Parth H. Pathak

Postdoctoral Researcher
Department of Computer Science
University of California, Davis
Davis, CA 95616

Tel: (919) 480-6248
Email: phpathak@ucdavis.edu
Homepage: http://www.phpathak.com

Research Interests

Wireless networking: Design and analysis of next-generation wireless networks, MIMO systems, multi-gigabit wireless communications, Internet of things

Ubiquitous and mobile computing: RF sensing, mobile/wearable sensing for applications in healthcare and mobile interaction, energy efficiency and privacy, and cyber-physical systems

Network analytics: Deep network inspection, large-scale data mining, traffic analysis for privacy/security and anomaly detection

Current Appointment

Postdoctoral Research Fellow
Computer Science Department, University of California, Davis, CA, USA
Advisor: Prasant Mohapatra

Education

Ph.D. in Computer Science, 2012
North Carolina State University, Raleigh, NC, USA
Advisor: Rudra Dutta

M.S. in Computer Science (En Route to Ph.D.)
North Carolina State University, Raleigh, NC, USA
Advisor: Rudra Dutta

B.E. in Information Technology, 2005
Gujarat University (L.D. College of Engineering), Gujarat, India.

Awards

- **Excellence in Postdoctoral Research at UC Davis** - Campus-wide award for outstanding postdoctoral research; One of the two recipients of the award for year 2015 selected from 800+ postdocs at UC Davis.
- **Best Paper Award** at IFIP International Networking Conference 2014 for work titled "A First Look at 802.11ac in Action: Energy Efficiency and Interference Characterization".
- Travel grant awards for ACM Mobisys 2015, ACM CoNEXT 2015 and ACM HotMobile 2015.
- Best Poster Award at NC State Graduate Student Seminar 2007 for poster titled "Software-defined Cognitive Radio Networks".
- Research In Motion (RIM) Graduate Research Fellowship 2011, North Carolina State University.
- Nominated for exceptional graduate student researcher from Computer Science department for The 5th Annual NC State University Graduate Student Research Symposium (2010).
- Research fellowship for 2008-2010 from Army Research Office (ARO), managed by Secure Open Systems Initiative (SOSI) at NC State University.
- Honorable mention by the President of India at Indian Science Congress 2005 for B.E. project on open-source cross-carrier mobile voting.

Publications

Books

1. Parth H. Pathak and Rudra Dutta, "Designing for Network and Service Continuity in Wireless Mesh Networks", *Springer Science and Business Media*, 2012.

Journals

1. Parth H. Pathak, Xiaotao Feng, Pengfei Hu and Prasant Mohapatra, "Visible Light Communication, Networking and Sensing: A Survey, Potential and Challenges", *IEEE Communications Surveys and Tutorials* (**COMSOC-CST**), 2016.

2. Arun Raghuramu, Parth H. Pathak, Hui Zang, Jinyoung Han, Chang Liu and Chen-Nee Chuah, "Uncovering the Footprints of Malicious Traffic in Wireless/Mobile Networks", *Elsevier Journal on Computer Communications* (**COMCOM**), 2016.

3. Yunze Zeng, Parth H. Pathak and Prasant Mohapatra, "Throughput, Energy Efficiency and Interference Characterisation of 802.11ac", *Transactions on Emerging Telecommunications Technologies* (**ETT**), 2015.

4. Parth H. Pathak, Rudra Dutta and Prasant Mohapatra, "On Availability-Performability Trade-off in Wireless Mesh Networks", *IEEE Transactions on Mobile Computing* (**TMC**), 2014.

5. Kefeng Tan, Shraboni Jana, Parth H. Pathak and Prasant Mohapatra, "On Insider Misbehavior Detection in Cognitive Radio Networks", *IEEE Network Magazine, Special Issue on Security in Cognitive Radio Networks* (**Network**), 2013.

6. Parth H. Pathak and Rudra Dutta, "Centrality-based Power Control for Hot-spot Mitigation in Multi-hop Wireless Networks", *Elsevier Journal on Computer Communications* (**COMCOM**), 2012.

7. Parth H. Pathak and Rudra Dutta, "A Survey of Network Design Problems and Joint Design Approaches in Wireless Mesh Networks", *IEEE Communications Surveys and Tutorials* (**COMSOC-CST**), 2011.

Conferences and Workshops

1. Zhicheng Yang, Parth H. Pathak, Yunze Zeng and Prasant Mohapatra, "Monitoring Vital Signs using Millimeter Wave", *ACM International Symposium on Mobile Ad Hoc Networking and Computing* (**MobiHoc**), Paderborn, Germany, July 2016.

