

# Roman Chertov

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- EDUCATION**
- Purdue University**
- Ph.D. in Computer Science, May 2008. Thesis project: *A Device Independent Router Model: From Measurements to Simulations*, under Sonia Fahmy and Ness B. Shroff
  - Master of Science in Computer Science, Spring 2004
- University of Maryland at College Park**
- Bachelor of Science in Computer Science, Spring 2002
  - Bachelor of Arts in Economics, Spring 2002
- INTERESTS** High capacity networking design/analysis/measurement, distributed systems, High fidelity emulation and simulation, embedded devices
- HONORS** Upsilon Pi Epsilon member  
Graduated with departmental honors in computer science from Univ. of Maryland
- SKILLS** C/C++, Perl, PHP, Visual Basic, Java, ML, Lisp, C#, COBOL, RPG, x86 assembly  
Network design and analysis, large cluster administration, IPv4/IPv6 networking, multi-process asynchronous I/O programming, SATCOM/LTE network emulation, Linux kernel/device programming, cross-platform embedded Linux development (ARM), buildroot toolset, MySQL, Cisco IOS, JUNOS, MATLAB, Zebra/Quagga open source routing platform, OpenGL graphics programming,  
Network performance analysis, patent analysis, scientific and technical report writing  
Fluent spoken/written English, Russian
- WORK EXPERIENCE**
- Senior Member of Technical Staff**, The Aerospace Corporation (February 2010–present)
- LTE emulation over Ethernet and commodity servers to study impacts of cyberattacks on resource scheduling
  - Annual capital budget management in excess of 120K to expand and upgrade a rapid prototyping networking and distributed systems testbed
  - Management and operation of a 150+ Linux/BSD server Emulab testbed
    - Automated experiment setup, management, and data aggregation
    - Scripted realistic network traffic generation and traffic analysis
    - Centralized and automated coordination of experimental servers
  - Utilization of Endace 7000 probe to analyze and remove sources of network jitter
  - Implementation and analysis of Quality of Service (QoS) for satellite modems capable of multiple simultaneous transmissions
  - Network integration studies to determine the viability of the contractors' proposed architectures that meet latency, throughput, and jitter requirements
  - Performance analysis of military networks in a multi-homed environment composed out of terrestrial and satellite wireless links

- Study of Network Centric Waveform (NCW) and evolution of mobile SATCOM
- Development of testbed emulation approaches to conduct high fidelity mobile SATCOM networking studies in the NCW context
- Performance studies of serial circuits over packet switched networks

**Computer Scientist**, Kelly Technology Group (July 2009–February 2010)

- Patent analysis for litigation cases related computer technology
- Analysis of large scale industrial code basis in COBOL/RPG/C#/PHP to support patent infringement claims
- Infringement/non-infringement expert witness reports

**Visiting Researcher**, University of California, Santa Barbara (May 2008–present)

- Provided technical assistance to graduate students in the Networking and Multimedia Systems Lab (NMSL)
- Wrote conference papers relating to satellite IP networking and wireless research
- Analyzed BGP performance in mobile networks that utilize satellite links

**Senior Research Scientist**, Santa Barbara Labs, LLC (May 2008–May 2009)

- Conducted satellite network studies, which resulted in white paper deliverables for the Air Force’s TSAT Mission Operations System (TMOS) project
- Created a satellite payload emulator capable of supporting multiple antennas, frequency sub-channels, and seamless IP transitions between antennas and sub-channels
- Created a high-fidelity emulated testbed for researching mobile IPv6 satellite networks
- Created layer 2 emulation tools to mimic satellite link behavior
- Directed, supervised, and presented team research projects
- Contributed to the Click modular router open source project and developed network card Linux drivers

**Research Assistant**, Purdue University (Spring 2004–present)

- Explored differences between simulation and emulation to create higher fidelity simulation router models
- Created a network emulation tool based on the ns-2 simulator, designed for conducting router measurements and traffic generation
- Created a set of tools to aid experiment automation on large testbeds like Emulab and DETER as part of the EMIST project
- Data analysis of large packet captures
- Reviewed papers for conferences (ICNP, INFOCOM, IWQoS, WWIC, ICDCS)
- Reviewed papers for journals (TDSC, JPDC)

PUBLICATIONS

Refereed Conferences and Workshops

- **Roman Chertov**, Joseph Kim, and Jiayu Chen, “LTE over Wired Ethernet,” *Under submission*.
- **Roman Chertov** and Kevin Almeroth, “Using BGP in a Satellite-Based Challenged Network Environment,” *In Proceedings of IEEE Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON)*, June 2010.
- **Roman Chertov**, Daniel Havey, and Kevin Almeroth, “MSET: A Mobility Satellite Emulation Testbed,” *In Proceedings of IEEE INFOCOM (the conference on computer communications)*, March 2010.

