

## RESEARCH INTERESTS

I work at the intersection of distributed systems and applied machine learning, with a focus on sustainability. I have developed open-source tools that forecast carbon footprint of electricity grids and real-world systems. Currently, I am exploring how to design systems that can leverage these forecasts and similar relevant signals to reduce emissions at scale.

## EDUCATION

- University of Massachusetts, Amherst, USA** Aug '21 – Present  
PhD Candidate (6th year), College of Information and Computer Sciences (GPA: 3.90/4)  
**Advisor:** Prof. Ramesh K. Sitaraman (ramesh@cs.umass.edu)  
**Expected Graduation Date:** May 2027
- Indian Institute of Technology, Bombay, India** Jul '18 – Jun '20  
Master of Technology (M.Tech), Dept. of Computer Science and Engineering (GPA: 9.70/10)  
**Thesis:** Design, Development and Optimization of the User Plane Function (UPF) Dataplane in 5G  
**Description:** Designed and implemented a high-performance DPDK-based UPF dataplane. Developed two UPF models that achieved 10 Gbps line rate for various packet sizes while enforcing QoS rules for 16K sessions.  
**Advisor:** Prof. Mythili Vutukuru
- Jadavpur University, Kolkata, India** Jul '12 – May '16  
Bachelor of Engineering (B.E), Dept. of Computer Science and Engineering (GPA: 8.47/10)

## SELECTED PUBLICATIONS

The list below is in reverse chronological order. The full list of publications is available on [Google Scholar](#).

- ReVo: A Cross-Layer Neural Loss Recovery for Reliable Volumetric Videoconferencing** Under Review  
*Ankur Aditya\*, Diptyaroop Maji\* et al.*
- CarbonX: An Open Source Tool For Computational Decarbonization Using Time Series Foundation Models [pdf]** e-Energy '26  
*Diptyaroop Maji\*, Kang Yang\*, Prashant Shenoy, Ramesh K. Sitaraman, Mani Srivastava*  
In the 17th ACM International Conference on Future Energy Systems (e-Energy), June 2026
- A First Look at Node-Level Curtailment of Renewable Energy and its Implications [pdf] [Best paper finalist]** e-Energy '25  
*Diptyaroop Maji, David Irwin, Prashant Shenoy, Ramesh K. Sitaraman*  
In the 16th ACM International Conference on Future Energy Systems (e-Energy), June 2025
- The Green Mirage: Impact of Location- and Market-based Carbon Intensity Estimation on Carbon Optimization Efficacy [pdf] [Best paper runner-up]** e-Energy '24  
*Diptyaroop Maji, Noman Bashir, David Irwin, Prashant Shenoy, Ramesh K. Sitaraman*  
In the 15th ACM International Conference on Future Energy Systems (e-Energy), June 2024
- Bringing Carbon Awareness to Multi-cloud Application Delivery [pdf]** HotCarbon '23  
*Diptyaroop Maji, Ben Pfaff, Vipin PR, Rajagopal Sreenivasan, Victor Firoiu, Sreeram Iyer, Colleen Josephson, Zhelong Pan, Ramesh K. Sitaraman*  
In the 2nd Workshop on Sustainable Computer Systems (HotCarbon), July 2023
- CarbonCast: Multi-day Forecasting of Grid Carbon Intensity [pdf]** BuildSys '22  
*Diptyaroop Maji, Prashant Shenoy, Ramesh K. Sitaraman*  
In the 9th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys), November 2022
- Leveraging Programmable Dataplanes for a High Performance 5G User Plane Function [pdf]** APNet '21  
*Abhik Bose\*, Diptyaroop Maji\*, Prateek Agarwal, Nilesch Unhale, Rinku Shah, Mythili Vutukuru*  
In the 5th Asia-Pacific Workshop on Networking (APNet), June 2021
- (\* denotes student authors with equal contribution)

## AWARDS AND HONORS

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|-------------------------------------------------------------------------------------------------------------------|---------|
| <b>Best Paper Finalist:</b> ACM e-Energy 2025.                                                                    | Jun '25 |
| <b>Best Paper Runner-Up:</b> ACM e-Energy 2024.                                                                   | Jun '24 |
| <b>ACM SIGEnergy Student Travel Grant:</b> For ACM e-Energy 2024.                                                 | Jun '24 |
| <b>Teaching Assistant of the Month:</b> For the Design and Engineering of Computing Systems course at IIT Bombay. | Sep '19 |
| <b>All India Rank 42:</b> In Graduate Aptitude Test in Engineering (GATE) examination amongst 107893 candidates.  | Feb '18 |
| <b>First-Class with Honors:</b> In Bachelor of Engineering, Jadavpur University                                   | May '16 |

## RESEARCH AND WORK EXPERIENCE

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### University of Massachusetts Amherst, USA

Graduate Research Assistant

Aug '21 – Present

**Project:** Computational Decarbonization of Societal Infrastructures at Mesoscales (NSF CoDec).

**Description:** Working on building open source tools for carbon intensity forecasts and designing systems that leverage these forecasts to reduce emissions at scale.

