

Aadesh Madnaik

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Website

LinkedIn

Google Scholar

Education

Ph.D. in Electrical and Computer Engineering

Georgia Institute of Technology

Advisor: Dr. Karthikeyan Sundaresan

May 2027 (*expected*)

Atlanta, GA, USA

M.S. in Electrical and Computer Engineering

Georgia Institute of Technology

Advisor: Dr. Karthikeyan Sundaresan

GPA: 4.0/4.0

May 2024 (*expected*)

Atlanta, GA, USA

B.Tech. with *Honors* in Electrical Engineering

Indian Institute of Technology Bombay

Advisor: Dr. Sharayu Moharir

Minor: Computer Science and Engineering

GPA: 9.31/10

May 2022

Mumbai, India

Research Interests

5G/6G: Reconfigurable Intelligent Surfaces (RIS), Dynamic Spectrum Access, Machine Learning approaches to Integrated Sensing and Communication (ISAC)

Publications

Madnaik, A., Matson, N. C. and Sundaresan, K., “Scalable Network Tomography for Dynamic Spectrum Access,” *IEEE INFOCOM 2024 - IEEE Conference on Computer Communications*, [arXiv:2403.03376](https://arxiv.org/abs/2403.03376)

Madnaik, A., Moharir, S., Karamchandani, N., “Renting Edge Computing Resources for Service Hosting”, *EAI VALUETOOLS 2022*, [doi:10.1007/978-3-031-31234-2_17](https://doi.org/10.1007/978-3-031-31234-2_17)

Research Experience

Reconfigurable Intelligent Surfaces (RIS)

Jun '23 – Present

Advised by Dr. Karthikeyan Sundaresan, MARGA, Georgia Tech

- Working on integrating RIS with commodity mmWave radars

Dynamic Spectrum Access (DSA)

Aug '22 – Jun '23

Advised by Dr. Karthikeyan Sundaresan, MARGA, Georgia Tech

- Developed a scalable network tomography framework to maximize resource utilization in unlicensed, high-interference environments
- Proposed an algorithm to infer multi-channel interference statistics by transforming clients into spectrum sensors with linear overheads

Backscatter for Low-power IoT Environmental Sensing

Aug '23 – Present

Advised by Dr. Ashutosh Dhekne, Georgia Tech

- Building an ultra low-power battery-free backscatter tag to communicate over long distances through spread-spectrum and ECC techniques

	Online Decision Making for Edge Computing <i>Aug '21 – Jun '22</i> <i>Advised by Dr. Sharayu Moharir, IIT Bombay</i> <ul style="list-style-type: none"> Proposed an online algorithm to decide the state of an edge computing system incurring switching costs under stochastic and adversarial environments
Awards & Achievements	<ul style="list-style-type: none"> Recipient of the M & H Bourne Fellowship (Fall '22 & Spring '23). All-India-Rank 114 in JEE Main 2018 amongst 1.14 million candidates Top 0.5 percentile in JEE Advanced 2018 amongst 230,000 candidates Top 1 percentile in National Examination for Physics and Chemistry, 2017 Awarded Passing Out Color by EE department, IIT Bombay
Other Research	Learning Unsupervised Representations for Sensing Humans <i>Aug '23 – Dec '23</i> <i>Advised by Dr. Amirali Aghazadeh, Georgia Tech</i> <ul style="list-style-type: none"> Built an unsupervised framework to compress spatio-temporal features Reduced the training data requirements of downstream tasks by a factor of 50 Topological Methods for Data-Driven Analysis <i>May '20 – Feb '21</i> <i>Advised by Dr. Debasish Chatterjee, IIT Bombay</i> <ul style="list-style-type: none"> Applied persistent homology to analyse high-dimensional data using topological data analysis, to motor control, gait dynamics, and neurodegenerative diseases
Work & Teaching Experience	Oracle Cloud Infrastructure , Oracle India Pvt. Ltd. <i>May '21 – Jul '21</i> <i>Extended a full-time offer following remarkable internship performance</i> <ul style="list-style-type: none"> Integrated a methodology to record order payloads into pre-existing pathways Developed an i/o interface to visualise and record submissions to Jira Teaching Assistant (MA108: Differential Equations) <i>May '21 – Jul '21</i> SunEdison Infra (Solar PV Company) <i>Jul '20 – Aug '20</i>
Positions of Responsibility	Course Structure Organizer, Teaching Assistant <i>Jul '20 – Feb '21</i> <i>with Prof. Mairal, Director, Stanford Byers Center for Biodesign</i> <ul style="list-style-type: none"> Organized a two-phase design-thinking course aimed towards identifying need statements and innovative solutions for the under-served communities Course Structure Organizer <i>Nov '20 – Mar '21</i> <i>Making and Prototyping at MakerSpace of IIT Bombay</i> <ul style="list-style-type: none"> Designed the course content, structure, delivery mechanisms and logistics for a new elec-mech-prototyping course for all undergraduates at IIT Bombay Manager, Tinkerers' Laboratory <i>May '20 – Apr '21</i> <i>Nominated head of 'makerspace', led a team of 8</i> <ul style="list-style-type: none"> Designed a five-year plan for self-sustenance and industry partnerships Secured the expansion of the lab through pitches to alumni donors Volunteer, ACM SIGMETRICS / IFIP PERFORMANCE 2022 <i>Jun '22</i> <ul style="list-style-type: none"> Contributed to event organization and the logistics of conference tracks

**Relevant
Coursework**

Communication Networks, RF: Wireless Networks, Advanced Wireless Networks, Personal and Mobile Communications, Advanced Data Networks, Mobile Computing and IoT, Wireless Communications, Microwave Design

Machine Learning: Generative and Geometric Deep Learning, Foundations of Intelligent and Learning Agents, Deep Learning for NLP

Probability & Statistics: Random Processes, Stochastic Optimization, Stochastic Control, Advanced Probability and Random Processes

Signal Processing: Advanced Digital Signal Processing, Image Processing, Radar Signal Processing