



# Fall 2011 Colloquium

## Temple University

### Computer and Information Sciences

#### *MAC and Swarming Protocols for Underwater Networks*

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**Wednesday, 11/9, 3pm, Wachman 447**

**Abstract:**

In this talk, I will describe two research topics in the context of underwater networks.

First, I will argue that several ideas taken from medium access control (MAC) protocols for RF networks, including exclusive channel access, are either unnecessary in acoustic networks or must be redefined. I will present a time-based MAC protocol termed UW-FLASHR which does not require centralized control, tight clock synchronization, or accurate propagation delay estimation. I demonstrate, via simulation, that UW-FLASHR can achieve significantly higher channel utilization than the maximum utilization possible with existing time-based exclusive access MAC protocols.

Second, I will describe a bio-inspired swarming algorithm to control a swarm of autonomous underwater vehicles (AUVs). A swarming algorithm defines a set of rules which a group of autonomous vehicles follow to interact locally with other proximal vehicles without any centralized control. In particular, I will describe the covert leadership problem where a small subset of AUVs, whose identities remain covert, in a swarm possess destination information to guide the movement of the entire swarm. I will demonstrate the effectiveness of the swarming algorithm via simulations/animations.

**Bio:**

Chien-Chung Shen (cshen@cis.udel.edu) received his B.S. and M.S. degrees from National Chiao Tung University, Taiwan, and his Ph.D. degree from UCLA, all in computer science. He was a research scientist at Bellcore (now Telcordia) Applied Research working on control and management of broadband networks. He is now an associate professor in the Department of Computer and Information Sciences of the University of Delaware. His research interests include ad hoc, sensor, and underwater networks, dynamic spectrum management, control and management of broadband networks, distributed object and peer-to-peer computing, and simulation. He is a recipient of NSF CAREER Award, and his research has been supported by NSF, Army Research Lab, Navy SPAWAR, NASA, RAND, and industrial companies.