



Rochester Joint Chapter of the IEEE Computer and Computational Intelligence Societies

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presents

PHY-Layer Encryption and Modulation Obfuscation: Challenges and Solutions

by

Dr. Hanif Rahbari

Assistant Professor in the Department of Computing Security at RIT

Date: Wednesday, March 28, 2018

Time: 4:30 p.m. to 5:25 p.m. Presentation

Location: RIT Campus, Louise Slaughter Hall - Bldg 78, Room 2120

Computer Society announcements and venue information:

<http://ewh.ieee.org/r1/rochester/computer>

Cost: Free. Open to IEEE members and non-members.

Note: This event is part of the IEEE Rochester Section's Joint Chapters Meeting (JCM), which does have a fee associated with the optional dinner (reservations required) and keynote address.

See: <https://events.vtools.ieee.org/m/157596>



Abstract

The broadcast nature of wireless communications exposes various transmission attributes, such as the packet size, traffic volume, and the modulation scheme. Common (upper-layer) cryptographic methods fail to provide adequate security and privacy, as they leave low-level transmission attributes open to traffic analysis. An adversary can exploit these attributes to launch passive (e.g., traffic fingerprinting) or selective jamming attacks. In this talk, I will discuss various challenges in hiding such attributes. These include sender identification dilemma in physical (PHY) layer header encryption and high sensitivity to residual carrier-frequency-offset (CFO) in payload's modulation obfuscation. Modulation obfuscation aims at decorrelating the modulation scheme from other attributes by embedding information symbols into the constellation map of the highest-order modulation supported by the system. I will then present a novel full-frame encryption and modulation obfuscation approach that employs preamble identifier and adaptive (CFO-aware) demodulation techniques to overcome those challenges.

Speaker's Biography

Hanif Rahbari is currently an assistant professor in the Department of Computing Security, Rochester Institute of Technology (RIT) and a member of the Center for Cybersecurity at RIT. He received the Ph.D. degree in electrical and computer engineering from The University of Arizona, Tucson in May 2016. He joined Rochester Institute of Technology in January 2018, after a short-term affiliation with The University of Arizona as a Senior Research Specialist and then a brief experience as a postdoctoral associate at Virginia Tech. He also holds the B.Sc. degree in information technology engineering from Sharif University of Technology and the M.Sc. degree in computer networks from AmirKabir University of Technology, Iran. Dr. Rahbari's research interests include wireless networks, security issues in wireless communications and IoT, hardware experimentation, and secure vehicle-to-vehicle communications.

