

Ashwini Suriyaprakash

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EDUCATION

Massachusetts Institute of Technology (MIT), Cambridge, MA

Masters in Electrical Engineering and Computer Science In Progress 2024 - 2025
Bachelor of Science in Computer Science and Engineering GPA: 5.0 / 5.0 2021 - 2025

Relevant Courses Completed: Design & Analysis of Algorithms, Software Construction, Machine Learning, Computer Vision, Hardware Architecture for Deep Learning, Computer Systems, Operating Systems, Math for Computer Science, Differential Equations, Linear Algebra & Optimization, Probability & Statistics, Chemistry, Biology

Current & Planned Courses: TinyML & Efficient Deep Learning, Optimization Methods, Genetics, Probability, Computational Systems Biology: Deep Learning in the Life Sciences

RESEARCH EXPERIENCE

Graduate Researcher, Kellis Lab, MIT Sept. 2024 - Present

- Conducting research on the genomic basis of opioid use disorder by (1) identifying dysregulated genes through differential expression analysis of single-cell RNA-seq from patient brain tissue and (2) modeling the regulatory network to link transcription factors to target genes using Perturb-seq.
- Implementing analyses for each cell type, brain region, sex, and age group using Python programs.

Undergraduate Researcher, Kellis Lab, MIT Sept. 2023 - May 2024

- Developed a transformer-based deep learning approach (TRNReg) that infers gene regulatory networks and addresses limitations in existing CNN-based GraphReg method.
- Assessed TRNReg's performance compared to GraphReg's using metrics and improved accuracy through data augmentation.
- Implemented TRNReg using Python's Keras library.
- Presented poster on research and detailed results in a report: [ashwinis.com/wp-content/uploads/2024/11/TRNReg_ResearchArticle_AshwiniS.pdf](https://www.ashwinis.com/wp-content/uploads/2024/11/TRNReg_ResearchArticle_AshwiniS.pdf).

Undergraduate Researcher, Berger Lab, MIT Mar. 2022 - May 2022

- Analyzed 4,803 cancer cell line genetic mutations and prioritized 17 mutations for further investigation. Analysis involved determining potentially cancer-causing mutations that occurred in ICGC/TCGA clinical patient samples by developing Python and Linux shell programs.

Researcher, Snyder Lab, Stanford University May 2020 - Aug. 2021

- Identified DNA repeat expansions implicated in cancer by developing a software pipeline (TROPIC).
- Used TROPIC to analyze genomic data from cancer patients and identify 160 loci likely implicated across 38 cancers. Implemented TROPIC using Python, R, and Linux shell.
- Co-authored publication with Dr. Graham Erwin.

Researcher, Markstein Lab, UMass Amherst Jun. 2019 - Aug. 2019

- Demonstrated efficacy of two drug combinations on cancer treatment in fruit flies by conducting laboratory experiments with genetic crosses.

PUBLICATIONS

- Erwin, G. S., Gürsoy, G., Al-Abri, R., **Suriyaprakash, A.**, Dolzhenko, E., Zhu, K., ... & Snyder, M. P. (2023). [Recurrent repeat expansions in human cancer genomes](#). *Nature*, 613(7942), 96-102.

WORK EXPERIENCE

- Engineering Summer Analyst, Goldman Sachs** June 2024 - Aug. 2024
- Enhanced the firm's trading platform by increasing fault tolerance, expandability, and privacy of individual trader-client transactions. Developed a Java application that implements concurrent processes to determine which traders can view a particular client's transaction in real-time.
- Lab Assistant, Software Construction Course (6.1020), MIT** Feb. 2024 - May 2024
- Reviewed software engineering concepts (e.g., program testing, abstract data types, concurrency) during weekly office hours. Helped students solve programming problem sets. Provided feedback on code correctness, style, and versatility. Clarified questions on the online Q&A platform.
 - Will serve as a Graduate Teaching Assistant for this course in Spring 2025.
- Software Engineer Intern, Illumina** May 2023 - Aug. 2023
- Increased efficiency of Illumina's genomic analysis platform DRAGEN, which identifies genetic variants from next-generation sequencing data.
 - Enabled DRAGEN to run on an Amazon F1 instance. Doubled efficiency by enabling two DRAGEN applications to run concurrently on one instance with multiple FPGAs using Docker/Kubernetes.
- Software Engineer Intern, Quantea** June 2022 - Aug. 2022
- Significantly enhanced company's ability to monitor client networks and detect security breaches. Improved performance of network packet sorting (33.9% faster) and developed efficient file I/O algorithm with multithreading to store captured packets (~33.8% faster file write rate) in C.

INDEPENDENT PROJECTS

- ML-based Drug Identification for Breast Cancer** Dec. 2023 - Jan. 2024
- Predicted drug efficacy against breast cancer target protein HER2 using neural networks.
 - Trained model on ChEMBL database chemical compounds with features, including Morgan fingerprint, atomic composition, and molecular weight.
- Contemporary Music Clustering** Jan. 2022 - Feb. 2022
- Grouped contemporary music by developing a CNN-based autoencoder for spectrograms.

PROGRAMMING SKILLS

Languages & OOP: C/C++, Python, Java, Linux shell scripting; **Algorithms:** Recursion, DP, range queries, graph search; **Data structures:** Array, linked list, stack, queue, map, trees; **AI:** Regression and classification using scikit-learn, Deep Learning (CNN, Autoencoder, Transformer) using Keras/TensorFlow

LEADERSHIP / AWARDS

- Senior Associate, [Biotech Group](#), MIT** Sept. 2023 - Present
- Introduced MIT students to Boston's biotech startup/venture ecosystem by organizing the Founder & Venture Capital Dinner Series. Invited guest speakers, including Ankit Gupta from Reverie Labs and Tony Kulesa from Pillar VC, so students can learn about their entrepreneurial journeys.
 - Organized Career Fair, inviting 40 companies and fundraising over \$1,000 through sponsors.
- Scholarship Recipient, [Andy Grove Scholarship](#), Intel Corporation** August 2024
- Received \$4,000 scholarship based on academic achievement, demonstrated leadership, community involvement, and work experience.
- Mentor, [CodeIt](#), MIT** Oct. 2021 - May 2022
- Introduced programming to middle school girls from MA/NJ/NH. Taught students new concepts (e.g., variables, loops, conditionals) weekly and guided them to complete lab exercises in the Scratch language. Helped them brainstorm ideas and develop final projects.