *The Science and Engineering Workforce: Realizing America's Potential* (2003) points to the alarmingly low rate of bachelor's degrees in STEM disciplines, especially among women and underrepresented minorities under the age of 24. The science and technology bachelor's programs at UNH Manchester are relatively young. The full-time B.S. in Engineering Technology program was relocated from Durham to Manchester in 2001. The B.S. in Computer Information Systems program was launched in 2004. The B.A in Biology program will open its doors this coming fall to new students as well as UNHM associate's students who have majored in Biological Sciences. The scholarship program will

enrich the educational opportunities for STEM scholars and strengthen the Science and Technology Division's programs.

4. PROJECT DETAILS

Project Team

Mihaela Sabin, Computer Information Systems Program, Coordinator and Assistant Professor
Sarah Kenick, Biology Program, Assistant Professor of Chemistry
Roberta Kieronski, Mathematics Program, Assistant Professor of Mathematics
David Forest, Engineering Technology Program, Coordinator and Associate Professor of Electrical Engineering Technology
Regina McCarthy, Academic Student Services, Director
Miho Bean, Admissions Office, Director
Jodi Abad, Financial Aid Office, Director

Project Timeframe

Summer and Fall 2008: proposal preparation
Winter break and January 2009: proposal revisions
February 2009: proposal submission

Goals and Objectives

- Determine how existing student support structures and program elements will be utilized and enhanced for the STEM student scholars.
- Propose a plan for the process by which students will be selected to receive the NSF S-STEM scholarship award.
- Propose STEM-specific student support elements that will provide student scholars with industry experiences, internship opportunities, participation in local professional and industrial events, career counseling and job placement, and access to appropriate technology.
- Collect information on the demographics of the academic programs involved: number of majors and graduates per year, overall enrollment and retention within the institution and programs involved.
- Propose an assessment and evaluation plan of both student progress and overall programmatic evaluation at the end of the project.
- Propose an NSF S-STEM project management plan with key personnel and project logistics information.
- Outline a budget for the period of time of support requested.
- Collect letters of institutional support and letters documenting partnership commitments.

Target Population/Audience

Our target audience are high school juniors and seniors and STEM majors in two-year community colleges in the Greater Manchester area.

Methods

Four team members, Sarah Kenick, Roberta Kieronski, Regina McCarthy, and myself, have had the opportunity to examine the current student support structures at UNH Manchester and hold a session on the topic, *From College Classroom to Urban Community: Innovation, Access, and*

Success for Students at UNH Manchester, using a panel format at the first New Hampshire's First College Access Showcase event in March 2008. With the participation of a fourth faculty member, Dave Forest, coordinator of the Engineering Technology program, the team will focus on how existing student services can be enhanced to assist the STEM scholarship program. Key to the scholarship program is close involvement of faculty and student mentoring.

Typical team's operations include:

- Holding regular meetings and facilitate participation of external partners
- Assigning and carrying on responsibilities with researching, addressing specific proposal items, and communicating with external partners
- Delivering project components
- Managing project development with the Google Site wiki-based collaboration tool
- Consulting with the UNH Office of Sponsored Research and review proposal development
- Preparing first draft and review it with an NSF S-STEM program director
- Finalizing proposal and submit it by the February 2009 deadline.

The scholarships involve full-time students who are academically talented and financially needy. Some students may not be eligible for the maximum scholarship of $10,000 per year, depending on the students expected family contribution and the UNH Manchester cost of attendance. Since 85% of the awarded funding represents the student scholarships, the financial aid office will assist with determining the typical financial need for the proposed cohort of student scholars and proposing a budge with a good estimate of the numbers of scholarships and the total amount of funds that would be required.

The Admissions Office and external partners from local high schools and community colleges will prepare eligibility criteria for scholarship recipients and criteria for retention of students' scholarships from one year to another. External partners from local business and industry firms and non-profit organizations will participate in designing program components that link classroom experiences with professional practices and involvement with the real-world of the science and technology fields.

Evidence of External Collaboration and Partnership

We envision establishing a partnership that bridges two important New Hampshire programs: the New Hampshire Scholars and the 55% Initiative. The NH Scholars program is a collaborative effort involving area business and school volunteers who encourage and motivate high school students to complete a more rigorous academic course of study. The 55% Initiative, launched by the University System of New Hampshire in January 2007, calls for promoting New Hampshire to future college graduates with the clearly stated objective that the current migration rate of 50% be shifted to 55% of new graduates remaining in the state.

Our team will collaborate with Scott Power, Director of the State Scholars Initiative at NH College and University Council (NHCUC), and Matt Cookson, Associate Vice Chancellor for External Relations, University Systems of New Hampshire (USNH).

Our project to build a STEM student scholarship program will leverage the incentives the NH Scholars program presents to high school students. The 55% Initiative will promote our program to their partnering local organizations and facilitate their participation in the student support structures the program will offer. In this effort, we all share the goal of graduating well educated and skilled candidates for employment in science and technology areas in the state of New Hampshire.

Expected Impact

The expected outcome of this project is the awarding of the NSF S-STEM grant for four scholarship years and an initial one-year planning period. The student scholars will receive bachelor's degrees in Biology, Computer Information Systems, and Engineering Technology from UNH Manchester. Some of the students in the program will transfer from a STEM associate degree program at New Hampshire Institute of Technology or other two-year community college in the Greater Manchester area. Scholars graduates will pursue STEM professional careers, preferably in New Hampshire, or continue studies in their fields.

Scholarly Connection

The NSF S-STEM program solicitation strongly emphasizes the importance of STEM faculty active involvement with the STEM student scholars. A faculty member currently teaching in a STEM discipline must serve as principal investigator for the project. This close and direct connection with designing and managing an educational infrastructure for the successful graduation of the scholarship recipients is an opportunity for advancing and applying the knowledge of effective teaching and learning in STEM disciplines. The proposed methods have important broader impact components due to the participation of external partners. The teaching and outreach scholarship in association with this project will be disseminated through UNH Manchester public events, recognition of student scholars, the state's NH Scholars and 55% Initiative programs, and research papers submitted to the Journal of Computing Sciences in Colleges and at the ACM conferences of the special groups in CS and IT education.

5. EVALUATION PLAN

The awarding of the grant will be an indicator of meeting the NSF S-STEM standards for the merit review criteria, intellectual merit and broader impacts, of the proposed project. To reach this outcome the proposal will be revised based on feedback received from discussions with UNH OSR staff and designated NSF S-STEM director. Lynnette Hentges, OSR manager of program and proposal development, has been presented with the team's plan for preparing this proposal. She will guide us through the project development. Mihaela Sabin served on an NSF panel review for the S-STEM program in January 2008 and made contacts with two NSF S-STEM directors. They have offered to review drafts of the proposal. Finally, the proposal will have an assessment and evaluation component. It will include assessment of student progress and overall evaluation of the scholarship program. We are especially interested in measuring the impact the project has on the academic programs in our division.