The University of Alabama
Department of Computer Science
Colloquium Series Speaker

Dr. Fei Hu
Associate Professor
Department of Electrical and Computer Engineering
University of Alabama

Secure Time Synchronization in Underwater Sensor Networks

Friday, September 19th
11:00 a.m., EE 110

Abstract:
Under-water Wireless Sensor Networks (UWSNs) have important applications in ocean exploration and lake pollution monitoring. UWSNs use "acoustic" media to achieve sensor communications. They are essentially different from terrestrial "radio" sensor networks due to its highly variable, long propagation delay and mobility nature. Clock synchronization is an important protocol to achieve timing-based sensor communications. This talk will present a three-dimensional, scalable UWSN time synchronization scheme that can achieve both horizontal (i.e. in the same water depth) and vertical (i.e. from lake bottom up to the surface) clock synchronization. Our synchronization can overcome the effects of long acoustic delay in UWSN. On the other hand, it is necessary to secure UWSN clock synchronization services because malicious people (especially in navy monitoring applications) can use network attacks to mislead water monitoring operations. In this talk, we will focus on "insider" instead of "external" attacks. We will propose a two-step security UWSN synchronization model - (1) correlation test; (2) statistical reputation & trust model, to detect "outlier" timestamp data and identify nodes generating "insider" attacks that are different from "external" attacks due to the complete keying material disclosure in the insider attack events.

Bio:
Dr. Fei Hu is an associate professor in the Department of Electrical and Computer Engineering at the University of Alabama, Tuscaloosa, AL, USA. His research interests are wireless networks, wireless security and their applications in Bio-Medicine. His research has been supported by NSF, Cisco, Sprint, and other sources. He obtained his first Ph.D. degree at Shanghai Tongji University, China in 1999, and second Ph.D. degree at Clarkson University, USA in 2002, all in the field of Electrical and Computer Engineering. He has published over 100 journal/conference papers and book (chapters). He is also the editor for over 5 international journals.