ASHISH PATRO

1210 W Dayton St. Madison WI 53706

(318) 243-9731 • patro@cs.wisc.edu • http://pages.cs.wisc.edu/~patro/

EDUCATION	**University of Wisconsin Madison**	[August 2009 –]
	Ph.D. Candidate (Research Fellow)	
	Advisor: Prof. Suman Banerjee	
	Indian Institute of Technology Guwahati	[July 2005 – May 2009]
	B. Tech, Computer Science and Engineering	
	Department Rank: 3/53	

RESEARCH INTERESTS

- Algorithm/protocol/application development for networked systems.
- Using software defined frameworks for wireless networks.
- Machine learning techniques for mobile applications.

EXPERIENCE

Intern, Microsoft Research Redmond, USA   [June-September 2013]
(With Dr. Srikanth Kandula)

- Worked as part of the Mobility & Networking research group on building a vehicular analytics platform using WP8 smartphone devices.

Intern, Google - Mountain View, USA)   [May-August 2010]
(With Dr. Arunesh Mishra)

- Worked on Wi-Fi based localization algorithms for Android based location services.
- Created an Android application to process the real-time streams of partial GPS information on Android devices to infer various location characteristics.

Research Intern, Max Planck Institute for Software Systems, Germany   [May-July 2008]
  (With Prof. Rodrigo Rodrigues)

- Worked on a BitTorrent simulator called OctoSim, developed by Microsoft Research.
- Modified the simulator to incorporate some basic principles of Network Coding into the BitTorrent algorithm.

AWARDS/ ACHIEVEMENTS

- Best paper nominee at **ACM CoNEXT 2013** (for Insight project, one of top 4 papers)
- Awarded the **Microsoft Research Ph.D. Fellowship 2012**-14
- Won the second prize at the **InterDigital Innovation Challenge 2012**
- First place in the student research competition at **ACM MobiCom 2011**

SKILLS

- **Programming Languages:** C, C++, Java, Android SDK, WP8 SDK, C#, Python, Shell
- **Others:** OpenWrt, Floodlight + OpenFlow (SDN framework), Linux + Android kernel and driver development (networking), embedded platforms (Soekris, Alix), machine learning and analytics (Weka, R), web development (JavaScript, SQL, Azure, CouchDB)

PUBLICATIONS

[1] Capturing Mobile Experience in the Wild: A Tale of Two Apps (ACM CoNEXT'13)
Ashish Patro, Shravan Rayanchu, Michael Griepentrog, Yadi Ma, Suman Banerjee

[2] Observing Home Wireless Experience through WiFi APs (ACM MobiCom'13)
Ashish Patro, Srinivas Govindan, Suman Banerjee

[3] The Anatomy of a Large Mobile Massively Multiplayer Online Game (ACM SIGCOMM Workshop on Mobile Gaming, MobiGames'12: Best paper at the workshop)
Ashish Patro, Shravan Rayanchu, Michael Griepentrog, Yadi Ma, Suman Banerjee

[4] Catching Whales and Minnows using WiFiNet: Deconstructing non-WiFi Interference using WiFi Hardware (USENIX NSDI'12)
Shravan Rayanchu, Ashish Patro, Suman Banerjee

[5] AirTrack: Locating Non-WiFi Interferers using Commodity WiFi Hardware (Won the first prize in the Student Research Competition at ACM MobiCom'11)
Ashish Patro, Shravan Rayanchu, Suman Banerjee

[6] Airshark: Detecting RF Devices using Commodity Wi-Fi Hardware (ACM IMC'11)
Shravan Rayanchu, Ashish Patro, Suman Banerjee
(Slashdot and a number of other technical journals covered this work)

[7] A System for Audio Signaling Based NAT Traversal for Mobile Clients (ACM COMSNETS'11)
Ashish Patro, Yadi Ma, Fatemeh Panahi, Jordan Walker, Suman Banerjee

MAJOR RESEARCH PROJECTS

WiSe: Observing Home Wireless Experience through WiFi APs
- Designed and deployed a customized WiFi router platform in over 30 residential apartments **(running over a period of more than 9 months).**
- Developed passive techniques to analyse the impact of **link quality, co-channel WiFi and non-WiFi interference** that affect the performance of residential wireless networks in dense deployments, such as apartment complexes.
- Collaborated with Madison-based ISPs to debug their residential WiFi deployments.

Insight: Enabling Mobile Application Analytics and Network Measurements
- Designed and implemented a framework for application developers that collects mobile application analytics as well as performs network measurements.
- Performed a long-term measurement study (**spanning over 3 years**) across more than **1,000,000 users** on multiple cellular/WiFi networks through 2 popular mobile apps.
- By coupling network measurements along with application analytics, Insight also helped understand how network performance influenced application usage and revenues.

Airshark: Detecting non-WiFi interference using commodity WiFi hardware
- Identifies non-WiFi interferers **(e.g., analog phones, microwave ovens) in real-time** using cheap ($10 - $30) commodity WiFi cards.
- Airshark uses spectrum samples available from the recent generation of WiFi cards, builds non-WiFi device signatures and detects them using machine-learning techniques.

WiFiNet: Locate and quantify non-WiFi Interference using commodity WiFi hardware
- Combines updates from nearby WiFi APs in enterprise deployments to enable deeper analysis of non-WiFi interference.
- The system can locate non-WiFi devices using commodity WiFi hardware even if multiple devices of the same type of operating simultaneously.
- Uses packet level timing analysis to precisely identify the interference impact of each non-WiFi device on nearby WiFi links.

OTHER PROJECTS

Benchmarking Android's internal file systems
- Analyzed the performance of a popular file system used on Android devices (YAFFS2) by benchmarking performance of various components (garbage collection, check-pointing etc.).
- Proposed and implemented mechanisms to improve its wear-leveling performance

REFERENCES   Available upon request