2. Yunze Zeng, Parth H. Pathak and Prasant Mohapatra, "WiWho: WiFi-based Person Identification in Smart Spaces", *ACM/IEEE International Conference on Information Processing in Sensor Networks* (**IPSN**), Vienna, Austria, February 2016.

3. Aveek Das, Parth H. Pathak, Chen-Nee Chuah and Prasant Mohapatra, "Uncovering Privacy Leakage in BLE Network Traffic of Wearable Fitness Trackers", *ACM International Workshop on Mobile Computing Systems and Applications* (**HotMobile**), St. Augustine, FL, USA, February 2016.

4. Hao Fu, Zizhan Zheng, Aveek K. Das, Parth H. Pathak, Pengfei Hu and Prasant Mohapatra, "FlowIntent: Detecting Privacy Leakage from User Intention to Network Traffic Mapping", *IEEE International Conference on Sensing, Communication, and Networking* (**SECON**), London, United Kingdom, June 2016.

5. Pengfei Hu, Parth H. Pathak, Xiaotao Feng, Hao Fu and Prasant Mohapatra, "ColorBars: Increasing Data Rate of LED-to-Camera Communication using Color Shift Keying", *ACM International Conference on emerging Networking EXperiments and Technologies* (**CoNEXT**), Heidelberg, Germany, December 2015.

6. Zhicheng Yang, Parth H. Pathak, Yunze Zeng and Prasant Mohapatra, "Sensor-assisted Codebook-based Beamforming for Mobility Management in 60 GHz WLANs", *IEEE International Conference on Mobile Ad hoc and Sensor Systems* (**MASS**), Dallas, TX, USA, October 2015.

7. Ningning Cheng, Shaxun Chen, Parth H. Pathak, Prasant Mohapatra, "Long-term Privacy Profiling through Smartphone Sensors", *International Workshop on Social Sensing* (**SocialSens**), Dallas, TX, USA (co-located with MASS 2015), October 2015.

8. Muchen Wu, Parth H. Pathak and Prasant Mohapatra, "Monitoring Building Door Events using Barometer Sensor in Smartphones", *ACM International Joint Conference on Pervasive and Ubiquitous Computing*

(**UbiComp**), Osaka, Japan, September 2015.

9. Christopher Buckley, Parth H. Pathak, Aveek Das, Chen-Nee Chuah and Prasant Mohapatra, "AnonAD: Privacy-aware Micro-targeted Mobile Advertisements without Proxies", *IEEE International Conference on Computer Communications and Networks* (**ICCCN**), Las Vegas, NV, USA, August 2015.

10. Muchen Wu, Parth H. Pathak and Prasant Mohapatra, "Enabling Privacy-Preserving First-Person Cameras using Low-Power Sensors", *IEEE International Conference on Sensing, Communication, and Networking* (**SECON**), Seattle, WA, USA, June 2015.

11. Aveek Das, Parth H. Pathak, Chen-Nee Chuah and Prasant Mohapatra, "Characterization of Wireless Multi-Device Users", *IEEE International Conference on Sensing, Communication, and Networking* (**SECON**), Seattle, WA, USA, June 2015.

12. Li Zhang, Parth H. Pathak, Muchen Wu, Yixin Zhao and Prasant Mohapatra, "AccelWord: Energy Efficient Hotword Detection through Accelerometer", *ACM International Conference on Mobile Systems, Applications, and Services* (**MobiSys**), Florence, Italy, May 2015.

13. Yunze Zeng, Parth H. Pathak and Prasant Mohapatra, "Analyzing Shoppers Behavior through WiFi Signals", *ACM Workshop on Physical Analytics* (**WPA**), Florence, Italy (co-located with MobiSys 2015), May 2015.

14. Li Zhang, Chao Xu, Parth H. Pathak and Prasant Mohapatra, "Characterizing Instant Messaging Apps on Smartphones", *Passive and Active Measurements Conference* (**PAM**), Springer Pub., New York, NY, USA, March 2015.

15. Chao Xu, Parth H. Pathak and Prasant Mohapatra, "Finger-writing with Smartwatch: A Case for Finger and Hand Gesture Recognition using Smartwatch", *ACM Workshop on Hot Topics in Mobile Computing Systems and Applications* (**HotMobile**), Santa Fe, NM, USA, February 2015.

16. Yunze Zeng, Parth H. Pathak, Chao Xu and Prasant Mohapatra, "Your AP Knows How You Move: Fine-grained Device Motion Recognition through WiFi", *ACM Workshop on Hot Topics in Wireless* (**HotWireless**), Maui, HI, USA (co-located with Mobicom 2014), September 2014.

