Eric W. Anderson, Ph.D.

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SUMMARY

Applied Research Scientist with 10+ years of experience in hands-on computer science research and research program development for leading educational institutions and governmental agencies. Hands-on Leader with a passion for creating innovative technology solutions to drive meaningful societal impact and achieve organizational objectives.

SKILLS

- **Applied Research:** Cross-layer Wireless Networks, Network Architecture, Mobile & Vehicular Networking, Wireless Communication, Resource Management, Emergency & Disaster Communications, Public Safety Technology, Simulation & Modeling, Distributed Algorithms & Optimization, Network Security, Social-technical Interactions
- **Leadership:** Strategic Planning & Execution, Project Management, Research Program Development, Capacity Building Prioritization, Process Improvement, Cross-functional Collaboration, Training & Development, Coaching & Mentorship
- **Programming Languages:** Python, Java, C, C++, SQL, R, Haskell, Shell, OCaml

EDUCATION

- Postdoctoral Fellowship - Electrical & Computer Engineering; Mentor: Peter Steenkiste, Carnegie Mellon University
- Ph.D. in Computer Science; Advisors: Douglas Sicker & Dirk Grunwald, University of Colorado at Boulder
    - Dissertation: Integrated Scheduling and Beam Steering for Spatial Reuse in Dense Wireless Networks.
- Graduate Certificate in Science and Technology Policy, University of Colorado at Boulder
- Bachelor of Arts in Computer Science; Advisor: Jeffrey Ondic, Carleton College

RESEARCH EXPERIENCE

Senior Scientist - Public Safety Communications Research (PSCR), National Institute of Standards & Technology 2016 - 2019

- Designed architecture to improve the resilience and reliability of cellular-based communication systems and applications, enabling public safety personnel to utilize applications and maintain productivity despite limited or no network access.
- Led internal research capacity building and external research community development around information and communication technology for public safety.
- Defined the research and development funding strategy for PSCR's externally-funded research program, including developing the programs to recruit, evaluate, select, and monitor grantees aligned with PSCR's mission.
- Co-developed and managed PSCR's flagship research funding opportunity, the $38M Public Safety Innovation Accelerator Program (PSIAP) 2017.
- Served as the federal program officer, managing a $13.3MM portfolio of 10 awards spanning resilient system and research and prototyping platforms areas from concept and solicitation to application evaluation and award.

Systems Scientist - Computer Science, Carnegie Mellon University 2013 - 2016
Postdoctoral Fellow - Electrical & Computer Engineering, Carnegie Mellon University 2010 - 2013
Consulting Faculty Member - Institute for Software Research eBusiness Technology, Carnegie Mellon University 2010 - 2016

- Researched vehicular networking, efficient resource management in dense networks, and the characterization and realistic simulation of radio environments with a focus on semi-real-time bulk data retrieval and "push" data distribution.
- Led the complete software and hardware redesign of the Wireless Network Emulator, used to test network-sized vehicle-to-vehicle communication environments at highway speeds in real-time with 1 trillion signal calculations per second.
- Researched and tested secure and low-latency authentication, discovery, and mobility protocols for the $11MM expressive Internet Architecture (XIA) project, a high-performance, high-availability future internet after TCP/IP.

Ph.D. Student - Computer Science, University of Colorado 2004 - 2010

- Conducted research to design new protocols for high-performance high-density wireless networks.
- Researched the management of interference in large networks, integration of physical-layer control and measurement, experimental characterization of radio signal propagation, and simulation & modeling techniques.
- Designed and built the CU Wide Area Radio Testbed and Effective Directivity Antenna Model framework to enable the use of network simulators to accurately test wireless systems with directional antennas in complex and cluttered environments.
- Developed and proved the adaptive optimal duty-cycled sensor networking MAC protocol X-MAC, which became one of the technical foundations enabling the development of the Internet of Things (IoT).

Research Intern, Vanu, Inc. 2005

- Developed infrastructure for one of the first software-defined radio (SDR) systems; integrated processing between reconfigurable FPGA systems and general-purpose CPUs with a focus on software quality and optimization.

Co-Developer - Election Incident Reporting System, Computer Professionals for Social Responsibility 2004 - 2005

- Created an online tool used in the 2004-2005 election cycle to track and research voting irregularities in collaboration with

the Verified Voting Foundation and Lawyers' Committee for Civil Rights Under Law.

Ph.D. Student - Computer Science, University of Oregon **2002 - 2004**

- Researched, designed, and produced the initial implementation of the SWORD worm detection framework to automatically detect, recognize, and characterize new, unknown network worms and enable devices to quickly respond to attack traffic.

Software Engineer - Air Traffic Management, Lockheed Martin **2001 - 2002**

- Designed, developed, tested, and implemented ADS-B processing for the Common ARTS system, which received raw self-reported positions and provided time-correlated aircraft tracking data to safety-critical air traffic control systems.

