TITLE: Our funded project: National Science Foundation's 'Be a Nuclear Expert in Southeast Michigan" and Four Approach Points

AUTHORS: Lisa Anneberg, Kun Hua, Philip Olivier, Lawrence Technological University, Southfield, Michigan, Department of Electrical and Computer Engineering

ABSTRACT:

In the Electrical and Computer Engineering department [ECE] at Lawrence Technological University [LTU], the six full-time faculty have worked on various NSF [National Science Foundation] funding opportunities throughout the years. We have had a recent resounding success that we are documenting in this paper. Our department is very student focused, and the NSF funding is ideal, as it is student-focused scholarship money. In fact, part of NSF's mission is to encourage undergraduate STEM students. According to the NSF website, it was "created by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense…"[2].
Our funding is for S-STEM, scholarships for science, technology, engineering, and mathematics.
Our paper outlines our approach for the successful NSF S-STEM Scholarship program: 'Be a Nuclear Expert in Southeast Michigan". Our program runs from 2012 to 2017, and is for $598,000.

We are organizing our success points into four distinct areas:
1. Essential collaborations with other universities and with local industry
2. Division of labor for faculty in the program
3. Essential program changes or evolutions, with NSF support
4. Focus on our students

1. Essential Collaborations with Other Universities and with Local Industry

We collaborate with our local electrical utility, DTE Energy [DTE or 'Detroit Edison' [3]]. DTE is very committed to education and to our community. Collaboration with them was facilitated by information on their website [3], and they supplied a very robust letter of support for our program. They also collaborate with a local community college, specifically for energy programs, and we will discuss this more later. DTE is a national leader in alternative energy programs, and are intensely aware of the need for energy engineers for the next generation.
We also collaborate with our local energy distribution company, ITC Holdings [4]. ITC also has a broad community support program, and they also facilitated our grant application. In fact, ITC has a scholarship of their own which they market to our students. It is up to $11,500 per student per year. ITC [4] is committed to 'a better, stronger grid'. Additionally, our local IEEE branch also supports our students with educational seminars, scholarship opportunities, and encouragement for student engineers.
Our academic collaboration partnership is with a local community college: Monroe County Community College.
MCCC [5] is an active partner, and many of their students are recipients of the S-STEM scholarships. In Fact, Monroe High School students are enrolled in MCCC for their first two years and then they transfer to LTU for another two years. The grant supports five to ten students (up to $3500/year/student, $20,000/year in total) during the first 2 years at MCCC. After they transfer to LTU, the scholarship is up To $10,000/year for each student. Overall, they are able to receive totally 4 years' scholarship based on financial need. MCCC is fifty miles from LTU, so the success of the program requires travel and extra time devoted to meshing the needs of the two institutions. In fact, the faculty team from both

institutions is at work now on ensuring the continuation of more of these successful collaborations. For example, now we are working to set up a new 2+2+2 (High School+ MCCC+LTU) collaboration model, through which we plan to award Monroe high school students for 2 years, and another 2 years' scholarships at MCCC and finally those students will be able to complete their B.S. degrees in 2 additional years at LTU.

2. Division of Labor for Faculty in the Program

Our ECE department has 3 undergraduate degree programs: electrical engineering [ABET accredited since 1975], computer engineering [accredited since 2004], and embedded software engineering [announced in 2014]. In addition, we have a broad-based master's degree: the Master's in Electrical and Computer Engineering [MSECE]. We have six total full-time faculty. Three are tenure-track, and three are tenured. For survival, all new initiatives have a several diverse faculty. For the S-STEM, the department chair, Philip Olivier, was instrumental in discovering and nurturing the development of the program. A tenure-track faculty, Kun Hua [7] is the main PI, and he was assisted by associate professor Lisa Anneberg, who is very familiar with Michigan and its academic programs.

3. Essential Program Changes or Evolutions, with NSF support

LTU is one of two electrical engineering programs in Michigan with a power or energy concentration. The S-STEM focus is bringing additional students into this essential concentration, and giving some impetus to update and improve the concentration. The MCCC program, Nuclear Engineering Technology, is also increasing in enrollment and their nuclear engineering technologists find employment often far before they graduate. Both MCCC and LTU stress 'theory and practice', so our engineers can 'hit the ground running' with their energy-focused degrees.

4. Focus on Students

The S-STEM scholarship [6] program has had a very favorable impact on our recruitment and retention efforts. The amount of scholarship money is truly wonderful, especially filling in the industrial voids present in Southeastern Michigan. LTU's S-STEM program has also brought energy engineering speakers to campus, brought our students to various field trips. We at LTU think that the S-STEM program is the 'opportunity of a lifetime' [2], not only for our present students, but for the future in our community.

FIG. 1 – LTU S-STEM Scholars, 2014

REFERENCES

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