17. Yunze Zeng, Parth H. Pathak and Prasant Mohapatra, "A First Look at 802.11ac in Action: Energy Efficiency and Interference Characterization", *IFIP International Conference on Networking* (**Networking**), Trondheim, Norway, June 2014. *[**Best Paper Award**]*

18. Aveek K. Das, Parth H. Pathak, Chen-Nee Chuah and Prasant Mohapatra, "Contextual Localization Through Network Traffic Analysis", *IEEE International Conference on Computer Communication* (**INFOCOM**), Toronto, Canada, May 2014.

19. Gaurish Deuskar, Parth H. Pathak and Rudra Dutta, "Packet Aggregation based Back-pressure Scheduling in Multi-hop Wireless Networks", *IEEE Wireless Communications and Networking Conference* (**WCNC**), Paris, France, April 2012.

20. Parth H. Pathak and Rudra Dutta, "Impact of Power Control on Capacity of TDM-scheduled Wireless Mesh Networks", *IEEE International Conference on Communications* (**ICC**), Kyoto, Japan, June 2011.

21. Parth H. Pathak and Rudra Dutta, "Using Centrality-based Power Control for Hot-spot Mitigation in Multi-hop Wireless Networks", *IEEE Global Communications Conference* (**GlobeCom**), Miami, FL, USA, December 2010.

22. Parth H. Pathak and Rudra Dutta, "Impact of Power Control on Relay Load Balancing in Wireless Sensor Networks", *IEEE Wireless Communications and Networking Conference* (**WCNC**), Sydney, Australia, April 2010.

23. Junbum Lim, Parth H. Pathak, M. Pandian, U. Patel, G. Deuskar, A. Danivasa, M.L. Sichitiu, and R. Dutta, "CentMesh: A Modular and Extensible Wireless Mesh Network Testbed", *International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities* (**TridentCom**), Berlin, Germany, May 2010.

24. Parth H. Pathak and Rudra Dutta, "Impact of Power Control on Capacity of Large Scale Wireless Mesh Networks", *IEEE International Symposium on Advanced Networks and Telecommunication Systems* (**ANTS**), New Delhi, India, December 2009.

25. Dheeraj Kandula, Parth H. Pathak and Rudra Dutta, "MF-TCP : Design and Evaluation of TCP for Message Ferry Delay Tolerant Networks", *Australasian Telecommunication Networks and Applications Conference* (**ATNAC**), Canberra, Australia, November 2009.

26. Parth H. Pathak, Divya Gupta and Rudra Dutta, "Loner Links Aware Routing and Scheduling in Wireless Mesh Networks", *IEEE International Symposium on Advanced Networks and Telecommunication Systems* (**ANTS**), Mumbai, India, December 2008.

POSTERS AND DEMOS

1. Yunze Zeng, Parth H. Pathak, Zhicheng Yang and Prasant Mohapatra, "Poster: Human Tracking and Activity Monitoring using 60 GHz mmWave", ACM/IEEE International Conference on Information Processing in Sensor Networks (**IPSN**), Vienna, Austria, February 2016.

2. Yixin Zhao, Parth H. Pathak, Chao Xu and Prasant Mohapatra, "Demo: Finger and Hand Gesture Recognition using Smartwatch", *ACM International Conference on Mobile Systems, Applications, and Services* (**MobiSys**), Florence, Italy, May 2015.

3. Parth H. Pathak, Sankalp Nimbhorkar and Rudra Dutta, "Poster: Channel Width Assignment using Relative Backlog: Extending Back-pressure to Physical Layer", *ACM International Symposium on Mobile Ad Hoc Networking and Computing* (**MobiHoc**), Hilton Head Island, SC, USA, June 2012.

RESEARCH MENTORING EXPERIENCE

As a postdoctoral researcher at UC Davis, I have **mentored, collaborated and co-authored publications** with the following graduate students -

1. Aveek Das, Ph.D. Student, 2012-present
   Topic: Deep network inspection and traffic mining

2. Yunze Zeng, Ph.D. Student, 2012-present
   Topic: Ubiquitous sensing through radio frequency

3. Zhicheng Yang, Ph.D. Student, 2013-present
   Topic: Mobility-aware millimeter-wave network design

4. Pengfei Hu, Ph.D. Student, 2013-present
   Topic: Visible light communication and networking

5. Arun Raghuramu, Ph.D. Student, 2013-present
   Topic: Securing mobile devices through network traffic mining

6. Muchen Wu, Ph.D. Student, 2013-present
   Topic: Privacy issues in wearable devices

7. Li Zhang, Ph.D., 2013-2015
   Topic: Energy efficiency in mobile computing

8. Chao Xu, M.S., 2013-2015
   Topic: Gesture recognition with wrist-worn motion sensors

TEACHING EXPERIENCE

UNDERGRADUATE PROJECT MENTORING

– 2012-2013: Amanda Lins (Deep context detection - Android app dev.)

