Ameya Daigavane

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Education

- **Massachusetts Institute of Technology** — Cambridge, MA
  PhD in Electrical Engineering and Computer Science (GPA 5.0/5.0) — *2022-Current*
  - Research Assistant in the Atomic Architects group led by Prof. Tess Smidt.
- **Indian Institute of Technology, Guwahati** — Guwahati, India
  B.Tech in Computer Science and Engineering (GPA 9.38/10.0) — *2016-2020*

Experience

- **Pre-Doctoral Researcher - Google Research** — Bangalore, India
  Mentors: Dr. Gaurav Aggarwal and Dr. Prateek Jain — *September 2020 - August 2022*
  - Designed node-level differentially-private graph neural networks.
  - Developed interactive visualizations for microplate experiments.
- **Research Intern - NASA, Jet Propulsion Laboratory** — Pasadena, CA
  Mentor: Dr. Gary Doran — *June 2020 - August 2020*
  - Designed, prototyped and assessed radiation sensitivity of time-series anomaly detection methods in a flight system setting.
- **Research Intern - NASA, Jet Propulsion Laboratory** — Pasadena, CA
  Mentor: Dr. Kiri Wagstaff — *May 2019 - July 2019*
  - Explored unsupervised algorithms for onboard event detection in time-series data for the Plasma Instrument for Magnetic Sounding on the upcoming Europa Clipper mission.
  - Developed a novel extension of the matrix profile for the discovery of anomalous subsequences in multidimensional time-series.
- **Research Intern - Indian Institute of Science** — Bangalore, India
  Mentor: Prof. Aditya Gopalan — *May 2018 - July 2018*
- **Research Intern - Indian Institute of Technology, Gandhinagar** — Gandhinagar, India
  Mentor: Prof. Shanmuganathan Raman — *May 2017 - July 2017*

Publications

- **Learning Integrable Dynamics with Action-Angle Networks**
  Ameya Daigavane, Arthur Kosmala, Miles Cranmer, Tess Smidt, and Shirley Ho.
  Accepted at Machine Learning and the Physical Sciences at NeurIPS, 2022.
- **Unsupervised Detection of Magnetic Field Boundary Crossings From Plasma Spectrometer Data**
  Ameya Daigavane, Kiri Wagstaff, Gary Doran, Corey Cochrane, Caitriona Jackman, and Abigail Rymer.
  Published at Computers and Geosciences, 2022.
  Invited talk at ML for Planetary Science and Space Physics and ML in Heliophysics.
- **Resource Consumption and Radiation Tolerance Assessment for Data Analysis Algorithms Onboard Spacecraft**
  Gary Doran, Ameya Daigavane, and Kiri Wagstaff.
  Published at IEEE Transactions on Aerospace and Electronic Systems, 2022.

- **Integrating Deep Learning and Unbiased Automated High-Content Screening to Identify Complex Disease Signatures in Human Fibroblasts**
  Lauren Schiff, et al.
  Published at Nature Communications, 2022.

- **Node-Level Differentially Private Graph Neural Networks**
  Ameya Daigavane, Gagan Madan, Aditya Sinha, Abhradeep Thakurta, Gaurav Aggarwal, and Prateek Jain.
  Accepted for oral presentation (one of four papers) at PAIR^{2}Struct at ICLR, 2022.

- **Understanding Convolutions on Graphs**
  Ameya Daigavane, Balaraman Ravindran, and Gaurav Aggarwal.
  Published at Distill, 2021.

- **Interactive Media for Understanding ML Methods: A Case-Study on Graph Neural Networks**
  Ameya Daigavane, Balaraman Ravindran, and Gaurav Aggarwal.
  Accepted at Rethinking ML Papers at ICLR, 2021.

- **Detection of Environment Transitions in Time Series Data for Responsive Science**
  Ameya Daigavane, Kiri Wagstaff, Gary Doran, Corey Cochrane, Caitriona Jackman, and Abigail Rymer.
  Accepted for oral presentation (one of five papers) at MiLeTS at KDD, 2020.

Awards and Honours

MIT SERC Scholar Award 2022
ACM SIGBED Scholars Award – One of three awardees 2020
ACM SIGKDD Student Registration Award 2020
Caltech Summer Undergraduate Research Fellowship (SURF) Award 2019
ACM ICPC Qualifiers – 61st in India among 4000+ teams 2019
ACM ICPC Kanpur Regionals – 18th in India among 200+ teams 2019
OzCHI Student Design Challenge – Honorable Mention (Top 5) 2019
Outstanding (AS) Grade in 10 courses across CS and Math 2016-2020
Analyze This – Outstanding Performer – 55th in India among 2000+ teams 2017
KVPY Science Scholarship – SA Stream – 156th in India 2015
FIITJEE Talent Reward Examination – 1st in India 2014
Regional Mathematics Olympiad – 1st in state 2014

Selected Open-Source Contributions

- **Magnetic Field Boundaries in Cassini Plasma Spectrometer Data**
  Caitriona Jackman, Michelle Thomson, Michele Dougherty and Ameya Daigavane.
- **ogbg-molpcba** Molecular activity prediction with graph neural networks in JAX
  Ameya Daigavane and Thomas Kipf.
- **densratio_py** α-Relative probability density ratio estimation with RuLSIF
  Koji Makiyama and Ameya Daigavane.

Volunteering

- **English on Call**: Taught English to economically disadvantaged students.
- **SHINE Youth4Jobs**: Mentored differently-abled participants on time, emotion, and career management.
- **EECS GAAP**: Mentoring students from underrepresented backgrounds on graduate school applications.