

L O U K A S L A Z O S

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RESEARCH INTERESTS

Ubiquitous Computing, Wireless Ad Hoc and Sensor Networks, Embedded and RFID Systems, focusing on identification, modeling and mitigation of network security vulnerabilities, and analysis of network performance.

EDUCATION

- Ph.D. in Electrical Engineering,** **2006**
“Securing Network Services for Wireless Ad Hoc and Sensor Networks”
University of Washington, Seattle, WA
Advisor: Prof. Radha Poovendran
- M. S. in Electrical Engineering,** **2002**
“Power Proximity Based Key Management for Secure Multicast in Ad Hoc Networks”
University of Washington, Seattle, WA
Advisor: Prof. Radha Poovendran
- Diploma in Electrical and Computer Engineering,** **2000**
“DECT Radio Coverage of the Athens Olympic Stadium”
National Technical University of Athens, Athens, Greece
Advisor: Prof. Filippos Konstantinou
Major: Communications and Computer Networks
Minors: Computer Systems, Waves and Telecommunications

EXPERIENCE

Research Associate **University of Washington**
Co-director of the Network Security Lab (NSL) **Seattle, WA**
10/2006 - present

Co-investigator in project titled “Boeing-University of Washington Strategic Plan for External Business” for establishing an Information Assurance group between the University of Washington and The Boeing Company. Conducted research in the problem of mobile target detection in sensor networks that led to the analytical characterization of the network performance for sensors with *heterogeneous* sensing areas. Supervising one Ph.D. student and one M.S. student, in their research on authentication in Radio Frequency Identification (RFID) systems. Currently addressing the problem of identifying and modeling network vulnerabilities in pervasive computing environments.

**Research Assistant
Network Security Lab (NSL)**

**University of Washington
Seattle, WA
9/2001 – 8/2006**

Co-investigator in project funded by Telcordia Technologies Inc., titled “*Secure Network Initialization and Multi-Group Key Management for Sensor Networks.*” Project aims at developing resource efficient key management techniques for secure network bootstrapping and link establishment. Our investigation led to the development of resource efficient key management schemes for group communications in Ad Hoc networks, using cross-layer interactions and Network Tomography theory. Conducted research in the problem of Secure Localization in Wireless Ad Hoc and Sensor Networks that led to the development of SeRLoc, the *first* algorithm that can provide estimation of the location of nodes in the presence of adversaries. Formulated a graph-theoretic framework for characterizing the Wormhole (relay) attack in Ad Hoc and Sensor Networks, and proposed a distributed algorithm for preventing it. Analytically evaluated the coverage achieved by the stochastic deployment of *heterogeneous* Sensor Networks using tools from Integral Geometry.

**Teaching Assistant
Network Security Lab (NSL)**

**University of Washington
Seattle, WA
9/2000 – 6/2001**

Lectured, graded, held office hours and supervised two projects for senior undergraduate course jointly offered by the EE and CSE departments, *EE/CSE 461, Introduction to Computer Networks,*” taught by Professor Sumit Roy. My overall evaluation was 4.32/5.00. Lectured, graded, held office hours and supervised one project for senior undergraduate course *EE 417, Communications I, II,* taught by Professor Jim Ritcey. Held three lectures for graduate course *EE565 Computer Networks I,* as a replacement for Professor Radha Poovendran.

**Telecommunications Engineer
Mobile Radiocommunications Laboratory**

**National Technical University of Athens
Athens, Greece
4/2000 – 7/2000**

Participating in a project contracted by the Hellenic Ministry of Transport and Communication to identify and measure channel interference in FM, VHF and UHF bands. Responsible for measuring carrier frequency, signal strength, bandwidth occupied, and channel interference of all radio and TV stations broadcasting in the Attica county, Greece (Athens). Delivered a comprehensive report that was used for prosecution of illegally operating radio and TV stations, as well as licensed ones that caused channel interference.

RESEARCH GRANTS

Co-investigator for project funded by the Telcordia Technologies Inc., 2002 – 2010

- Project title: “Secure Network Initialization and Multi-Group Key Management for Sensor Networks,” **\$283,550 total funding** (excluding any pending supplements).

Co-investigator for project funded by The Boeing Company, 10/2006 – present

- Project title: “Boeing-University of Washington Strategic Plan for External Business,” **\$300,000 total funding** (excluding any pending supplements).