- Daniel Havey, **Roman Chertov**, and Kevin Almeroth, “Wired Wireless Broadcast Emulation,” *In Proceedings of the 5th International workshop on Wireless Network Measurements (WiNMee)*, June 2009
- **Roman Chertov** and Kevin Almeroth, “High-Fidelity Link Shaping,” *In Proceedings of 5th International IEEE/CreateNet Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities (TridentCom)*, April 2009.
- Daniel Havey, Elliot Barlas, **Roman Chertov**, Kevin Almeroth, and Elizabeth Belding, “A Satellite Mobility Model for QUALNET Network Simulations”, *In Proceedings of MILCOM*, November 2008
- **Roman Chertov**, Sonia Fahmy, and Ness B. Shroff, “A Device-Independent Router Model,” *In Proceedings of IEEE INFOCOM (the conference on computer communications)*, April 2008.
- **Roman Chertov**, Sonia Fahmy, and Ness B. Shroff, “A Black-box Router Profiler,” *In Proceedings of the IEEE Global Internet Symposium (GI)*, May 2007.
- J. Mirkovic, S. Wei, A. Hussain, B. Wilson, R. Thomas, S. Schwab, S. Fahmy, **R. Chertov**, P. Reiher, “DDoS Benchmarks and Experimenter’s Workbench for the DETER testbed,” *In Proceedings of 3rd International IEEE/CreateNet Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities (TridentCom)*, May 2007.
- **Roman Chertov** and Sonia Fahmy, “Optimistic Load Balancing in a Distributed Virtual Environment,” *In Proceedings of the 16th ACM International Workshop on Network and Operating Systems Support for Digital Audio and Video (NOSSDAV)*, pp. 74-79, May 2006.
- **Roman Chertov**, Sonia Fahmy, and Ness B. Shroff, “Emulation versus Simulation: A Case Study of TCP-Targeted Denial of Service Attacks,” *In Proceedings of 2nd International IEEE/CreateNet Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities (TridentCom)*, March 2006.

#### Refereed Journals

- **Roman Chertov** and Sonia Fahmy, “Forwarding Devices: From Measurements to Simulations,” *ACM Transactions on Modeling and Computer Simulation (TOMACS)*, 32 pp., accepted for publication.
- **Roman Chertov** and Kevin Almeroth, “Qualitative Comparison of Link Shaping Techniques”, *International Journal of Communication Networks and Distributed Systems (IJCNDS)*, volume 5, issue 1/2, pp. 109-129, 2010.
- **Roman Chertov**, Sonia Fahmy, and Ness B. Shroff, “Fidelity of Network Simulation and Emulation: A Case Study of TCP-Targeted Denial of Service Attacks”, *Transactions on Modeling and Computer Simulation (TOMACS)*, December 2008.

#### CONFERENCE WORKSHOP PRESENTATIONS

*IEEE SECON*, Boston, June 2010  
*IEEE INFOCOM*, San Diego, March 2010  
*IEEE TridentCom*, Washington DC, April 2009  
*IEEE INFOCOM*, Phoenix, April 2008  
*IEEE GI*, Anchorage, May 2007  
*DETER Workshop*, Arlington, June 2006  
*ACM NOSSDAV*, New Port, May 2006  
*IEEE TridentCom*, (Barcelona, March 2006), (Fairfax, April 2009)

#### SOFTWARE

**Mobility Satellite Emulation Testbed (MSET)**, a highly modular emulation framework used to study mobility effects (line of sight blockages, beam and satellite handovers) in satellite networks. The satellite link emulation component was delivered to Lockheed Martin.

**Black Box Profiler**, a traffic generation/measurement system based on ns-2 simulator, modified Linux network driver, and Click modular router. The system is capable of creating arbitrary traffic flow scenarios with multiple unique IPs, as well as measuring packet loss, corruption, and delay with microsecond precision. The tool is planned to be released in early 2008.

**EMIST Tool Suite**, a collection of tools designed to control, measure, and analyze experiments on testbeds. The tools can be downloaded at <http://www.cs.purdue.edu/homes/fahmy/software/emist/>

REFERENCES

Available upon request