

BCWS Seminar Series

Secure Localization in Wireless Sensor Networks

by

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Place: Room ME 4356, Mackenzie Building, Carleton University

Abstract: In ad-hoc networks and wireless sensor networks (WSNs), several routing algorithms rely on a network's nodes ability to know their own geographic location and the geographic locations of other nodes. This requirement is commonly referred to as the *localization problem*. When WSNs are deployed in hostile environments, many attacks happen (e.g., wormhole, sinkhole and Sybil attacks). Such attacks make secure localization of unknown nodes in a WSN an important research subject. In this presentation, we will first briefly present the common attacks against localization and survey the state-of-the-art in secure localization. In particular, two scenarios pertaining to the secure localization of unknown nodes will be discussed: (i) The attackers may disguise as or attack unknown and anchor nodes to interfere with the localization process, and (ii) the attackers may forge, modify or replay localization information to make the estimated positions incorrect. Then, we will present the evil ring attack, an attack on the geographic location algorithms of Garcia-Alfaro *et al.* that misleads nodes about the true position of their neighbors. Finally, we will introduce and analyze an evil ring attack detection algorithm.

Biography: Wei Shi is an assistant professor in the Faculty of Business and Information Technology in the Game Development and Entrepreneurship program, University of Ontario Institute of Technology (UOIT), and an Adjunct Professor in the School of Computer Science, Carleton University. Prior to joining UOIT, Wei obtained a Bachelor's of Engineering in Computer Science and Computer Engineering from the Harbin Institute of Technology, China. She then worked in Beijing for the China Information Security Center and for Beijing Founder Order Computer Systems. She arrived in Ottawa in August 2002 and obtained a Master's degree in Computer Science from Carleton University in December 2003. Her Master's research addressed object-oriented software engineering and feature modeling. She then worked, under the supervision of Dr. Nicola Santoro, on the "Black Hole Search" problem, and obtained her Ph.D. in May 2006. Dr. Shi's research interests are in Distributed Systems, Mobile Computing, Vehicular Networks, and Cognitive Modeling and Artificial Intelligence in the context of Gaming. Her research is supported by the Natural Sciences and Engineering Research Council of Canada (NSERC) and IBM.