Akshay Gadre

Carnegie Mellon University

10, 5700 Munhall Road, Pittsburgh • https://www.linkedin.com/in/gadreakshay

+1 669 278 9441 • agadre@andrew.cmu.edu • www.akshaygadre.com

Education

Program	Institution	%/CGPA	Years
Doctor of Philosophy, Electrical and Computer Engineering, Advisor: ***Prof. Swarun Kumar***	Carnegie Mellon University	**4.00/4.00**	2017 –
Dual Degree (B.Tech.(Honors)+M.Tech.), Computer Science and Engineering Advisor: ***Prof. Krishna Sivalingam***	Indian Institute of Technology Madras	**9.14/10.00**	2012 – 2017

Selected Publications

Full Duplex Radios: Are we there yet? **Nov 2020**
Vaibhav Singh, **Akshay Gadre***, Swarun Kumar* *ACM HotNets 2020*

Joltik : Enabling Energy-Efficient "Future-Proof" Analytics on Low-Power Wide-Area Networks **Oct 2020**
*M. Wang, J. Zhang, **Akshay Gadre**, Z. Liu, S. Kumar, V. Sekar* *ACM MOBICOM 2020*

Millimeter-Wave Full Duplex Radios **Oct 2020**
*V. Singh, S. Mondal, **Akshay Gadre**, M. Srivastava, J. Paramesh, S. Kumar* *ACM MOBICOM 2020*

Quick (and Dirty) Aggregate Queries on LP-WANs **Apr 2020**
***Akshay Gadre**, Fan Yi, Swarun Kumar, Anthony Rowe, Bob Iannucci*
[BEST PAPER AWARD] *ACM/IEEE IPSN 2020*

Low-Power Wide-Area Networks: Connect, Sense and Secure **Apr 2020**
Akshay Gadre **[BEST PRESENTATION AWARD]** *ACM/IEEE IPSN PhD Forum 2020*

Frequency Configuration for Low-Power Wide-Area Networks in a Heartbeat **Feb 2020**
***Akshay Gadre**, Revathy Narayanan, Anh Luong, Swarun Kumar, Anthony Rowe, Bob Iannucci* *USENIX NSDI 2020*

Poster: Maintaining UAV Stability using Low-Power WANs **Oct 2018**
***Akshay Gadre**, Revathy Narayanan, Swarun Kumar* **[BEST POSTER RUNNER-UP]** *ACM MOBICOM 2018*

A Deep Learning Approach to IoT Authentication **May 2018**
*Rajshekhar Das, **Akshay Gadre**, Shanghang Zhang, Swarun Kumar, José Moura* *IEEE ICC 2018*

Charm: Exploiting Geographical Diversity in Low-Power WANs **Apr 2018**
*A. Dongare, R. Narayanan, **Akshay Gadre**, A. Balanuta, A. Luong, S. Kumar, B. Iannucci, A. Rowe*
[BEST PAPER AWARD] *ACM/IEEE IPSN 2018*

Patents

Methods, systems, and articles of manufacture for joint decoding of packets in wireless networks using chirp spread-spectrum modulation **Oct 2019**
*A. Dongare, A. Balanuta, **Akshay Gadre**, R. Iannucci, S. Kumar, A. Luong, R. Narayanan, A. Rowe*
US Patent App. 16/374,981

Scholastic Achievements and Awards

- Awarded the 2020-21 CyLab Presidential Fellowship
- ACM/IEEE IPSN 2020 Best Paper Award
- ACM/IEEE IPSN Ph.D Forum 2020 Best Presentation Award
- ACM MOBICOM 2018 Best Poster Runner-up Award
- ACM/IEEE IPSN 2018 Best Paper Award
- ACM/IEEE CPSWeek 2018 Travel Grant Recipient
- Named a Carnegie Institute of Technology Dean's Fellow

Talks

Low-Power Wide-Area Networks: Connect, Sense and Secure **Apr 2020**
ACM/IEEE IPSN PhD Forum 2020 *Sydney, Australia (Virtual)*

Quick (and Dirty) Aggregate Queries on LP-WANs **Apr 2020**
ACM/IEEE IPSN 2020 *Sydney, Australia (Virtual)*

Frequency Configuration for Low-Power Wide-Area Networks in a Heartbeat **Feb 2020**
USENIX NSDI 2020 *Santa Clara, USA*

A Deep Learning Approach to IoT Authentication **May 2018**
IEEE ICC 2018 *Kansas City, USA*

Internships

Research Intern – Microsoft Research **Mentor: Dr. Ranveer Chandra | May - Aug 2020**
Azure Global *(14 weeks)*

- Developing wireless research solutions for Azure Global customers.

Research Intern – Univ. of Massachusetts, Amherst **Mentor: Prof. Arjun Guha | May - Jul 2016**
Programming Languages and Systems at Massachusetts(PLASMA) Lab *(11 weeks)*

- Performed research on software-defined network super-optimizers
- Worked with physical OpenStack cluster and OpenFlow switches to derive proof of concept of the planned algorithm.
- Developed a robust tool to integrate the above algorithm into modern systems using OpenFloodlight and OpenStack.

Research Intern – Microsoft Research India **Mentor: Dr. Monojit Choudhury | May - Jul 2015**
Machine Learning, Natural Language Processing and Multilingual Systems Group *(12 weeks)*

- Developed a procedure to compare the performances of Machine Translation systems on code-mixed texts.
- Investigated features for studying language independent and unsupervised code-switching Named Entity Recognition.

Research Projects

Low Latency Sensing at City-Scale **Sep 2018 - Oct 2019**
Low-Power Wide Area Network (LP-WAN) devices are expected to be ubiquitously deployed across urban spaces. A key impediment is the ability to quickly query a large number of clients within a small bandwidth. We aim to develop key techniques to enable real-time aggregation of sensor information from thousands of clients at city-scale.

Spectrum Selection for Low-Power WANs **Dec 2017 - Mar 2019**
LP-WAN devices are enabling a lot of city-scale IoT applications. The most important parameter that greatly impacts battery life of LP-WAN clients is their choice of transmission frequency. We design an intelligent spectrum selection protocol for LP-WANs that incurs minimal overhead and minimal power consumption to find the optimum band.

Deep Learning for IoT Security **Oct 2017 - Dec 2017**
Internet-of-Things (IoT) is penetrating all walks of life, from cars to implanted pacemakers. Most of these devices being low-power and cheap remain vulnerable to malicious intruders. We develop novel communication mechanisms to secure these billions of heterogeneous devices with minimal power and compute consumption and yet remain secure against much more powerful adversaries.

Coherent Combining for Low-Power WANs **Aug 2017 - Oct 2017**
LP-WAN devices are pushing the boundaries of long range low-cost battery powered communications. The benefits also bring a set of new exciting challenges, related to low-cost, low power consumption and small bandwidth. My research on coherent combining for LP-WANs attempts to improve the range, data rates and battery life of these devices by exploiting geographical diversity.

Teaching Experience

Compiler Design Lab and Computer Networks Lab **Aug 2016 - May 2017**
Teaching Assistant *IIT Madras*

Computer Networks and Special Topics in Communication **Jan 2018 - Dec 2019**
Teaching Assistant *Carnegie Mellon University*