MARIANNE ARRIOLA

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Research Experience

UNDERGRADUATE RESEARCHER | DYNAMO LAB, UCSB | PROF. AMBUJ SINGH | 9/21 – 5/23

I am designing an architecture to detect multi-scale anomalies in attributed networks by using graph autoencoders with multi-scale spectral filters to learn node representations at different scales.

MIT MSRP FELLOW | GEOMETRIC DATA PROCESSING GROUP, MIT | PROF. JUSTIN SOLOMON | 6/22 – 11/22

I advanced an efficient and robust 3D vision architecture that incorporates geometric shape information to learn from point cloud data relevant in object detection for autonomous cars.

CALTECH WAVE FELLOW | ARNOLD LAB, CALTECH | PROF. FRANCES ARNOLD | 6/21 – 8/21

I developed graph machine learning models to predict a protein's functional capacity and search for proteins with high function by leveraging a graph representation of protein structure.

LAB INTERN | DYNAMO LAB, UCSB | CSEP EUREKA! PROGRAM | PROF. AMBUJ SINGH | 6/20 – 6/21

I inferred dynamic Bayesian networks to describe microbial community behavior throughout diabetes progression. I also briefly began on a project that aimed to identify key trends in Alzheimer's disease progression in structural and functional brain connectivity networks.

LAB INTERN | SAFINYA LAB, UCSB | PROF. CYRUS SAFINYA | 8/18/19 – 8/30/19

I investigated Tau protein behavior related to neurodegenerative disease. I prepared samples for fluorescence microscopy, analyzed results with advanced imaging software, and presented our work.

Work Experience

UNDERGRADUATE LEARNING ASSISTANT & PROGRAM LEAD | UCSB | 9/21 – PRESENT

I mentor students in both introductory and advanced computer science classes and facilitate instructors in designing and executing course learning objectives. As a program lead, I contribute to hiring, training, and coordinating learning assistants in maintaining and improving the teaching program.

PEER MENTOR | SUMMER INSTITUTE IN MATHEMATICS AND SCIENCE, UCSB | 8/22 – 9/22

I mentored rising UCSB freshmen from underrepresented backgrounds interested in pursuing STEM research. I fostered their career, academic, and research development by coordinating events and workshops to prepare them for success at UCSB and beyond.

RECRUITING ASSISTANT | COLLEGE OF CREATIVE STUDIES COMPUTING, UCSB | 3/21 – 5/21

I coordinated outreach to students admitted into the Computing major by connecting prospective students to current students for mentorship in an effort to diversify the program.

Publications

Arriola, M. & Johnston, K. *Identifying Optimal Proteins by Their Structure Using Graph Neural Networks.* Caltech Undergraduate Research Journal '22, Jun. 2022.

Arriola, M.*, Huang, X.*, Wang, Y., Guizilini, V.C., Ambrus, R.A., Solomon, J. *Hybrid Geometric Primitive Representations for Point Clouds.* Submission to conference in May 2023.

Arriola, M., Kosan, M., Huang, Z., Sharma, S., Singh, A. *Evolving Graph Autoencoders for Multi-Scale Anomaly Detection in Attributed Networks.* Submission to conference in May 2023.

Conference Presentations

Arriola, M., Kadina, J., Arnold, F. *Identifying Optimal Proteins by Their Structure Using Graph Neural Networks.* College of Creative Studies Research and Creative Activities Conference, Nov. 2021.

Arriola, M.*, Huang, X.*, Wang, Y., Guizilini, V.C., Ambrus, R.A., Solomon, J. *Geometry-Aware Point Cloud Learning for Robust and Efficient 3D Vision.* College of Creative Studies Research and Creative Activities Conference, Nov. 2022.

Patents

Arriola, M.*, Huang, X.*, Wang, Y., Guizilini, V.C., Ambrus, R.A., Solomon, J. *Hybrid Geometric Primitive Representations for Point Clouds.* U.S. patent pending.

Education

CORNELL UNIVERSITY
Incoming Computer Science Ph.D. student at Cornell Tech | Joining Sept. 2023 | Graduate School Dean's Scholar

UNIVERSITY OF CALIFORNIA, SANTA BARBARA
Computing B.S., College of Creative Studies **|** June 2023 | Cumulative GPA: 3.89

Programming Skills

- **Python;** Implemented geometric deep learning models in TensorFlow and PyTorch
- **R;** Implemented a Dirichlet-Multinomial Model to infer communities in microbial data and Markov chain Monte Carlo algorithm analysis for state redistricting
- **JavaScript;** Created a biological multi-access key with a Prolog and Node.js backend and a Vanilla JS frontend
- **MATLAB;** Modeled a dynamic genetic circuit
- **Java**; Created a protein translation program
- **C;** Designed a virtual machine from scratch
- **C++;** Completed several courses in C++
- **Bash**; Created a pipeline for preprocessing neuroimaging data
- **React JS**; Designed web portfolios

Awards

NSF Graduate Research Fellowship | National Research Foundation | 3/23
   5-year fellowship for the graduate education of individuals who have demonstrated their potential for significant research achievements in STEM or STEM education.

Hopper-Dean / Bowers CIS Deans Excellence Fellowship | Cornell University | 2/23
   2-year fellowship for graduate students admitted into the Dean's Scholar program.

Barry Goldwater Scholarship | The Barry Goldwater Scholarship Foundation | 3/22
   National scholarship awarded to undergraduates pursuing careers in STEM fields who demonstrate outstanding academic performance and potential in research.

Wendy Purcell & Kenneth Wilton Alumni Merit Scholarship | UCSB | 10/21 & 10/22
   Two-time award winner given to one undergraduate studying the physical sciences who demonstrates academic merit.

Activities

TEACHING VOLUNTEER | Society of Women Engineers: UCSB **|** 1/21 – 3/21

I motivated middle school girls to pursue computer science in higher education by teaching them the foundations of Scratch and Python and guiding them through problem-solving techniques.

WOMXN HACKS INTERN | UCSB **|** 10/19 – 1/20

I shadowed and contributed to a variety of Womxn/Hacks committees that organize the annual Womxn Hacks event, a hackathon inclusive for womxn and non-binary students.