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Syed Ali Khayam

RESEARCH INTERESTS

Modeling and simulation of complex network phenomena, performance evaluation of network architectures and protocols, detection and spread prevention of self-propagating malicious codes, cross-layer protocol/application design for wireless networks.

EDUCATION

- Ph.D. Michigan State University (MSU) – Electrical Engineering
December 2006
Academic Advisor: Professor Harder Radha
Research Lab: Wireless and Video Communications (WAVES) Lab, MSU
- M.S. MSU – Electrical Engineering
Graduation: May 2003
Academic Advisor: Professor Harder Radha
Research Lab: Wireless and Video Communications (WAVES) Lab, MSU
- B. E. National University of Sciences & Technology (NUST), Pakistan – Computer Systems Engineering
Graduation: November 1999

RESEARCH/ACADEMIC PUBLICATIONS AND PATENTS

Book Chapter(s)

- **Syed Ali Khayam** and Hayder Radha, "MAC Layer Wireless Channel Modeling," to appear in *Multimedia Networking*, publisher Elsevier Science.

Journal Papers

- **Syed Ali Khayam**, Shirish Karande, Muhammad U. Ilyas, and Hayder Radha, "Header Detection to Improve Multimedia Quality over Wireless Networks," to appear in *IEEE Transactions on Multimedia*.
- **Syed Ali Khayam**, Hayder Radha, Selin Aviyente, and John R. Deller, Jr., "Markov and Multifractal Wavelet Models for Wireless MAC-to-MAC Channels," to appear in *Elsevier Performance Evaluation Journal*.
- **Syed Ali Khayam** and Hayder Radha, "Modeling Worm Propagation over Vehicular Ad Hoc Networks," to appear in *SAE Transactions. (invited paper)*
- **Syed Ali Khayam** and Hayder Radha, "Using Signal Processing Techniques to Model Worm Propagation over Wireless Sensor Networks," *IEEE Signal Processing*, vol. 23, no. 2, pp. 164–169, March 2006.
- **Syed Ali Khayam** and Hayder Radha, "Linear-Complexity Models for Wireless MAC-to-MAC Channels," *ACM Wireless Networks (WINET) – Special Issue on Selected Papers from MSWiM'03*, vol. 11, no. 5, pp. 543–555, September 2005.
- **Syed Ali Khayam**, Shirish Karande, Hayder Radha, and Dmitri Loguinov, "Performance Analysis and Modeling of Errors and Losses over 802.11b LANs for High-Bitrate Real-time Multimedia," *Elsevier/EURASIP Signal Processing: Image Communication*, vol. 18, no. 47, pp. 575–595, August 2003.
- **Syed A. Khayam** and Hayder Radha, "Maximum-Likelihood Header Estimation: A Cross-layer Methodology for Wireless Multimedia," submitted to *IEEE Transactions on Wireless Communications*, submitted July 2005, revised September 2006.
- **Syed A. Khayam** and Hayder Radha, "Complexity Reduction for High-Order Markov Models of Binary

Wireless Channels," submitted to *IEEE Transactions on Wireless Communications*, submitted December 2006.

