

The 22nd Wallace Lecture in Ocean Sciences and Engineering

Acoustic Communications and Underwater Networks



Milica Stojanovic

Associate Professor

Electrical and Computer Engineering

Northeastern University

on Friday, May 4th at 3:30pm in 3-270

Wireless information transmission is an enabling technology for the development of future ocean-observation systems, with applications ranging from climate recording and aquaculture to oil-field monitoring and coordinated missions of autonomous underwater vehicles. Typically established by acoustic waves, underwater communications are governed by three factors: limited, distance-dependent bandwidth; time-varying multipath propagation, and low speed of sound. Together, these factors result in a propagation medium that is often said to be the most difficult communication channel in use today. In this presentation, we overview the channel characteristics and outline the signal processing methods that led to the development of first high-speed acoustic modems, as well as those that are the subject of on-going research. We then discuss underwater acoustic networks and the challenges involved in their design. The performance of various techniques is illustrated through experimental results, which include transmission over varying distances and in varying conditions of mobility, and include the highest bit-rates demonstrated to date. We conclude by outlining the open research problems.

The annual Wallace lecture program has been made possible by a gift from Mr. and Mrs. A. H. Chatfield, in honor of Mrs. Chatfield's father, Robert Bruce Wallace, MIT 1898. As president of the American Ship Building Company, Mr. Wallace made major contributions to develop inland waterway shipping. This generous gift provides funding for the Robert Bruce Wallace Academic Prize and the Lecture Series. The academic prize consists of a stipend and a year's full tuition at MIT awarded to a student in the Area of Ocean Science & Engineering in the Department of Mechanical Engineering who has shown excellence in scholarship in Ocean Engineering and leadership in student affairs. The annual Lecture Series is presented by an eminent figure in the marine community.

Reception to follow in 1-236.

Please contact Tony Pulsone at pulsone@mit.edu with any questions.