# Gati Aher

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Boston, MA


## EDUCATION

**Olin College of Engineering** — Needham, MA
*Candidate for B.S. in Engineering: Computing;* ***GPA:*** *4.00/4.00* — *May 2023*
**Relevant Courses:** Neurotech: Brain and Machines; User-Oriented Collab. Design; Discrete Math

## RESEARCH AND WORK EXPERIENCE

**Olin College Microbiology and Bioinformatics Research Lab** — Needham, MA
*Research in the laboratory of Jean Huang, Ph.D.* — *Jan. 2021 – Present*
- Leveraged R and Python packages to visualize trends in time-series data with hierarchical properties
- Performed literature review and empirical evaluation of methods for compositional data analysis
- Implemented and analyzed algorithms for inferring network interactions in microbial communities
- Cleaned and interpreted 2D Fourier analysis to measure periodic patterns in bacteria surface images

**Olin College Satellite + Spectrum Technology & Policy Group** — Needham, MA
*Research in the laboratory of Whitney Lohmeyer, Ph.D.* — *Sep. 2021 – Present*
- Applied causal statistics and game theory to analyze factors driving value in 5G spectrum auctions
- Automated web-scraping, pdf-text extraction, and data mining with Python and R scripts
- Researched and formulated economic implications of ongoing FCC satellite and spectrum policies

**Indico Data Solutions, Inc.** — Boston, MA
*Software Research Intern, Applied Deep Learning Research & Development Team* — *May 2021 – Aug. 2021*
- Prototyped and user-tested novel React.js GUI for predicting and correcting grouped extractions
- Adapted object detection Faster R-CNN model to classify handwriting on business documents
- Incorporated methods for alternate pre-training, multi-label tasks, and small object detection

**The MITRE Corporation** — Bedford, MA
*Research in the laboratory of John Henderson, Ph.D., Natural Language Processing* — *Sep. 2020 – Jan. 2021*
- Researched new methods to exploit vulnerabilities in natural language machine learning systems
- Adapted and updated research code for generating a paraphrase database using bilingual pivoting
- Determined hardware configuration and extrapolated run-time for computation with 4x more data
- Applied logistic regression and feature engineering for classification on imbalanced dataset

**Cumulus Digital Systems** — Cambridge, MA
*Software Intern* — *May 2020 – Aug. 2020*
- Implemented Serverless microservice REST API using Swagger and AWS CloudFront
- Created AWS SNS, Lambda, and DynamoDB webhooks system to enable real-time data updates

**The MITRE Corporation** — Bedford, MA
*Software Intern, Secured Assured Intelligence Learning Systems (US Govt. IARPA Project)* — *Jun. 2019 – Aug. 2019*
- Prototyped containerized pipeline to evaluate security vulnerabilities in machine learning models
- Consolidated information about adversarial attacks and defenses to populate educational resource

**Boston University, Hariri Institute for Computing** — Boston, MA
*Research in the laboratory of Andrei Lapets, Ph.D.* — *Jul. 2018 – Aug. 2018*
- Evaluated and improved secure-multiparty computation algorithms for sorting and set-intersection

## Presentations and Posters

Madan, S., **Aher, G.**, Huang, J., et al. "What factors affect microbial community composition?" *NEMPET 2021.*

**Aher, G.** "Principal Component Analysis for Facial Recognition." *Technical University of Łódź, PL MathUp Conference 2021.*

**Aher, G.**, Qin, L., Issa, R. "Refining Private Set Intersection Under Secure Multi-Party Computation." *BU GROW 2018.*

Wong, L., Tyrell, S., **Aher, G.** "Artificial Intelligence and Chatbots." *ISTE 2018*.

Wong, L., **Aher, G.,** et. al. "SOARing with Drones in Education." *MassCUE 2018*.

## Grants and Awards

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| Massachusetts Space Grant Undergraduate Research Award | *Sep. 2021* |
| Franklin W. Olin College Student Academic Grant Research Award | *Sep. 2021* |
| 4-year, 50% Tuition Franklin W. Olin College Merit Scholarship | *Sep. 2019 – Present* |
| AFCEA Fellowship, Lexington-Concord MA Highest-Ranking STEM Student Award | *May 2019* |

## Academic Service and Teaching

**Data Science and Machine Learning Lunch-and-Learn Program** — Olin College, MA
*Main Organizer, Main Presenter* — *Fall 2021 – Present*

**Software Design in Python** — Olin College, MA
*Teaching Assistant* — *Fall 2020*

**Olin Dance Ensemble** — Olin College, MA
*Classical Indian Dance Instructor, Dancer* — *Fall 2019 – Present*

## Relevant Projects

**Hand Gesture Detection** (https://github.com/GatiAher/EMG_Gesture_Recognition) — Olin College, MA
*Neurotechnology: Brains and Machines* — *Spring 2021*
- Applied machine learning to create system for classifying rock, paper, and scissor hand gestures
- **Independent Project** – replicated research on creating a topological chart of sEMG feature space

**Designing Technology For Museum Exhibition Planners** — Olin College, MA
*User-Oriented Collaborative Design* — *Spring 2021*
- Interviewed museum exhibition planners about their experiences with COVID-19 pandemic
- Defined value and developed innovative, user-oriented concepts, products, and services

**Survey of Data Structures for Large Scale Search & Information Retrieval** (write-up) — Olin College, MA
*Data Structures, Algorithms, and Software Systems* — *Spring 2021*
- Investigated design and use-cases of inverted index, compression codes, and the BitFunnel structure

**Procedurally Generating Graphs for Realistic Network Simulations** (write-up) — Olin College, MA
*Discrete Mathematics* — *Fall 2021*
- Implemented and analyzed algorithms for generating small-world and scale-free graphs

## Skills

**Programming:** Python, R, SQL, Hadoop, Java, C, Linux/Bash, Git, JavaScript, React.js, Node.js, D3.js, HTML/CSS, Serverless, AWS, Docker, Pytorch, Tensorflow, OOPS, Data Structures and Algorithms, Machine Learning, Deep Learning

**Math:** Probability and Statistics, Calculus, Linear Algebra, Discrete Mathematics, Network Analysis