Seminar Announcement

The Missing Basics: What Engineers Don't Learn and Why They Don't Learn It

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Date: 29 June 2009, Monday
Time: 3 pm
Venue: LT1 (Lecture Theater), FoE
Host: Assoc Prof Vladan Babovic

The talk begins by inquiring what graduating undergraduate engineering students are unable to do when as seniors they are asked to solve real-world problems in an industrial-sponsored and project-based senior design course. It answers by listing seven qualitative thinking skills essential in engineering design and problem solving (questioning, labeling, qualitative modeling, empirical inquiry, visualization and ideation, and communication) and asks how it is possible that such fundamental skills are so lacking at the end of a supposedly modern engineering education. The talk answers this question by briefly reviewing the history of how the engineering education got to its current state following World War 2 and considers the missed revolutions (quality, entrepreneurial, and IT) of the modern academy since that time.

In the face of growing recognition of a problem, the talk asks why things haven't changed much, especially in the light of the issuance of many plans and substantial funding of curriculum reform. The talk suggests that the primary problems are organizational and identifies the difficulty of changing the curriculum as an academic NIMBY (not in my backyard problem) in that faculty members generally support reform but logroll with their colleagues to prevent changes to their own courses. The result is a system locked into the status quo with only the most modest changes at the margins.

An initiative to overcome these organizational difficulties at the University of Illinois is discussed, the Illinois Foundry for Innovation in Engineering Education (iFoundry). iFoundry's systems design is briefly presented, highlighting the need for an interdepartmental curriculum incubator that permits change at the same time it respects faculty governance. The three-part conceptual decomposition of a balanced curriculum is discussed in the 3Space proposal that considers a creative-era engineering curriculum in ThingSpace, ThinkSpace, and FolkSpace. Other early initiatives and experiences of iFoundry are surveyed. Finally, the importance of working with other schools in a more collaborative way is emphasized, and the talk closes with a discussion of the Olin-Illinois Partnership (OIP) and a larger Alliance for Promoting Innovation in Engineering Education (APIE2).

About the speaker

David E. Goldberg, a leader in the field of genetic algorithms, is the Jerry S. Dobrovolny Distinguished Professor in Entrepreneurial Engineering at the University of Illinois at Urbana-Champaign. He is also co-founder and chief scientist of ShareThis Inc., a web2.0 startup company. Trained as a civil engineer at the University of Michigan, where he earned his B.S.E. and took his Ph.D. in 1983, Dr. Goldberg has held positions at Michigan, Alabama, and Illinois. He is co-chair of the inaugural and 2nd Workshop on Philosophy and Engineering (TUDelft & the Royal Academy of Engineeirng), and he was recently name co-director the Illinois Foundation for Innovation in Engineering Education. Among many honors, he is the recipient of a National Science Foundation Presidential Young Investigator Award, a Wickenden Award presented by the American Society for Engineering Education, and an Outstanding Instructor Award presented by the National Technological University . In addition to articles in professional journals, he is the author of two books on genetic algorithms, the widely-cited Genetic Algorithms in Search, Organization, and Machine Learning (1989) and The Design of Innovation (2002), and, most recently, The Entrepreneurial Engineer, which was published in 2006 by Wiley.