Conference/Workshop/Magazine Papers

- **Syed A. Khayam** and Hayder Radha, "Worm Detection at Network Endpoints using Information-Theoretic Traffic Perturbations," submitted to *IEEE ICDCS*, November 2006.
- **Syed A. Khayam** and Hayder Radha, "Detecting Malware Outbreaks using a Statistical Model of Blackhole Traffic," submitted to *IEEE ICDCS*, November 2006.
- **Syed A. Khayam** and Hayder Radha, "Theoretical Framework and Practical Solution for Header Estimation over Wireless Channels," submitted to *IEEE ICIP*, January 2006.
- **Syed Ali Khayam** and Hayder Radha, "Using Session-Keystroke Mutual Information to Detect Self-Propagating Malicious Codes," to appear in *IEEE International Conference on Communications (ICC)*, June 2006.
- **Syed Ali Khayam** and Hayder Radha, "On the Impact of Ignoring Markovian Channel Memory on Analysis of Wireless Systems," to appear *IEEE International Conference on Communications (ICC)*, June 2006.
- Shirish Karande, **Syed Ali Khayam**, Yongju Cho, Kiran Misra, Hayder Radha, Jaegon Kim, and Jin-Woo Hong, "On Channel State Inference and Prediction using Observable Variables in 802.11b Networks," to appear *IEEE International Conference on Communications (ICC)*, June 2006.
- **Syed Ali Khayam**, Shirish Karande, Muhammad U. Ilyas, and Hayder Radha, "Improving Wireless Multimedia Quality using Header Detection with Priors," *IEEE International Conference on Communications (ICC)*, June 2006.
- **Syed Ali Khayam** and Hayder Radha, "Constant-Complexity Models for Wireless Channels," *IEEE Infocom*, April 2006.
- **Syed Ali Khayam** and Hayder Radha, "Modeling Worm Propagation over Vehicular Ad Hoc Networks," *SAE World Congress*, April 2006.
- Aparna Gurijala and **Syed Ali Khayam**, "Encryption Effects on Compression Efficiency of Still Images," *SPIE Newsroom Magazine*, February 2006.
- Aparna Gurijala, **Syed Ali Khayam**, Hayder Radha, and John R. Deller, Jr., "On Encryption-Compression Trade-off of Pre/Post-Filtered Images," *SPIE Conference on Mathematics of Data/Image Coding, Compression, and Encryption (MDICCE)*, August 2005.
- **Syed Ali Khayam** and Hayder Radha, "A Topologically-Aware Worm Propagation Model for Wireless Sensor Networks," *IEEE ICDCS International Workshop on Security in Distributed Computing Systems (SDCS)*, June 2005.
- **Syed Ali Khayam**, Muhammad U. Ilyas, Klaus Pörsch, Shirish Karande, and Hayder Radha, "A Statistical Receiver-based Approach for Improved Throughput of Multimedia Communications over Wireless LANs," *IEEE International Conference on Communications (ICC)*, May 2005.
- **Syed Ali Khayam**, Selin Aviyente, and Hayder Radha, "On Long-Range Dependence in High-Bitrate Wireless Residual Channels," *International Conference on Information Sciences and Systems (CISS)*, March 2005.
- **Syed Ali Khayam** and Hayder Radha, "Analyzing the Spread of Active Worms over VANET," *ACM Mobicom International Workshop on Vehicular Ad Hoc Networks (VANET)*, October 2004.
- **Syed Ali Khayam** and Hayder Radha, "Markov-based Modeling of Wireless Local Area Networks," *ACM Mobicom International Workshop on Modeling, Simulation and Analysis of Wireless and Mobile Systems (MSWiM)*, September 2003.
- **Syed Ali Khayam**, Shirish Karande, Michael Krappel, and Hayder Radha, "Cross-Layer Protocol Design for Real-time Multimedia Applications over 802.11b Networks," *IEEE International Conference on Multimedia and Expo (ICME)*, July 2003.
- Shirish Karande, **Syed Ali Khayam**, Michael Krappel, and Hayder Radha, "Analysis and Modeling of Errors at the 802.11b Link-Layer," *IEEE International Conference on Multimedia and Expo (ICME)*, July 2003.
- M. Usman Ilyas, **Syed Ali Khayam**, Omer Suleman, and Shahid Masud, "A Configurable Platform for Simulating Multiprocessor-based System-on-Chip," *International Symposium on Wireless Systems and Networks (ISWSN)*, May 2003.
- **Syed Ali Khayam**, Shoab A. Khan, and Sohail Sadiq, "A Generic Integer Programming Approach to Hardware/Software Codesign," *IEEE International Multi-topic Conference (INMIC)*, December 2001.
- **Syed Ali Khayam** and Mudassar Farooq, "Voice and Video over IP: Challenges and the Existing

Infrastructure," *International Workshop on Distributed Computing, Communications and Applications (IWDCCA)*, January 2000.

Ph.D. Dissertation

- **Syed Ali Khayam**, "Wireless Channel Modeling and Malware Detection using Statistical and Information-Theoretic Tools," in prep.

M.S. Thesis

- **Syed Ali Khayam**, "Analysis and Modeling of Errors and Losses over 802.11b LANs," May 2003.

