

***Joint Industrial Engineering/Mechanical Engineering/Electrical and Computer
Engineering Grad Seminar 056:191/058:191/055:191***

CCAD Graduate Engineering Seminar Series

**“On the Semi-Automated Design of Power Conversion Components and
the Pursuit of the Pareto-Optimal Front”**

Presented by

**Prof. Scott D. Sudhoff
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Abstract: The availability of engineering time and talent has always been limited, but is particularly so today in the realm of power conversion equipment such as inductors, transformers, and electric machinery. A long term decline in the power engineering workforce has intersected with upsurge in global need. As a result, there is intense interest in developing semi-automated design codes. This presentation begins by reviewing semi-automated component design. This review originates with the formulation of the design problem as an optimization problem, and then considers the solution to this optimization problem through the use of evolutionary computing. Next, design optimization in the presence of multiple objectives is considered. The desired result is the Pareto-optimal front – a set of designs which constitute the best tradeoff between competing objectives. These issues are explored in the context of a variety of power engineering components including power inductors, transformers, and rotating electric machinery. Finally, some recent research results in semi-automated design and evolutionary computing are presented. These results include a new solution to mini-max optimization problem, as well as a new method for design in the presence of uncertainty.

BIO: Scott D. Sudhoff received the B.S. (highest distinction), M.S., and Ph.D. degrees in electrical engineering from Purdue University in 1988, 1989, and 1991, respectively. From 1991-1993, he served as a consultant for P.C. Krause and Associates in aerospace power and actuation systems. From 1993 to 1997, he served as a faculty member at the University of Missouri - Rolla, and in 1997 he joined the faculty of Purdue University where he currently holds the rank of full professor. In 2007, he also began working for Temeku Technologies in the area of shipboard degaussing systems.

Professor Sudhoff has worked on Navy related research for over 15 years in electric machinery, drives, and power electronics based distribution systems. His research sponsors include the Naval Surface Warfare Centers, Naval Sea Systems Command, and Office of Naval Research.

He has over 60 journal publications, 75 conference publications, and a graduate level text book in electric machinery. He has authored or co-authored five prize papers. In 2006, he won the IEEE Power Engineering Society Cyril Veinott Electromechanical Energy Conversion Award for outstanding contributions to the field of electromechanical energy conversion. He has served as Editor in Chief of IEEE Transactions on Energy Conversion since 2007. In 2008, he became an IEEE Fellow.

His interests include electric machinery, power electronics, marine and aerospace power systems, applied control, power magnetics, and evolutionary computing. Much of his current research focuses on genetic algorithms and their application to power electronic converter and electric machine design.

Thursday, November 19th
3:30-4:20 pm
1505 Seamans Center

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