

Studies at the Interface: Engineering Education as a Field of Research

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The engineering education research community is growing rapidly through the emergence of PhD granting programs in the US (Purdue, Virginia Tech, Utah State, Clemson, Carnegie Mellon, and Arizona State) and Europe, India, Malaysia, and Mexico. Also, several universities have established Centers that emphasize engineering education research, including the University of Washington, Colorado School of Mines, Ohio State University, Washington State University, Michigan State University, and others.

In 2004, the National Science Foundation sponsored three projects to build capacity in engineering education research: Rigorous Research in Engineering Education: Creating a Community of Practice (RREE) [DUE-0341127], Strengthening HBCU Engineering Education Research Capacity, [HRD-0411994], and the Institute for Scholarship in Engineering Education (ISEE), an element of the Center for the Advancement of Engineering Education [ESI-0227558]. These programs attracted tremendous interest, with participant applications outweighing available slots by a ratio of approximately 3 to 1. The engineering education research communities that RREE and ISEE helped to foster have expanded and now have global reach. Capability building has also been aided by the creation of Engineering Education Research Centers and PhD-granting departments of Engineering Education at several US and international institutions.

NSF recently funded a new project to continue and expand the work done by RREE and ISEE. *Expanding and sustaining research capacity in engineering and technology education: Building on successful programs for faculty and graduate students* (DUE-0817461) broadens the Community of Practice (COP) model successfully used to develop the RREE and ISEE programs.

This seminar provides a personal perspective from the speaker who started his career as a materials processing engineering researcher and became an engineering education researcher, and who has been deeply involved with the emergence of engineering education as a field of research.



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Karl has been actively involved in engineering education research and practice for over forty years. He is in phased retirement as Morse–Alumni Distinguished Teaching Professor and Professor of Civil Engineering at the University of Minnesota and is Cooperative Learning Professor of Engineering Education, School of Engineering Education, at Purdue University West Lafayette, where he is helping start the engineering education PhD program. His research and development interests include building rigorous research capabilities in engineering education; the role of cooperation in learning and design; problem formulation, modeling, and knowledge engineering; and project and knowledge management. He is a Fellow of the American Society for Engineering Education and past Chair of the Educational Research and Methods Division. He has served as PI and Co–PI on several NSF funded projects including two NSF Centers for Learning and Teaching (CLT). He was Co–PI on an NSF CCLI National Dissemination grant entitled "Rigorous Research in Engineering Education: Creating a Community of Practice" and is currently Co-PI on an NSF CCLI Phase III project, "Expanding and sustaining research capacity in engineering and technology education: Building on successful programs for faculty and graduate students." Karl has worked with thousands of faculty all over the world on pedagogies of engagement, especially cooperative learning, problem-based learning, and constructive controversy. He has authored or co-authored eight books including *How to Model It: Problem Solving for the Computer Age*, *Active Learning: Cooperation in the College Classroom*, 3rd Ed., *Cooperative learning: Increasing college faculty instructional productivity*; *Strategies for energizing large classes: From small groups to learning communities*; and *Teamwork and project management*, 3rd Ed. His Bachelor's and Master's degrees are in Metallurgical Engineering from Michigan Technological University and he holds a Ph.D. in Educational Psychology from the University of Minnesota.