

**THURSDAY  
APRIL 6, 2006**

**Scaife Hall Auditorium  
Room 125**

**4:00 PM  
Refreshments—3:30 PM**



**DAVID PERREAULT**  
**MIT**

David Perreault received the B.S. degree from Boston University and the S.M. and Ph.D. degrees from the Massachusetts Institute of Technology, all in Electrical Engineering. He is presently the Emanuel E. Landsman Associate Professor of Electrical Engineering and Computer Science at the Massachusetts Institute of Technology. His research interests include design, manufacturing, and control techniques for power electronic systems and components, and in their use in a wide range of applications. Dr. Perreault received the Richard M. Bass Outstanding Young Power Electronics Engineer Award from the IEEE Power Electronics Society, the ONR Young Investigator Award, and the SAE Ralph R. Teetor Educational Award, and has co-authored two IEEE prize papers in the area of power electronics.

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For more information:  
<http://www.ece.cmu.edu/seminar>

## IN SEARCH OF POWERFUL CIRCUITS: DEVELOPMENTS IN VERY HIGH FREQUENCY POWER CONVERSION

Electrical energy is the cornerstone of our technological infrastructure, and its use pervades our society. Energy-processing circuits (or power electronics) are central to our ability to efficiently create, manipulate, and utilize electrical energy. Advances in this area are becoming vital, both for addressing the growing energy challenges we face and for extending our control over the world around us. A challenge of particular importance is the miniaturization of power circuits. Likewise, advances in the performance of power electronics (including efficiency, control bandwidth, and operating range) are essential to reducing energy consumption and increasing functionality in myriad applications.

This talk describes ongoing research at MIT that seeks to address the twin challenges of miniaturization and performance of power electronics. New system architectures, circuit topologies, and control methods are introduced that enable dramatic increases in switching frequencies (e.g., into the VHF range of 30-300 MHz). Higher frequencies are desirable because they reduce energy storage requirements, but necessitate circuit designs that either compensate for or utilize device parasitics. New types of power passive networks and integrated components that scale well to small sizes and high frequencies will also be introduced. Experimental results from power converters operating at frequencies of up to 100 MHz will be presented to illustrate these emerging technologies.