

**THURSDAY**  
**APRIL 15, 2004**

**Scaife Hall Auditorium**  
**Room 125**

**4:00 PM**  
Refreshments—3:30 PM



## **Eytan Modiano**

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Eytan Modiano received his B.S. degree in Electrical Engineering and Computer Science from the University of Connecticut at Storrs in 1986 and his M.S. and PhD degrees, both in Electrical Engineering, from the University of Maryland, College Park, MD, in 1989 and 1992 respectively. He was a Naval Research Laboratory Fellow between 1987 and 1992 and a National Research Council Post Doctoral Fellow during 1992-1993 while he was conducting research on security and performance issues in distributed network protocols.

Between 1993 and 1999 he was with the Communications Division at MIT Lincoln Laboratory where he designed communication protocols for satellite, wireless, and optical networks and was the project leader for MIT Lincoln Laboratory's Next Generation Internet (NGI) project. He joined the MIT faculty in 1999, where he is presently an Associate Professor in the Department of Aeronautics and Astronautics and the Laboratory for Information and Decision Systems (LIDS). His research is on communication networks and protocols with emphasis on satellite, wireless, and optical networks.

*For more information:*  
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# CROSS-LAYER CONTROL IN WIRELESS AND SATELLITE NETWORKS: SCHEDULING, ROUTING, AND POWER ALLOCATION

In this talk we will describe algorithms for resource allocation in satellite and wireless networks that attempt to optimize network performance across multiple layers of the protocol stack. We will discuss the problems of routing and scheduling in a multi-beam satellite systems. These include power and rate allocation for time-varying channels for maximizing data throughputs and (delay) optimal packet scheduling algorithms. In both cases we show that the optimal algorithm must take into account both the physical layer channel conditions as well as the network layer buffer occupancies.

While motivated by satellite networking, much of our work is directly applicable or can be extended to wireless networks. As an example, we will discuss the problem of joint routing and power allocation in a wireless network to maximize network throughput.

Finally, we will also discuss the problem of energy allocation for communication satellites and provide a dynamic programming algorithm for optimal energy allocation for data transmission over a fading channel with deadline constraints.