Willard Ford

wwford@ucsd.edu | WillardFord | willardford

Education

B.S. Bioinformatics, Probability and Statistics — *San Diego, CA*

Univeristy of California, San Diego, GPA 3.6 — *Sep. 2021 - Jun 2025*

- Anticipated graduation with honors in Biological Sciences
- TA for Calculus-Based Introductory Probability and Statistics, MATH 11, Fall 2024
- TA for Genetics, BICD 100, Spring 2023

Research and Experience

Gymrek Lab, UCSD — *San Diego, CA*

Undergraduate Researcher — *Aug. 2023 - Cur.*

- Designed and built pangenome wide association study framework to elucidate structural variants in oft ignored populations using All of Us biobank.
- Implemented and tested several pangenome complexity metrics to quantify the degree of variations across the human genome.
- Generated figures and data for Human Pangenome Research Consortium (HPRC) research presentation

Long Reads Lab, Data Sciences Platform, The Broad Institute of MIT and Harvard — *Cambridge, MA*

Broad Summer Research Program Intern — *Jun. 2024 - Aug. 2024*

- Reduced runtime of novel haplotype integration tool by 62% while maintainnig 95% accuracy.
- Theorized, tested, and implemented various locality-sensitive hashing techniques on long-read structural variant sequences to determine best performance on novel data type.
- Presented results in institution wide poster fair.

Allen Institute for Brain Science — *Seattle, WA*

Summer Intern — *Jun. 2023 - Aug. 2023*

- Built a deep-learning training pipeline for regulatory DNA model (scBasset) to assist staff scientists' in-silico experimental design and analysis.
- Interpreted ATAC seq DNA models to recover known motifs and accurately predict accessibility of 16 synthetic de-novo motifs.
- Presented results in institution wide poster fair.

Yeo Lab, UCSD — *San Diego, CA*

Undergraduate Researcher — *Jan. 2023 - Jun. 2023*

- Analyzed RNA binding protein interactome data and single cell RNA sequence data to identify new candidates for translational ALS research.
- Generated publication figures such as heatmaps and gene ontology dot plots using Python visualization tools. Publication accepted at Neuron.

Publications

Al-Azzam et al. Inhibition of RNA Splicing Triggers CHMP7 Nuclear Entry, Impacting TDP-43 Function and Leading to the Onset of ALS. Neuron (2024). Accepted.

Honors & Awards

2023 **Top 10 Team Award**, Women in Computing Hackathon — *San Diego, CA*

2023 **CS50's Introduction to Artificial Intelligence with Python**, Certification — *San Diego, CA*

2022 **Google Data Analytics Specialization**, Coursera Certification — *Salt Lake City, UT*

Presentation

Annual Biomedical Research Conference for Minoritized Scientists — *Pittsburg, PA*

Fast Structural Variant Merging at a Population Scale — *Nov. 2024*

- Presented poster on algorithmic optimizations to novel long-read variant caller to ABRCMS attendees.

Annual Summer Research Conference at UC San Diego — *San Diego, CA*

Fast Structural Variant Merging at a Population Scale — *Aug. 2024*

- Presented algorithmic optimizations to novel long-read variant caller to bioinformatics faculty and students.

Triton Neurotech Blitz Talk — *San Diego, CA*

How Can Machine Learning Lead to Better Healthcare? — *Feb. 2024*

- Introduced convolutional deep learning to 15 neuroscience-interested undergraduates.

Leadership

Undergraduate Bioinformatics Club, UBIC
San Diego, CA

Workshop Chair, Member — *Sep. 2023 - Cur.*

- Led and designed introductory workshops on types of computational biology not covered in UCSD coursework, reaching 30 students
- Mentored first year bioinformatics undergraduate in adjusting to college courses and social life and in finding a research position that suited their interest.

UCSD Dancesport Team
San Diego, CA

Treasurer, Board Member — *Sep. 2022 - Cur.*

- Planned and led team practices for 30 members 4 days/week and organized other board members to lead practices.
- Organized and hosted 18 univiersity dancesport teams and $\geq$ 250 dancers in yearly intercollegiate competition, raising $\geq$ \$5,000 profit for team funds each year.
- Recruited and welcomed dozens of new members each Fall and defused conflicts to maintain team cohesion.
- Organized travel, hotels, and food for 20 members to travel to 7 competitions each year.

Mentor Collective
San Diego, CA

Mentor — *Sep. 2023 - Cur.*

- Mentored 2 first year undergraduates and 1 transfer student through their first years at UCSD.
- Introduced mentees to student organizations and research programs that align with their goals of medical school, PhD, and industry.
- Suggested techinques to help mentees adjust to college courses and scheduling.

Skills

Computational Biology	Next-gen sequencing technologies, Long-reads, Alignment and genome construction, Admixture
Probability and Statistics	Multivariate regression, Bootstrap Monte-carlo hypothesis testing, Bivariate correlations, Markov chains
Machine Learning	Convolutional models, Transformer models, Multi-layer perceptrons, Traditional ML Algorithms
Programming	Python, Java, C++, R, MATLAB, Bash, LaTeX, SQL, High Performance Computing (HPC)
Languages	English, Spanish