PUBLICATIONS

- BOOK CHAPTERS Loukas Lazos, and Radha Poovendran, Secure Localization for Wireless Sensor Networks using Range-Independent Methods, In Radha Poovendran, Cliff Wang, Sumit Roy, editors, *Secure Localization and Time Synchronization for Wireless Sensor and Ad Hoc Networks*, pp. 185 – 214, Springer Verlag, New York, 2006.
- REFEREED JOURNAL ARTICLES Javier Salido, Loukas Lazos, and Radha Poovendran, Energy and Bandwidth-Efficient Key Distribution in Wireless Ad-Hoc Networks: A Cross-Layer Approach, *IEEE/ACM Transactions on Networking (ToN)*, (to appear).
- Loukas Lazos, and Radha Poovendran, Stochastic Coverage in Heterogeneous Sensor Networks, *ACM Transactions on Sensor Networks (TOSN)*, August 2006, Vol. 2, Issue 3, pp. 325 – 358.
- Loukas Lazos, and Radha Poovendran, Power Proximity Based Key Management for Secure Multicast in Ad Hoc Networks, *ACM/Springer Journal on Wireless Networks (WINET)*, May 2006, printed Vol. 13, Issue 1, February 2007.
- Radha Poovendran, and Loukas Lazos, A Graph Theoretic Framework for Preventing the Wormhole Attack in Wireless Ad Hoc Networks, *ACM/Springer Journal on Wireless Networks (WINET)*, May 2006, printed Vol. 13, Issue 1, February 2007.
- Loukas Lazos, and Radha Poovendran, HiRLoc: High Resolution Localization for Wireless Sensor Networks, *IEEE Journal on Selected Areas in Communications (JSAC), Special Issue on Network Security*, February 2006, Vol. 24, Issue 2, pp. 233 – 246.
- Loukas Lazos, and Radha Poovendran, SeRLoc: Robust Localization for Wireless Sensor Networks, *ACM Transactions on Sensor Networks (TOSN)*, August 2005, Vol. 1, Issue 1, pp. 73 – 100.
- JOURNAL ARTICLES UNDER REVIEW Loukas Lazos, Radha Poovendran, and James A. Ritcey, DATE: Deterministic Placement of Wireless Sensor Networks for Detecting Mobile Targets, submitted to *ACM Transactions on Sensor Networks (TOSN)*, (Submitted: December 2006).
- REFEREED CONFERENCE ARTICLES Loukas Lazos, Radha Poovendran, and James A. Ritcey, Probabilistic Detection of Mobile Targets in Heterogeneous Sensor Networks, *6th International Conference on Information Processing in Sensor Networks (IPSN '07)*, (to appear April 2007).
- Loukas Lazos, Radha Poovendran, and James A. Ritcey, On the Deployment of Heterogeneous Sensor Networks for Detection of Mobile Targets, *5th International Symposium on Modeling and Optimization in Mobile, Ad Hoc and Wireless Networks (WiOpt '07)*, (to appear April 2007).
- Loukas Lazos, and Radha Poovendran, Coverage in Heterogeneous Sensor Networks, *4th International Symposium on Modeling and Optimization in Mobile, Ad Hoc and Wireless Networks (WiOpt '06)*, April 2006, pp. 1-10.
- Loukas Lazos, Radha Poovendran, C. Meadows, P. Syverson, and L. W. Chang, Preventing Wormhole Attacks on Wireless Ad Hoc Networks: A Graph Theoretic Approach, *IEEE Wireless Communications and Networking Conference, March 2005, (WCNC '05)*, Vol. 2, pp. 1193 – 1199.
- Loukas Lazos, Srdjan Capkun, and Radha Poovendran, Rope: Robust Position Estimation in

Wireless Sensor Networks, *4th International Conference on Information Processing in Sensor Networks, (IPSN '05)*, April 2005, pp. 324 – 331.

Loukas Lazos, Javier Salido, and Radha Poovendran, VP3: Using Vertex Path and Power Proximity for Energy Efficient Key Distribution, *IEEE Vehicular Technology Conference, (VTC '04)*, September 2004, Vol. 2, pp. 1228 – 1232.

Loukas Lazos, and Radha Poovendran, Cross-Layer Design for Energy-Efficient Secure Multicast Communications in Ad Hoc Networks, *IEEE International Conference on Communications, (ICC '04)*, June 2004, Vol. 6, pp. 3633 – 3639.

Loukas Lazos, and Radha Poovendran, Energy-Aware Secure Multicast Communication in Ad-hoc Networks Using Geographic Location Information, *IEEE International Conference on Acoustics Speech and Signal Processing, (ICASSP '03)*, April 2003, Vol. 4, pp. 201 – 204, (33 citations per Google Scholar).

Loukas Lazos, and Radha Poovendran, Secure Broadcast in Energy-Aware Wireless Sensor Networks, *IEEE International Symposium on Advances in Wireless Communications, September 2002, (ISWC '02)*, pp. 151 – 152.

REFEREED WORKSHOP ARTICLES Loukas Lazos, and Radha Poovendran, SeRLoc: Secure Range-Independent Localization for Wireless Sensor Networks, *ACM Workshop on Wireless Security (WiSe '04)*, October 2004, pp. 21 – 30 (51 citations per Google Scholar).

ACADEMIC HONORS/AWARDS

**EE Chair's Award,
Dept. of Electrical Engineering**

**University of Washington
Seattle, WA
June 2006**

PROFESSIONAL ACTIVITIES

PROGRAM COMMITTEES	<ul style="list-style-type: none"> • International Conference on Communication and Networking in China (ChinaCom) 2007 • European Workshop on Security and Privacy in Ad hoc and Sensor Networks (ESAS) 2007 • ACM Workshop in Wireless Security (WiSe 2006), in conjunction with ACM MobiCom 2006
SESSION CHAIR	<ul style="list-style-type: none"> • Twelfth Annual International Conference on Mobile Computing and Networking ACM MobiCom 2006 • ACM Workshop in Wireless Security (WiSe) 2005, 2006
PEER REVIEWER	<ul style="list-style-type: none"> • Referee for the following journals: <ul style="list-style-type: none"> ○ ACM Transactions on Mobile Computing. ○ ACM Transactions on Sensor Networks. ○ ACM Transactions on Secure and Dependable Computing. ○ IEEE Transactions on Wireless Communications. • External referee for MobiCom, InfoCom, SecureCom, SASN, ICC, WCNC, MobiHoc.