– 2013-2014: Andrew Yi (Crawling online social networks), Yumo Rong (UC Davis GREAT program - Anonymization of network traffic traces)

– 2014-2015: Lidan Mu (Campus-area network mobility modeling), Jeymisson Oliveira (WiFi sniffing and traffic mining)

GUEST LECTURER

– Deep Network Inspection through Traffic Mining, Course: Internet Measurements, Modeling and Analysis, Spring 2015, UC Davis.

- Scalable Network Routing, Course: Computer Networks, Fall 2012, UC Davis.

- Survivability in Wireless Access Networks, Focused Research Meetings (FRM) at Network Research Lab (2013), UC Davis.

TEACHING ASSISTANT

- Computer Networks, Fall 2008, NC State University.

- Introduction to Operating Systems, Fall 2007, NC State University.

RESEARCH AND WORK EXPERIENCE

Postdoctoral Research Fellow   Aug. 2012 - Present
University of California, Davis, CA, USA
Mentor: Prasant Mohapatra

- Researching design and architecture of next generation wireless networks, novel techniques of low-cost ubiquitous sensing, and network analytics through traffic mining. Initiated and managed new research projects on millimeter wave sensing, visible light communication and wearable analytics at Network Research Lab at UC Davis, also mentored and supervised the research of multiple graduate students.

Research Assistant   Aug. 2008 - July 2012
North Carolina State University, Raleigh, NC, USA
Mentor: Rudra Dutta

- Led the effort on CentMesh Project to build highly programmable, extensible, open-source wireless mesh network testbed in the Centennial campus of NC State University. Leveraged the testbed in design of novel load balancing routing and power control mechanisms for multi-hop networks. Analyzed their performability and availability with respect to network design and deployment factors.

Research Intern   May 2006 - Dec. 2006
Qualcomm Flarion Research Center, Bedminster, NJ, USA

- Worked on measurement-driven evaluation of vertical and horizontal handover strategies for mobile devices connected to an integrated Flash-OFDM femtocell and WiFi access point. Extended open-source WiFi driver for (Realtek chipset) to support the handover techniques on uClinux embedded Linux microcontroller platform.

Software Intern   May 2008 - Aug. 2008
Cisco Systems Inc., Wireless Network Business Unit (WNBU), San Jose, CA, USA

- Developed a radio resource management module for 802.11n WLANs that enables diagnosis of access point outages through link layer information, and a cloud service that allows a reliable remote monitoring of access points through a wireless controller system (WCS).

Software Intern   Jan. 2005 - July 2005
Institute of Plasma Research (IPR), Ganghinagar, Gujarat, India

- Developed and fine-tuned a Windows NDIS driver for a gigabit Ethernet backbone connecting a sensor network (deployed for monitoring) and in-house data center for reliable transfer of jumbo frames.

PROFESSIONAL SERVICES

- **Publicity Chair:** IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM) 2014, Sydney, Australia.

- **Technical Program Committee:** IEEE Wireless Communications and Networking Conference (WCNC) 2010-2014, 2016; IEEE Global Communication Conference (GlobeCom) 2010, 2013; IEEE International Symposium on Personal, Indoor and Mobile Radio Communication (PIMRC) 2010, 2012.

- **Conference Reviewer:** IFIP International Conference on Networking 2010; IEEE International Conference on Computer Communications (INFOCOM) 2015, 2016; IEEE International Conference on Network Protocols (ICNP) 2013; IEEE International Parallel and Distributed Processing Symposium (IPDPS) 2011; IEEE International Conference on Communications in China (ICCC) 2012.

– **Journal Reviewer:** IEEE Transactions on Mobile Computing (TMC), IEEE/ACM Transactions on Networking (ToN), Elsevier Computer Networks Journal, ACM SIGMOBILE Mobile Computing and Communications Review (MC2R), IEEE Transactions on Vehicular Technology (TVT), Elsevier Ad Hoc Networks 2012.

References

Prasant Mohapatra
Professor, Computer Science Department,
Associate Chancellor,
University of California, Davis, CA USA.
Email: pmohapatra@ucdavis.edu

Chen-Nee Chuah
Professor, Department of Electrical and
Computer Engineering,
University of California, Davis, CA USA.
Email: chuah@ucdavis.edu

Rudra Dutta
Professor, Computer Science Department,
North Carolina State University,
Raleigh, NC, USA.
Email: rdutta@ncsu.edu