Akshay Gadre
Carnegie Mellon University

5000 Forbes Avenue, Pittsburgh • https://www.linkedin.com/in/gadreakshay

✉ agadre@andrew.cmu.edu • ⌂ www.akshaygadre.com

Education

Program	Institution	Years
Doctor of Philosophy, Electrical and Computer Engineering, Advisor: **Prof. Swarun Kumar**	Carnegie Mellon University	2017 – 2022
Doctoral Thesis: *Rethinking Low-power Wide-area Networks on Earth and Space*		
Dual Degree (B.Tech.(Honors)+M.Tech.), Computer Science and Engineering Advisor: **Prof. Krishna Sivalingam**	Indian Institute of Technology Madras	2012 – 2017
Master's Thesis: *Centralized Approaches for Static and Dynamic Network Function Placement in SDN-enabled networks*		

Achievements and Awards

- ACM SIGBED-SIGSOFT Frank Anger Memorial Award 2021
- 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 2017
- One of the two people awarded Bachelor of Technology (Honors) from CSE@IIT Madras out of 62
- Placed 3rd internationally in ThinkQuest Digital Media Event 2011 conducted by ORACLE Education Foundation

Publications

Towards Fine-grained Imaging and Inference from LoRa-enabled CubeSats
Akshay Gadre, Zachary Manchester, Swarun Kumar   *under review*

MiLTOn: Sensing Product Integrity *without* Opening the Box using Non-Invasive Acoustic Vibrometry
Akshay Gadre, D. Vasisht, N. Raghuvanshi, B. Priyantha, M. Kotaru, S. Kumar, R. Chandra

under review

OwLL: Accurate LoRa Localization using the TV Whitespaces   **May 2021**
A. Bansal, Akshay Gadre, V. Singh, A. Rowe, B. Iannucci, S. Kumar   *ACM/IEEE IPSN 2021*

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   **Sep 2020**
M. Wang, J. Zhang, Akshay Gadre, Z. Liu, S. Kumar, V. Sekar   *ACM MOBICOM 2020*

Millimeter-Wave Full Duplex Radios   **Sep 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, Anthony Rowe, Bob Iannucci, Swarun Kumar

[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, Anthony Rowe, Bob Iannucci, Swarun Kumar   *USENIX NSDI 2020*

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

Acoustic Signature Management Engine in an Object Integrity Sensing System   **Jul 2021**
D. Vasisht, R. Chandra, M. Kotaru, B. Priyantha, N. Raghuvanshi, Akshay Gadre
US Patent Filed

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 10,735,047

Posters and Invited Papers

Invited Paper: Designing an ML-Friendly Wireless Physical Layer for Low-Power IoT   **Feb 2020**
Akshay Gadre, Swarun Kumar   *IEEE WiOPT 2020*

Poster: Designing a PHY-layer for Machine Learning on Low-Power Sensors   **Feb 2020**
Akshay Gadre, Anthony Rowe, Bob Iannucci, Swarun Kumar   *USENIX NSDI 2020*

Poster: Wireless Network Functions in the Era of Low-Power IoT   **Oct 2019**
Akshay Gadre, Swarun Kumar   *ACM MOBICOM 2019*

Invited Paper: Towards Enabling City-Scale Internet of Things – Challenges and Opportunities   **Jan 2019**
Akshay Gadre, Diana Zhang, Swarun Kumar   *IEEE COMSNETS 2019*

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

Undergraduate Publications

Centralized approaches for VNF Placement in SDN-enabled Networks   **August 2018**
Akshay Gadre, Anix Anbiah, Krishna Sivalingam   *EURASIP JWCN*

A Customizable Agile Approach to Network Function Placement   **Jun 2017**
Akshay Gadre, Anix Anbiah, Krishna Sivalingam   *IEEE EuCNC 2017*

Machine Translating Code Mixed Text: Pain Points and Sweet Spots   **May 2016**
Akshay Gadre, Rafiya Begum, Monojit Choudhury, Kalika Bali 3rd*WILDRE, LREC 2016*

Network Function Virtualization: A Primer   **May 2016**
Akshay Gadre, Krishna Sivalingam   *EAI Endorsed Transactions on Future Internet*

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*
Stanford University   *Stanford, USA*
University of California, Berkeley   *Berkeley, USA*

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

A Customizable Agile Approach to Network Function Placement   **June 2017**
IEEE EUCNC 2017   *Oulu, Finland*

Internships

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

- Developing acoustic research solutions for Azure Global customers in the supply chain industry.
- Developed an robust acoustic platform for sensing product integrity non-invasively through the box driven by market dynamics.

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.

