

**The University of Alabama
Department of Computer Science
Colloquium Series Speaker**

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**A Secure Ad-hoc Routing Approach using Localized Self-healing
Communities**

**Friday, October 7th
11:00a.m., HO 108**

Abstract:

Mobile ad hoc networks (MANETs) are vulnerable to routing attacks, especially attacks launched by non-cooperative (selfish or compromised) network members and appear to be protocol compliant. For instance, since packet loss is common in mobile wireless networks, the adversary can exploit this fact by hiding its malicious intents using compliant packet losses that appear to be caused by environmental reasons.

In this paper we study two routing attacks that use non-cooperative network members and disguised packet losses to deplete ad hoc network resources and to reduce ad hoc routing performance. These two routing attacks have not been fully addressed in previous research. We propose the design of "*self-healing community*" to counter these two attacks. Our design exploits the redundancy in deployment which is typical of most ad hoc networks; Namely, it counters non-cooperative attacks using the probabilistic presence of nearby cooperative network members.

To realize the new paradigm, we devise localized simple schemes to (re-)configure self-healing communities in spite of random node mobility. We develop a general analytic model to prove the effectiveness of our design. Then we implement our secure ad hoc routing protocols in simulation to verify the cost and overhead incurred by maintaining the communities. Our study confirms that the community-based security is a cost-effective strategy to make off-the-shelf ad hoc routing protocols secure.

Dr. Hong's Bio:

Xiaoyan Hong is an Assistant Professor at the Department of Computer Science, University of Alabama. From 1999 to 2003, she worked as a Ph.D student in the Wireless Adaptive Mobility (WAM) Lab led by Professor Mario Gerla at the department of Computer Science, University of California, Los Angeles. She received her Ph.D. degree from UCLA in 2003. Her research is in the area of mobile and wireless networking, particularly ad hoc networks and energy concerned sensor networks. She has worked on scalable routing protocols and mobility issues for MANETs. Recently her research focuses on secure routing and anonymity issues in wireless networks.