The Next Challenge in Engineering Education Curriculum Reform– A New NSF Program

Smerdon[1], Ernest T[2]., *[1] Department of Civil Engineering, University of Arizona , USA, Email: smerdon@arizona.edu,[2] Directorate for Engineering , Engineering Education and Centers Division, The National Science Foundation, Email: esmerdon@nsf.gov*

Background. The National Science Foundation has been instrumental in encouraging and supporting engineering education reform in the United States. The NSF actions came about after studies indicated shortcomings in current engineering education. Noteworthy, in 1989 a special blue ribbon task force recommendation led to approval of the NSF coalitions program which is now ten years old. When the program ends in about three years over 50 institutions will have been involved and NSF will have invested over $150 million in the program, all of which will have been matched by the universities.

A follow-up program. This paper will summarize a modest NSF follow-up program for the last two years that has been focused on engineering education curriculum reform. Progress from several 3-year engineering education reform projects, which have been funded in the range of $600,000 total, will be presented.

New NSF Program. The new program at NSF is entitled "The Action Agenda for Engineering Curriculum Innovation" and is topic-centered as opposed to issues-centered. This program is intended to encourage innovative education programs in new, emerging major technology tracks. The goal is to motivate faculty to incorporate the technology developments of our time and those envisioned for the future into the curriculum. Some examples of emerging areas are information technology, nano-technology, micro-electronics/systems, and biotechnology. The program also encourages attention to lifelong learning in engineering and structured early career support as graduates find that their jobs require skills and knowledge beyond what they have received. Each proposal in this new program must be highly focused with a specific set of measurable goals and deliverables. In general, the projects that are funded have a budget of about $500,000 total for its three-year duration..

The view of NSF is that major generic improvements in engineering education are occurring in the U.S. and throughout the world. However, we must continue to encourage the leading engineering faculty who excel in research and scholarly endeavors to become more active in undergraduate engineering education innovation through topic- and research-centered curriculum innovation in emerging areas of engineering. Along this line, NSF is encouraging research-centered curriculum changes through its Combined Research and Curriculum Development program, which will also be discussed.