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 Intern – Tata Research Development and Design Centre   **May - July 2014**
Software R&D Human Centric Systems Lab   *(10 weeks)*

- Deployed game-based assessment of behavioral characteristics and nudging person's choices through gamification.
- Developed a web-based game to extract valuable emotional and behavioral data to predict real life behavior.

Service

Program and General Chair   **Feb 2022**
1st ACM Workshop on No Power and Low Power Internet-of-Things (LP-IoT)

Program Committee Member   **Feb 2022**
12th ACM Wireless of the Students, by the Students, and for the Students Workshop (S3)

Journal Reviewer
ACM/IEEE Transactions on Networking   *2020-2021*
ACM Transactions on Sensor Networks   *2019-2020*
ACM Transactions on Asian and Low-Resource Language Information Processing   *2019-2020*
IEEE Transactions on Information Forensics & Security   *2021*
IEEE Internet-of-Things   *2019-2020*
IEEE Access   *2020*

Ordinary Wireless Lectures (OWL) Reading Group   **2020 - 2021**
Co-founder   *https://owlwireless.github.io/*

- Organized a weekly cross-university virtual reading group for discussing upcoming research in wireless conference venues.
- Organized talks by graduate students, professors and researchers with more than 15 affiliations.
- Attended by 78 members from over 30 universities during the pandemic.

Mentoring

Graduate Students

Adhishree Jaiprakash *(CMU→Akamai)*   *2017-2018*
- Assisted in building the distributed synchronization platform for Chime [NSDI '20]

Atulya Ravishankar *(CMU→Microsoft)*   *2017-2018*
- Assisted in coding synchronized phase measurement algorithms for Chime [NSDI '20]

Mingran Yang *(CMU→MIT)*   *2019-2020*
- Led the team which built Joltik [MobiCom '20]. I mentored on the LP-WAN and wireless aspects of the project.

Riddhiman Lahiri *(CMU→)*   *2020-2021*
- Assisted in developing time series compression algorithms for Space IoT.

Undergraduate Students

Fan Yi *(Shanghai Jiao Tong University→ CMU Intern → Princeton Ph.D)*   *Summer 2018*
- Assisted in building and evaluating the asynchronous LP-WAN collisions for QuAiL [IPSN '20 Best Paper]

Milind Srivastava *(IIT Madras→ CMU Intern→CMU Ph.D)*   *Summer 2019*
- Assisted in building the full-duplex cancellation techniques for mmFD [MobiCom '20]

Junwei Zhou *(CMU)*   *Fall 2020*
- Assisted in building a MAC layer version of QuAiL [IPSN '20 Best Paper] using homomorphic encryption

Teaching Experience

Compiler Design Lab   **Aug 2016 - Dec 2016**
Teaching Assistant   *IIT Madras*

- Assisted professor during lab hours to instruct students on in-lab assignments for building a Java compiler
- Invigilated and graded exams along with other teaching assistants based on well-defined rubrik.
- Redesigned the UI/UX of the course webpage.

Computer Networks Lab   **Jan 2017 - May 2017**
Teaching Assistant   *IIT Madras*

- Assisted professor during lab hours to instruct students on in-lab assignments for socket programming
- Invigilated and graded exams along with other teaching assistants based on well-defined rubrik.

Computer Networks   **Jan 2018 - May 2018**
Teaching Assistant   *Carnegie Mellon University*

- Organized recitations and meeting hours to instruct students on projects to develop a mini-YouTube in parallel to the theory.
- Managed the project component of the course, clearing the doubts and grading it.
- Proctored and graded exams based on well-designed rubrik.

Special Topics in Communication   **Aug 2019 - Dec 2019**
Teaching Assistant   *Carnegie Mellon University*

- Assisted professor during recitations and meeting hours to assist students to build research proposals.
- Provided feedback on feasibility, research directions and evaluation criterion on proposed projects.
- Provided continual evaluation of research projects over the semester and graded along with instructor during mid-term and end-term review.

References

Swarun Kumar
Associate Professor
Electrical and Computer Engineering
Carnegie Mellon University
swarun@cmu.edu

Ranveer Chandra
Managing Director, Research for Industry
Partner Manager, Networking Research
Microsoft
ranveer@microsoft.com

Anthony Rowe
Siewiorek and Walker Family Professor
Electrical and Computer Engineering and CyLab
Carnegie Mellon University
agr@ece.cmu.edu

Bob Iannucci
Distinguished Engineer
Processors at Google
biannucci@google.com

Deepak Vasisht
Assistant Professor
Computer Science
University of Illinois Urbana-Champaign
deepakv@illinois.edu