GADIRAJU "CHINMAY" VARMA

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LinkedIn GitHub Website

EDUCATION

S.R.M. Institute of Science and Technology **Chennai, India**
B. Tech. in Computer Science and Engineering, Honors Aug 2020 – Present
Concentration: Artificial Intelligence and Machine Learning
Bachelor's Thesis (ongoing): Analysis of human Tfh cell differentiation using a gene regulatory network approach.
Supervisor: Dr. Vinay S. Mahajan (Brigham and Women's Hospital, Harvard Medical School, Boston, MA)

Waseda University **Tokyo, Japan**
Study Abroad Program, School of Fundamental Science and Engineering Mar – Sept 2023
Gained technical expertise and language skills through participation in university-hosted workshops and specialized seminars on data mining. Enhanced understanding of cross-cultural research and collaboration.

PUBLICATIONS AND CONFERENCE PRESENTATIONS

– **Gadiraju CV***, Venkatesh S, Viswanathan K, Omelchenko A, Viswanadham V, Yuen GJ, Mattoo H, Pillai S, Das J, Mahajan VS. (Jul 2024) Integrative analysis of human Tfh cell differentiation using a multilayered gene regulatory network approach. **International Conference on Intelligent Systems for Molecular Biology, Montréal.** *Poster, *presenting author.*

– Yockey L, Guy T, **Gadiraju C**, Doyle I, Akaa J, Puri A, Wallace Z, Katz G, Montesi S, Stone J, Castelino F, Pillai S, Luster A, Mahajan V, Perugino C. (Nov 2024) FoxP3Hi CTLA4$^+$ ICOS$^+$ Regulatory T Cells Are Expanded in Patients with Sarcoidosis but Not Systemic Sclerosis or IgG4-Related Disease. **ACR Convergence.** *Poster*

– Moro C, Bhagat KK, Veer V, **Gadiraju CV**, Das A, & Birt, J. (2023) Indian and Australian university students' acceptance of using accessible, web-based, and smartphone-delivered augmented reality in tertiary learning: a cross-country analysis. **Journal of University Teaching & Learning Practice** *doi.org/10.53761/1.20.6.14*

RESEARCH EXPERIENCE

Ragon Institute of MGH, MIT, and Harvard **Cambridge, MA, USA**
Research Intern Jul 2024 – Present
Mentor: Dr. Shiv Pillai (Ragon Institute of MGH, MIT, and Harvard)
Co-Mentor: Dr. Vinay S. Mahajan (BWH Division of Engineering in Medicine)
Project: **Epigenomic analysis of CD4$^+$ CTL differentiation in IgG4-related disease.**

Drs. Pillai and Mahajan and their colleagues had previously shown that CD4$^+$ CTLs are likely drivers of a human autoimmune fibrotic disease, and they sought to understand the molecular mechanisms involved in the the generation of these cells. I designed and implemented advanced bioinformatics pipelines for a comprehensive multiomic study on human CD4$^+$ cytotoxic T lymphocyte (CTL) differentiation. It required integration of whole genome bisulfite sequencing (WGBS), RNA-seq, single-cell RNA-seq, ATAC-seq and enhancer RNA sequencing datasets to uncover epigenomic and transcriptomic regulatory mechanisms underlying CD4+ CTL development. I identified novel enhancer regions and CpG methylation signatures, contributing to uncovering key transcriptional regulators underlying CD4$^+$ CTL development and these results have potential implications for both autoimmune diseases and cancer immunotherapy.

Brigham and Women's Hospital **Cambridge, MA, USA**
Research Intern Jan 2024 – Present
Mentors: Dr. Vinay S. Mahajan (BWH Division of Engineering in Medicine), Dr. Jishnu Das (University of Pittsburgh)
Project: **Algorithm development for gene regulatory network analysis.**

To address the limitations of current methods in integrating diverse datasets for identifying candidate driver genes, I developed a comprehensive multilayer network analysis framework using the Multi-Dimensional HITS (MD-HITS) algorithm for temporal gene regulatory network (GRN) analysis in cell differentiation. I applied this framework to T follicular helper (Tfh) cell differentiation, integrating ATAC-seq chromatin accessibility, RNA-seq data and Protein-protein interaction networks to map critical transcriptional regulators. Using this approach I identified key regulatory

nodes and pathways in Tfh cell lineage specification, demonstrating superior performance over other gene regulatory network centrality ranking approaches. The work was presented as a poster titled "Integrative analysis of human Tfh cell differentiation using a multilayered gene regulatory network approach" at ISMB Montreal 2024, detailing the computational and biological insights gained.

IIT Kharagpur **Kharagpur, India**
Research Intern Aug 2021 – Mar 2023
Mentor: Dr. Kaushal Kumar Bhagat (Indian Institute of Technology, Kharagpur)
Project: **Real-time pose estimation and gesture tracking for education.**

Motivated by passion of computer graphics and a focus on improving educational technologies, I implemented machine learning models for large-scale data analysis in real-time pose estimation and gesture tracking, and developed AR/VR applications aimed at enhancing medical education and interactive learning environments. I also led project teams, managed cross-functional development cycles, and contributed to open-source educational software. This work resulted in a co-authored research publication with Dr. Christian Moro, Bond University, Australia.

PROFESSIONAL EXPERIENCE

HDI Global SE **Tokyo, Japan**
Software Intern (on-site, Tokyo branch) Mar – Aug 2023
Automation and Deployment Engineer (remote contractor) Sept 2023 – Feb 2024

– Automated complex insurance policy generation processes, achieving 80% significant time savings, reducing processing errors and enhancing business efficiency through efficient data extraction and validation systems.
– Provided remote oversight and managed ongoing product operations within the home branch in Germany.

Freelance Developer
Software Developer

– As team leader and lead developer, secured significant funding (Rs. 1,20,000) for a AR/VR start-up project focused on hardware-software integration from the Govt. of India Department of Defense.
– Published productivity-focused mobile applications on Google Play Store, amassing significant user engagement.

CONFERENCES AND MEETINGS ATTENDED

– International Conference on Intelligent Systems for Molecular Biology, Montréal. **(poster presenter)** *July 2024*
– Cold Spring Harbor Laboratory Meeting: Biological Data Science. *Nov 2024*
– MIT Bio-informatics Seminar Series. *Fall 2024*

TECHNICAL SKILLS

Programming Languages: Python, R, C^{++}, Rust, Bash, MATLAB, GLSL/HLSL, Arduino, Raspberry Pi
Machine Learning: Model development and validation, Neural networks, Ensemble methods
Web Development: Azure/AWS cloud integration, Full-stack (HTML, CSS, JavaScript, React, Node.js), UI/UX design.

LEADERSHIP AND EXTRACURRICULAR ACTIVITIES

– Led technical teams for robotics competitions; held leadership roles in various non-technical clubs.
– Guitarist and ukulele player with experience performing at several school and collegiate music competitions.
– Winner of national-level hackathons.
– Winner of essay competitions, recognized by the South Korean Ambassador.
– Avid learner of new languages; currently learning business-level Japanese.
– Conducted workshops on bio-informatics tools and computational biology methods at inter-collegiate tech events.

COMMUNITY SERVICE

– Initiated book donation drives and literacy programs for under-served communities.
– Volunteered extensively in community service, providing free meals and supporting charitable outreach programs.
– Participated in tutoring and mentoring programs for village children as well as caregiver support programs for senior citizens near Indian Army Cantonments and Air Force Stations across India.