### Google, Systems Research Group, USA

Student Researcher (Mentor: Yawen Wang)

May '26 – Present

**Project:** Carbon-aware placement of ML workloads across geo-distributed Google clusters.

**Description:** Developing a scheduler that places ML workloads across geo-distributed clusters with the aim of minimizing system emissions while maintaining resource occupancy and user-specified constraints.

### VMware Research, USA

Research Intern (Mentor: Ben Pfaff)

May '22 – Aug '22

**Project:** Bringing carbon-awareness to the NSX Avi Global Load Balancer.

**Description:** Developed a prototype load balancer that redirects requests based on carbon intensity and latency, lowering average operational emissions by 21% relative to the native load balancer.

### Indian Institute of Technology Bombay, India

Project Engineer (PI: Mythili Vutukuru)

Jul '20 – Jun '21

**Project:** Development and optimization of high-performance User Plane Function (UPF) dataplane in 5G.

**Description:** Developed a high-performance DPDK-based UPF dataplane that achieved 40 Gbps line rate for various packet sizes while enforcing QoS rules for 65K sessions.

### Samsung Research Institute Bangalore, India

Senior Software Engineer

Mar '18 – Jun '18

Software Engineer (Manager: Farooq Hussain S)

Jun '16 – Feb '18

**Project:** Feature development in and maintenance of Android Mobile Hotspot for flagship devices.

**Description:** Worked on feature development and product lifecycle management mainly in Android framework & UX layers, writing code that went into commercialization.

### Samsung Research Institute Bangalore, India

Student Trainee (Mentor: Farooq Hussain S)

May '15 – Jul '15

**Project:** Concurrent effective utilization of Wi-Fi frequency bands for data sharing in RSDB enabled devices.

**Description:** Developed a file-sharing application that uses both Hotspot & Wi-Fi of a device simultaneously to create two channels (2.4 & 5GHz) for fast file transfer between two devices.

## TEACHING EXPERIENCE

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### University of Massachusetts Amherst, USA

Teaching Assistant

**CS 590AE:** Wireless and Mobile Networks. (Instructor: Prof. Jim Kurose)

Jan '26 – May '26

### Indian Institute of Technology Bombay, India

Teaching Assistant

**CS 695:** Topics in Virtualization & Cloud Computing. (Instructor: Prof. Mythili Vutukuru)

Jan '20 – May '20

**CS 744:** Design and Engineering of Computing Systems. (Instructor: Prof. Umesh Bellur)

Sep '19 – Dec '19

**CS 224:** Computer Networks. (Instructor: Prof. Kameswari Chebrolu)

Jan '19 – May '19

**CS 305:** Computer Architecture. (Instructor: Prof. Bernard Menezes)

Sep '18 – Dec '18

MENTORSHIP EXPERIENCE

|                                                                                                                             |               |
|-----------------------------------------------------------------------------------------------------------------------------|---------------|
| Duy Nguyen, Ryan Li, Preet Mendapara, Shanmukh Praharaju (UG, UMass) – Early Research Scholars Program (ERSP), UMass [link] | 2026 (Fall)   |
| Tanush Savadi (UG, UMass) – Independent Study, UMass                                                                        | 2024-2025     |
| Jason Chen (UG, Boston University) – NSF Research Experience for Undergraduates (REU), UMass                                | 2024 (Summer) |
| Chaehyeon Kim, (UG, Case Western Reserve University) – NSF REU, UMass [link]                                                | 2023 (Summer) |
| Rohan Lekhwani (MS, UMass) – Independent Study, UMass                                                                       | 2023 (Spring) |

ACADEMIC SERVICE

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Shadow Program Committee: The 21st European Conference on Computer Systems [link]                                                                                            | EuroSys '26    |
| Program Committee: The second ACM International workshop on Foundation Models for Energy-Efficient Buildings, Cities, Transportation, and Sustainability (FMSust '26) [link] | BuildSys '26   |
| Chair and Organizing Committee: The Second Workshop on Measurements, Modeling, and Metrics for Carbon-Aware Computing (CarbonMetrics '26) [link]                             | SIGMETRICS '26 |

NEWS AND MEDIA COVERAGE

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|-------------------------------------------------------------------|------|
| CarbonCast                                                        |      |
| Revolutionary Insider (Issue XXXXI), UMass Amherst [link]         | 2026 |
| Are Data Centers Bad for the Environment? [link]                  | 2024 |
| CarbonX                                                           |      |
| Manning CICS Helps Shape Inaugural ACM Sustainability Week [link] | 2026 |

SKILLS

Programming Languages: C/C++, Java, Python  
Systems & Networking: DPDK, Docker, AWS, Kubernetes  
Machine Learning: PyTorch, TensorFlow, Keras