

Guest Editorial

The rise of the dot.com boom in the late 1990's saw the creation of literally thousands of high-tech ventures. A few, such as Yahoo, eBay, and Google, have been wildly successful. Most failed, stimulating the explosive rupture of the dot.com bubble. It was in the wake of this crash that the American Society for Engineering Education founded its Entrepreneurship Division to support the small cohort of engineering entrepreneurship programs and foster the creation of new programs around the world. All over the globe, universities began entrepreneurship programs for engineers and scientists in hopes of generating the next Jerry Yang or Larry Page. Programs such as Stanford's Technology Ventures Program were active before the dot.com boom. Most of these early programs were very entrepreneurial in their development, blending student demand for such content with instructor interest in creative opportunities for entrepreneurial study.

Here we are now in 2005, several years after the dot.com crash. Engineering entrepreneurship programs have diffused broadly around the world, mimicking the successful innovations these programs seek to spawn. Each program is uniquely designed for the context in which it exists. What might be a tremendously successful programmatic implementation at Brown University in the United States, the university in Helsinki, Finland has developed a substantially different program with a cross university collaboration between engineering, design, and economics. Though different, these programs are unified in their goal to develop entrepreneurial skills in engineers and scientists. Many of these programs, both fledgling and mature, have been assisted by a few private foundations and government agencies. These groups have been critical in providing the funding and support to spark the creation of new programs and ensuring the survival of mature programs. The National Collegiate Innovators and Inventors Alliance and the National Science Foundation in the United States along with the European Union's 6th Framework are significant examples of institutions that are investing in engineering entrepreneurship programs of teaching and research. These agencies see the development of entrepreneurial engineers and scientists as essential elements in maintaining the global engine of innovation. Not designed to be an overnight success, these programs have been building momentum over time, many with their first graduates stoking the fires of value creation, either by driving innovation at their existing firms or at start-up companies of their own creation.

This special issue of the International Journal of Engineering Education presents a representative mix of programs and philosophies. We begin with a few philosophical papers from opposite sides of the world, with Dr. David Radcliffe from University of Queensland proposing that entrepreneurship is an essential attribute of any engineering student. Then Dr. Laurence Gebhardt of the Idaho Technology Corridor asserts that all engineers can and should be entrepreneurs and innovators. Some of the programs are just starting, such as the novel Entertainment Engineering Program at the University of Nevada-Las Vegas. Others represent mature programs with the beginning of significant assessment results such as the Enterprise Program at Michigan Tech or the Technology-Based Entrepreneurship program at Brown University. Many engineering entrepreneurship programs have their roots in the mechanical engineering design curriculums, such as the Invention and Innovation Course at the University of Colorado at Boulder run by Drs. Lawrence Carlson and Jacquelyn Sullivan. Other programs introduce notions of entrepreneurship and innovation to engineering fields not traditionally seen as entrepreneurial, such as Dr. Kwok-wing Chau's blending of design and innovation in civil engineering. Many programs make extensive use of E-Teams, which are entrepreneurial teams of engineers based on curricular models advanced by NCIIA (www.nciia.org). Dr. Asbjorn Osland and his colleagues at San Jose State, in Silicon Valley, share their extensive insights from utilizing E-Teams. Many entrepreneurship programs form as collaborations between business and engineering faculty. Drs. Ed Leach and Timothy Little relate their experiences in evolving a world class entrepreneurship curriculum at Dalhousie University in Nova Scotia.

Each of these submissions provides insight into the nature of entrepreneurial education for engineering students. The myriad of perspectives will allow the reader to tailor the various approaches to assist them in starting or improving an engineering entrepreneurship program. Entrepreneurial skills are fast becoming as necessary to the engineering student as integral calculus. Inherent in the vision of these programs is the desire to empower their students to create long term economic value on a global scale.

It has been a pleasure working with these authors and Dr. Michael Wald in the preparation of this special issue. The authors and editors have been patient and worked hard to create this masterful compilation of entrepreneurship education research, which will both inspire and assist you in improving your own engineering education programs. This issue brings together insights for new and innovative programs, making this publication the first of its kind. I proudly present to you the first entrepreneurship education special issue, which I know will be instrumental in building and maintaining a strong community of international engineering educators for the 21st century.

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