Teaching Statements

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Teaching at a major university has several aspects. In addition to introducing new insights into teaching service and required classes, we need to design new courses that bring the state-of-the-art materials to the classroom; we need to build our research team to provide research-oriented students with an environment for creative thinking and for potential collaboration. Of course, we need to advance our own research in order to make all this possible.

Since 1991, I have designed several new courses to enhance the Computer Science program, the Scientific Computation program, and other interdisciplinary studies such as Algorithmic Game and Economics Theories, at Boston University, UIUC, the University of Minnesota, and MIT.

My own research experiences have taught me the value of interdisciplinary education. I have benefited greatly from my collaborators from Scientific Computing, Operations Research, and Game Theory. My goal is to bridge the educational gap between these disciplines, and to promote interdisciplinary appreciation, research, and studies among undergraduate and graduate students. Achieving this goal has always been a challenging but rewarding task for me. As a theorist who cares about the practical impact of mathematical and algorithmic work, one of my goals is improve and promote the education of Theoretical Computer Science. In addition to providing students with the fundamental theories of algorithm design and complexity analyses, I make it my mission to provide illustrations of real-world applications so that students can see direct connections between theory and practice.

During the past fifteen years, I have taught a broad spectrum of undergraduate courses in Computer Science and Applied Mathematics. They include Algorithms, Programming Languages, Scientific Computing, Applied Linear Algebra, Calculus, Differential Equations, Computational Geometry, Cryptography and Network Security.

The following are some examples of new graduate and upper-undergraduate level courses that I have designed and introduced.

Algorithms for the New Age.
Computational Geometry and Scientific Computing.
Topics in TCS: Internet Research Problems — From Akamai Experiences
(with Tom Leighton, Bruce Maggs, and Ravi Sundaram).
Spectral Graph Theory and Applications.
Cryptography and Network Security.
High Performance and Parallel Scientific Computing.
Parallel Scientific Computing.
The Probabilistic Method and Applications.
Geometric Methods and Algorithms.

In addition, with Alan Edelman and Rob Schreiber, I designed and taught a MIT Summer Professional Program 6.50s "A peek at parallel processing from an application perspective". This program attracted professionals from industry, government research labs and universities. Such a program not only helps professionals keep pace with state-of-the-art developments in this field, but it also helps to initiate collaboration between universities and industry.