

## Guest Editorial

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THIS special issue of the *International Journal of Engineering Education (IJEE)* is providing a forum for recipients of the National Science Foundation Instrumentation and Laboratory Improvement Program (NSF-ILIP) grants to disseminate successes of their particular projects to the engineering and technology community at large. These papers focus on a broad range of topics, from using computers in the laboratory to advanced process instrumentation. The overall theme is to innovate the experimental experience for undergraduate students.

The NSF-ILIP supports the development of new experiments and laboratories, with the objectives of improving the education of undergraduate students in science, mathematics, engineering and technology (NSF publication no. 94-160). The NSF supports projects for the development of innovative methods for using laboratory equipment and exercises to improve student understanding and learning of the basic principles, and for use of modern instrumentation, new technologies, or new applications for instruments, that extend the instructional capability of equipment. The ILIP aims to improve laboratory instruction nationally as well as at specific project sites. Accordingly, it seeks projects that will produce models for improvement of instructional undergraduate laboratories.

Currently, there are two types of programs: (i) Instrumentation Projects to provide instrumentation and improve laboratory instruction, and (ii) Leadership in Laboratory Development Projects to support national models for fundamental reform and improvement of laboratory instruction. The Instrumentation Projects, which last for 2 years, provide matching grants in the range of \$5000-100,000 for instrumentation (equipment and related items) only. Awards are made in smaller numbers to the Leadership Projects that allow for expenditures in categories other than equipment, e.g. faculty time, travel, expendibles, in addition to laboratory equipment.

Project principal investigators are asked to disseminate the results of their work through journals, such as this, presentations at scientific/technical meetings, electronic networks and media, published laboratory manuals, experiments or software. This special issue of the *IJEE* provides a vehicle for successful project dissemination.

This special issue not only describes results of various projects, but is in reality a report of a major venture between the Division for Experimentation and Laboratory-Oriented Studies (DELOS) of the American Society for Engineering Education (ASEE) and the NSF. The history of this venture is of prime importance to the dissemination effort and has been a successful model for other professional organizations to follow.

In 1985 Dr Robert Watson and his directorate, assisted by Dr Edward Ernst, initiated the ILIP, then known as the College Science Instrumentation Program. The first request for proposals (RFPs) was issued that year and C. Stewart Slater was one of the 234 successful grantees. As his project focused on the innovative field of advanced separation processes, he sought a way to tell other educators about his work. At a DELOS session at the 1986 ASEE Meeting in Cincinnati, Ohio, Dr Slater presented his paper and invited Dr Watson to speak about the program. Spurred on by both the increased number of awards and desire for greater involvement of DELOS in the program, plans were made for several sessions at the 1987 ASEE meeting in Reno, Nevada. Drs John Rudzki and Anita LaSalle were the NSF Program Directors during that period. Three symposium sessions were dedicated to awardee participation, and it was impossible to accommodate all those who wanted to attend. Additionally, there was no unifying way to bring all ILI principal investigators together with interested faculty since sessions were spread out over 3 days and future ASEE conference scheduling was a concern.

A concept was developed by the DELOS officers, Lawrence Genalo, Edward C. Roche, Jr and C. Stewart

Slater, to develop a poster session format that would (i) accommodate the larger number of Principal Investigators eligible to participate, (ii) bring all participants together with each other and with the NSF Program Directors and (iii) provide attendees with a greater chance to examine in detail these projects and interact directly with participants and also the facilitators. In essence, a vehicle for more effective technology transfer was developed. A separate symposium session would be utilized to highlight innovative projects and would complement the poster sessions. The 1988 Portland meeting was the first to use this format and was a success with 20 posters and, most importantly, a large session attendance.

This successful format was duplicated and enhanced at successive meetings: 1989, Lincoln, Nebraska; 1990, Toronto, Ontario; 1991, New Orleans, Louisiana; 1992, Toledo, Ohio; 1993, Champaign-Urbana, Illinois; 1994, Edmonton, Alberta; and 1995, Anaheim, California. Each year the number of presenters has grown, but more importantly the attendance of interested faculty and interested equipment manufacturers and suppliers at these sessions has increased. At the 1994 conference 54 presenters participated in the poster session. The team of Genalo, Roche and Slater are constantly confronted with the task of more papers to review and accommodating them at the conference. Electronic mail is now utilized to contact ILI Principal Investigators and solicit papers. Since all papers that appear in the ASEE conference proceedings are peer-reviewed, the conference committee starts its work early each academic year with a review of solicited abstracts by e-mail.

The Division of Undergraduate Education at the NSF is currently headed by Dr Robert Watson. Many rotating Program Directors have been involved with the ILI program. During the period 1985-1995 under the successful direction of Drs John Rudzki, Anita LaSalle, George Peterson, James Harris, Karen Frair, Patricia Daniels, and currently Norman Fortenberry, the NSF-ILIP has grown from an initial \$5 million to the current level of \$21 million.

The papers included in this special issue represent ILI projects presented to ASEE meetings. Each participant was invited to submit a revised or updated version of their presentation. These papers were then further subjected to the stringent review process of this journal. The effort expended in developing this phase of the dissemination program has been extensive, but well worthwhile.