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Subject: NSF IUSE/Professional Formation of Engineers: Revolutionizing Engineering Departments (RED)
(NSF 14-602)

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The NSF Engineering (ENG) Directorate is launching a multi-year initiative, the Professional Formation of Engineers, to create and support an innovative and inclusive engineering profession for the 21st Century. Professional Formation of Engineers (PFE) refers to the formal and informal processes and value systems by which people become engineers. It also includes the ethical responsibility of practicing engineers to sustain and grow the profession. The engineering profession must be responsive to national priorities, grand challenges, and dynamic workforce needs; it must be equally open and accessible to all.

In FY 2015 the PFE initiative in ENG is launching a pilot program aligned with the IUSE framework: Revolutionizing Engineering Departments (herein referred to as RED), in partnership with the Directorates for Computer and Information Science and Engineering (CISE) and Education and Human Resources (EHR). This funding opportunity enables engineering departments to lead the nation by successfully achieving significant sustainable changes necessary to overcome long-standing issues in their undergraduate programs and educate inclusive communities of engineering students prepared to solve 21st century challenges. Computer science departments, whether administratively located in or outside an engineering program, are included in RED, as they share the same challenges as traditional engineering departments. (Note: "Engineering departments" in this solicitation will refer to engineering and computer science departments.)

In FY 2015, the NSF-wide undergraduate STEM education initiative, *Improving Undergraduate STEM Education (IUSE)*, serves as the framework for all investments in research and development that are critical for curricular improvement in undergraduate STEM education, within formal and informal learning environments. FY2015 IUSE programs call for proposals to:

- use and build evidence about improved STEM instructional practices;
- design and study innovative learning opportunities, including cyberlearning;
- create, implement, and test program, curricular, course, and technology-driven models;
- develop, implement, and test creative approaches for adoption of education research to improve disciplinary teaching;
- develop and validate assessments/metrics for undergraduate STEM learning and instructional practice;
- conduct fundamental research on issues of undergraduate STEM teaching and learning.

The IUSE / Professional Formation of Engineers: Revolutionizing Engineering Departments (RED) Program expects to make 5 to 10 awards pending availability of funds, with the average award size expected to be approximately \$1 million to \$2 million over 5 years. More details can be found at <http://www.nsf.gov/pubs/2014/nsf14602/nsf14602.pdf>. The deadline for **required** Letter of Intent to the NSF is October 28, 2014, with full proposals due November 26, 2014.

A Principal Investigator is allowed only one submission per competition. The Principal Investigator(s) must be a department chair/head (or equivalent) to establish institutional accountability. Additionally, there must be a RED team that includes (at a minimum) an expert in engineering education or computer science education research, who can ground the research plan in the literature, and a social science expert who can evaluate department dynamics and monitor change processes. The social scientist must have expertise to advise on strategies for developing a culture of change and on strategies for creating meaningful collective ownership of the effort among faculty, students, and staff.

This is a limited competition; each institution is limited to two proposals per competition. Please submit your 3-page preproposal (plus budget and CV; all documents in a SINGLE PDF file, 11 point font) by NOON on Monday, October 6, 2014 to limited@unm.edu with the subject line indicating: NSF IUSE 14-602 - your name. No late submissions will be considered. The pre-proposal should address the major points that will be included in the proposal narrative (including: 1) Research plan and the vision for the department; 2) how revolutionary the vision is in light of a well-grounded understanding of the history, context, and culture of the department. (Revolutionary means radically, suddenly, or completely new; producing fundamental, structural change; or going outside of or beyond existing norms and principles); 3) goals of the proposed RED project; 4) a sufficient connection in the proposed project to professional practice; 5) how faculty development is planned and incentivized to build department cultures that support the holistic professional formation of engineers or computer scientists.) The narrative should be accompanied by a **draft budget overview** and an **abbreviated PI CV**. The scoring will be weighted as follows: proposal narrative (70%), draft budget overview (15%), and abbreviated PI CV (15%).

Should you have any questions please feel free to contact Susan De Los Santos (sdelossa@unm.edu or 277-0272) or Monica Fishel (mlfishel@unm.edu or 277-8114).