

# Aadesh Madnaik

[amadnaik3@gatech.edu](mailto:amadnaik3@gatech.edu)

(404) 644 4551

[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

May 2024 (*expected*)

Atlanta, GA, USA

GPA: 4.0/4.0

### 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*, [Pre-print](#)

**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](#)

## 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

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

**Relevant  
Coursework**

**Communication Networks:** Wireless Networks, Advanced Wireless Networks, Personal and Mobile Communications, Advanced Data Networks, Mobile Computing and IoT, Wireless Communications

**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:** Image Processing, Radar Signal Processing