Patents

- **Syed Ali Khayam** and Hayder Radha, "Mobile Network System for Malware Monitoring," filed to the United States Patents and Trademarks Office, application # PCT/US2006/021501, June 2005.
- Shirish Karande, **Syed Ali Khayam**, Yongju Cho, Kiran Misra, Hayder Radha, Jaegon Kim, and Jin-Woo Hong, "Channel State Inference and Prediction using Observable Variables in 802.11b Networks," submitted to the MSU Office of Intellectual Property Rights, September 2006.
- **Syed Ali Khayam** and Hayder Radha, "Worm Detection at Network Endpoints using Information-Theoretic Traffic Perturbations," submitted to the MSU Office of Intellectual Property Rights, February 2006.
- **Syed Ali Khayam**, Shirish Karande, and Hayder Radha, "Header Estimation to Improve Multimedia Quality over Wireless Networks," submitted to the MSU Office of Intellectual Property Rights, February 2006.
- **Syed Ali Khayam** and Hayder Radha, "Joint Network-Host Modeling of Normal User Behavior for Anomaly Detection," submitted to the MSU Office of Intellectual Property Rights, May 2005.
- **Syed Ali Khayam** and Hayder Radha, "Constant-Complexity Models for Wireless MAC-to-MAC Channels," submitted to the MSU Office of Intellectual Property Rights, July 2004.

Technical Report(s)

- **Syed Ali Khayam**, "The Discrete Cosine Transform: Theory and Application," WAVES lab technical report, May 2004.

PROFESSIONAL AFFILIATIONS

Reviewer

- *IEEE/ACM Transactions on Networking, IEEE Transactions on Wireless Communications, IEEE Transactions on Multimedia, IEEE Signal Processing Letters, EURASIP Journal on Wireless Communications & Networking (JWCN), Elsevier Performance Evaluation Journal, Journal of Communications and Networks (JCN)*
- *IEEE International Conference on Communications (ICC) 2007, IEEE Consumer Communications & Networking Conference (CCNC) 2007, IEEE Wireless Communications & Networking Conference (WCNC) 2006*

Member

- Graduate Student Member – *IEEE*
- Student Member – *ACM*
- Professional Member – *Pakistan Engineering Council (PEC)*

HONORS/AWARDS

- Selected to serve on the review panels of many prestigious journals and conferences
- Research paper on Markov models for wireless channels was selected in the top 9% papers of ACM MSWiM 2003 and was invited to be submitted as a journal paper to ACM WINET journal
- Research paper on worm propagation over vehicular networks in SAE World Congress 2006 was selected to be appear in SAE Transactions
- Research paper on encryption-compression tradeoffs of image coding systems in SPIE MDICCE 2005 was invited to appear in SPIE Newsroom Magazine

- Received a rating of 4.0 from 38 out of the total 40 students in the Electronic Design and Instrumentation Lab Course taught at MSU
- Journal paper on linear-complexity wireless channel models was one of ACM WINET's five most downloaded articles in February/March 2006
- Recipient *MSU Research Enhancement Award* to attend IEEE Infocom 2006
- Recipient of *Pakistan HEC Partial Ph.D. Support Scholarship* to complete Ph.D. studies at MSU
- Recipient of *Pakistan HEC Split Ph.D. Scholarship* to pursue Ph.D. studies at MSU
- Recipient of *NUST Split M.S. Scholarship* to pursue Masters studies at MSU
- Made key technical contributions to a research proposal that was submitted to NSF CyberTrust Program: After peer-review the NSF funded the 3 year project in August 2004
- Made key technical contributions to a research proposal submitted to MSU CyberSecurity Initiative: MSU funded the 2 year project in August 2003
- Selected to serve as Graduate Representative on the MSU Engineering College Advisory Committee in 2004/2005

EXPERIENCE IN ACADEMIA

- | | |
|---|---|
| <ul style="list-style-type: none"> □ Summer 2002 to present □ Spring 2002, Summer 2003, Spring 2004 □ Summer 2000, Spring 2001 | <p>MSU – <i>Research Assistant</i>, Wireless and Video Communications (WAVES) Lab, MSU</p> <p>MSU – <i>Teaching Assistant</i></p> <p>NUST – <i>Teaching Assistant</i></p> |
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EXPERIENCE IN INDUSTRY

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| <ul style="list-style-type: none"> □ October 2000 to August 2001 □ April 1999 to July 1999 | <p>Communications Enabling Technologies – <i>Design Engineer</i></p> <ul style="list-style-type: none"> ▪ Lead a team which designed layer controller of a VoIP chip ▪ Lead a team which developed an IPSec security framework <p>Communications Enabling Technologies – <i>Intern</i></p> |
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REFERENCES

- Hayder Radha, Professor, MSU (radha@egr.msu.edu)
- John R. Deller, Jr., Professor, MSU (deller@egr.msu.edu)
- Dmitri Loguinov, Assistant Professor, Texas A&M University (TAMU) (dmitri@cs.tamu.edu)