SELECT PUBLICATIONS & PRESENTATIONS

- Xiaohui Wang, Eric W. Anderson, Peter Steenkiste, and Fan Bai. **Improving the accuracy of environment-specific channel modeling.** IEEE Transactions on Mobile Computing, 2015.
- Eric W. Anderson, Caleb Philips, Doug Sicker, and Dirk Grunwald. **Optimization decomposition for scheduling and system configuration in wireless networks.** ACM/IEEE Transactions on Networking, 22:271 – 284, 2014.
- Eric W. Anderson, Caleb Phillips, Douglas Sicker, and Dirk Grunwald. **Modeling environmental effects on directionality in wireless networks.** Mathematical and Computer Modeling, 53:2078–2092, 2011.
- Eric W. Anderson, Caleb Philips, Douglas Sicker, and Dirk Grunwald. **Signal quality pricing: Decomposition for spectrum scheduling and system configuration.** In New Frontiers in Dynamic Spectrum Access Networks (DySPAN), 2011 IEEE Symposium on, pages 408 – 419, May 2011. doi: 10.1109/DYSPAN.2011.5936230.
- Michael Buettner, Gary V. Yee, Eric W. Anderson, and Richard Han. **X-MAC: A short preamble MAC protocol for duty-cycled wireless sensor networks.** In SenSys '06, pages 307–320, New York, NY, USA, 2006. ACM Press. Most-cited SenSys paper, 2005-present.
- Xiaohui Wang, Eric W. Anderson, Fan Bai, and Peter Steenkiste**. Simulating spatial cross-correlation in vehicular networks**. In Vehicular Networking Conference (VNC), 2014.
- Xiaohui Wang, Kevin Borries, Eric W. Anderson, and Peter Steenkiste. **Network-scale emulation of general wireless channels.** In The 74th IEEE Vehicular Technology Conference (VTC2011-Fall), 2011.
- Eric W. Anderson, Caleb Philips, Gary Yee, Douglas Sicker, and Dirk Grunwald. **Challenges in deploying steerable wireless testbeds.** In Proc. 6th International conference on testbeds and research infrastructures for the development of networks and communities (Tri- dentCom), 2010.
- Eric W. Anderson, Gary Yee, Caleb Phillips, Dirk Grunwald, and Douglas Sicker. **The impact of directional antenna models on simulation accuracy.** In 7th Intl. Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, 2009.
- Eric W. Anderson and Jun Li**. Aggregating detectors for new worm identification.** In USENIX 2004. USENIX, June 2004.
- Jason Matusiak, Richard Graham, Keith Taylor, Eric W. Anderson, and Brenton Walker. **Using if-scale delays to emulate the effects of site-specific multipath in a digital wireless channel emulator.** In Proceedings of the 8th ACM international workshop on Wireless network testbeds, experimental evaluation & characterization, WiNTECH '13, pages 41–48, New York, NY, USA, 2013. ACM. ISBN 978-1-4503-2364-2.
- Xiaohui Wang, Eric W. Anderson, Peter Steenkiste, and Fan Bai. **Improving the accuracy of environment-specific vehicular channel modeling**. In WiNTECH '12, 2012.
- Eric W. Anderson, Caleb Philips, Harold Gonzales, Kevin Bauer, Douglas Sicker, and Dirk Grunwald. **Inferring human contact patterns using wireless devices**. In Hot Topics of Planet-scale Mobility Measurements, 2009a.
- Eric W. Anderson, Caleb Phillips, Douglas Sicker, and Dirk Grunwald. **Modeling environmental effects on directionality in wireless networks.** In 5th Intl. Workshop on Wireless Network Measurements, 2009b.

PRESENTATIONS

- **"Reinventing Mobile Communications for Emergency Responders,"** Electrical Engineering Talks Research Colloquium, University of Washington, 2017.
- **"NIST Public Safety Innovation Accelerator,"** GENI Network Innovators Community Event (NICE), 2016.
- **"Edge Computing for Public Safety: A NIST Perspective,"** First IEEE/ACM Symposium on Edge Computing, 2016.
- **"Optimal Scheduling and Antenna Configuration,"** Ph.D. Forum Talk, ACM MobiSys, 2010.
- **"Integrating Beam Steering and Scheduling for Spatial Reuse,"** Doctoral Consortium Talk, Tenth Intl. Workshop on Mobile Computing Systems and Applications (HotMobile), 2009.
- **"New Worm Detection and Analysis,"** Invited Talk, Department of Mathematics and Computer Science Colloquium, Carleton College, 2003.

COMMUNITY INVOLVEMENT

- **Technical Program Committee (TPC) Member:** ACM/IEEE Symposium on Edge Computing (SEC), IEEE Southern Programmable Logic (SPL), IEEE Symposium on Computers and Informatics (ISCI), IEEE/CIC International Conference on Communications in China
- **Reviewer:** ACM SIGCOMM, ACM MobiSys, IEEE INFOCOM, IEEE DySPAN, ICST/EAI CrownCom, IEEE GLOBECOM, IEEE Journal on Selected Areas in Communications, Springer Mobile Networks and Applications, IEEE Transactions on Wireless Communications/Mobile Computing/Networking, NIST Boulder Editorial Review Board