



**The Center for Control, Dynamical Systems, and Computation  
University of California at Santa Barbara  
Fall 2008 Seminar Series  
Presents**

## **The nonlinear dynamics of complex networks: from highway traffic to olfactory neurons**

**Gabor Orosz  
UC Santa Barbara**

**Friday, October 24, 2008 3:00-4:00pm Webb 1100**

---

### **Abstract:**

We use networks every day when browsing the internet or commuting to work by the road network. Our body also contains networks, for example the most advanced neural network on Earth, the human brain. In order to regulate these networks (e.g., control traffic to avoid congestion; control neural networks to treat diseases) it is crucial to understand their dynamics that are highly nonlinear. I will focus on two specific challenging problems: (i) the mechanism of traffic jam formation on highways with an eye to the roles of reaction time-delays; (ii) neural coding via winnerless competition of partially synchronized cluster states in olfactory systems. I will address these problems by using recently developed methods of bifurcation theory that allow me to map out the emergent dynamics: global phenomena that are originated in local characteristics.

### **About the Speaker:**

Gabor Orosz received his MSc in Applied Physics from the Budapest University of Technology and Economics, Hungary in 2002. He was awarded a PhD in Applied Mathematics with Special Honor by the University of Bristol, UK in 2006. He held a postdoctoral position at the University of Exeter, UK before he arrived at UCSB. His research interests are in the nonlinear dynamics of complex networks and related control algorithms with an eye to the roles of information delays. Specifically, he is interested in applications like highway traffic and neural networks.

---