McCormick
Northwestern Engineering
Northwestern Center for Engineering Education Research

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News

- An NCEER seminar with Lois Trautvetter, of Northwestern's own Higher Education Administration and Policy Program, is scheduled for January 20th, 2012. Prof. Trautvetter will discuss her study of recruitment and retention of women and underrepresented minorities as part of the NSF Prototyping the Engineer 2020 project. Further details including location will be announced.

- INSPIRE, the Institute for P-12 Engineering Research and Learning at Purdue University, recently announced the new Journal of Pre-College Engineering Education Research (J-PEER). It is intended to provide a venue for the growing community of Pre-K – 12 Engineering Education Research. Issues can be found here: http://docs.lib.purdue.edu/jpeer.

- In conjunction with the 2012 NSF EEC Awardees Conference, the Graduate Engineering Education Consortium for Students (GEECS) is providing an opportunity for up to 30 graduate students who are conducting engineering education research to attend a pre-conference seminar on developing research proposals and to participate in the conference. The pre-conference workshop will be March 3 – 4, and the conference March 4 – 6, 2012. Attendees are expected to attend both. For more information and the application form, see here: http://students.asee.org/wp-content/pdfs/GEECS_Application_FINAL.pdf

- A large number of NCEER scholars presented papers at this year's ASEE Conference in Vancouver. Among them are Arthur Felse, Lois Trautvetter, Rob Linsenmeier, Wendy Murray, Jennifer Cole and Xaver Neumeyer, as well as former NCEER member Ann McKenna; a number of our undergraduate REU students were co-authors. To see all the papers, visit http://www.asee.org/search/proceedings, click the Author box, and enter Northwestern in the search field.

Northwestern Joins CIRTL Network

CIRTL is the *Center for the Integration of Research, Teaching and Learning*. It began in 2003 as an NSF-funded Center for Teaching and Learning at the University of Wisconsin, Madison along with two initial partners, Michigan State and Pennsylvania State. Northwestern has been accepted into the CIRTL Network, and activities are gearing up.

The ambitious goal of CIRTL was and is to improve STEM learning of all students at every college and university across the country. By taking such a wide approach, CIRTL also aims to address the problems of minority underrepresentation in STEM fields as well as the overall scientific literacy of the American public. CIRTL's strategy is to use graduate education as the means for growing a national STEM faculty committed to developing and implementing more innovative and effective teaching practices for all kinds of student learners.

This approach is attractive because nearly 80% of STEM faculty receive their PhDs at only 100 doctoral research universities. This relatively small number of universities populates the STEM faculties of several thousand undergraduate institutions in the United States. Therefore, changing how we educate STEM graduate students at these few large research institutions – including training them to think about their teaching as they would their research – is a powerful lever by which to improve undergraduate STEM learning across the entire country.

To further this program, in 2006 CIRTL expanded to become a network of universities, comprising Howard, Michigan State, the University of Colorado Boulder, Texas A&M and Vanderbilt as well as Wisconsin. CIRTL is different at different campuses, but CIRTL institutions are guided by three principles: 1) the establishment of learning communities, 2) learning through diversity, and 3) teaching as research. This intentionally diverse set of research universities was selected to explore how these principles would work in practice across diverse campus cultures, and to see if a cross-network learning community would emerge that would allow future faculty at every institution to benefit from the diversity of the network. Both the local and the cross-network learning communities of the initial 'prototype' CIRTL Network have indeed thrived, and currently serve more than 1,000 STEM future faculty each year.

Yet to have a national impact CIRTL must include a much larger proportion of those 100 research universities. In 2011-2012, CIRTL is therefore making its next leap in growth, from 6 to 25 institutions, an expansion that builds on the lessons of the prototype network.

Northwestern, in an effort spearheaded by NCEER and the Searle Center for Teaching Excellence, supported by the Graduate School, has been admitted as one of these new Core Institutional Members. Northwestern joins 18 other new members, including Cornell, Johns Hopkins, Purdue, Michigan and UCSD. Among the benefits to McCormick will be access to future faculty education programs for graduate students and postdocs, and resources including seminars, evaluation tools, online short courses and the opportunity to collaborate with the other network institutions.

Of course, an expansion of this scale requires new resources; therefore one of the first collaborative projects will be to craft an NSF proposal funding a transition period of five years, after which the network will be supported internally by contributions from each member institution.

The new CIRTL Network met in person for the first time in Madison in October. This meeting was be preceded by the two-day CIRTL Forum, a conference on STEM graduate education open to all, including non-CIRTL members. Rob Linsenmeier, Joe Lampert (Searle Center), Simon Greenwold (Graduate School), Xaver Neumeyer (grad student in ME) and Greg Dam (Postdoc from SESP) represented Northwestern.

NCEER will continue to provide updates and notices of opportunities to benefit from this exciting new collaboration, but if you are especially interested, please contact Rob Linsenmeier or Joe Lampert

For more on CIRTL and its expansion, visit http://www.cirtl.net/expansion.

BER REU – Outreach Projects and Renewal Proposal

The Bioengineering Education Research REU program completed the second of its three planned summers in 2011, again hosting nine students across three sites (Northwestern, Vanderbilt and the University of Texas). Each of these students worked on a project in engineering education with a faculty mentor. A substantial number of the projects this year concerned K-12 outreach; in particular, two of the four projects here at Northwestern were outreach.

The first, led by Prof. Suzanne Olds, was for the Science Club program, an NIH-funded after-school science education program in partnership with the McCormick Boys and Girls Club of Chicago. The Club is located in Chicago's Uptown neighborhood and serves middle-school students from the

neighborhood, many from under-privileged backgrounds. Science Club is designed as an academic year after-school activity that pairs the students with Northwestern graduate student and post-doc mentors in an ongoing mentoring relationship, encouraging the students to become interested in science and consider a career in it.

Over the past two summers, BER REU students helped develop week-long units in environmental science, acoustics, medical diagnostics, and nutrition and food science. In all cases, the main point is to teach students to think critically and scientifically, and encourage them to realize how science and engineering impact our lives. The latter two projects, done in 2011, also attempted to expose students to important facts about health and healthy lifestyles. For more information, or to learn how our students can become involved as mentors, visit http://scienceclub.northwestern.edu/.

In the second outreach project at Northwestern, Prof. Eric Perrault and his REU student developed educational materials for a middle school outreach program called Cyber-physical Applications for Rehabilitation and Education (CARE). Initiated in 2010, the goal is to enhance educational outcomes in science, math, technology and communication through a guided, challenge-based curriculum focused on the use of robotics in rehabilitation. In its first year, the project was geared towards high-achieving students. The goal this year was to expand its applicability to a broader range of students and to provide instructional materials that can be implemented by their teachers.

The BER REU will have its third and possibly final summer in 2012. However, the team led by Prof. Linsenmeier has recently submitted a renewal proposal to the NSF for another five years. If successful, the program would continue through 2017! If you are interested in becoming a mentor next summer, contact Rob Linsenmeier or Mark Bourgeois. For more information about the REU, visit http://ber-reu.northwestern.edu.

If you have any engineering education news to share please send it to Mark Bourgeois at m-bourgeois@northwestern.edu for inclusion in the next NCEER newsletter. We are always interested in learning more about any awards you have received, projects that have been funded, results from your research, or any other news that would be of interest to the community.

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