

Daniel Marrama

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BIOINFORMATICIAN

Leveraging a background in bioinformatics, I am dedicated to advancing research and developing solutions for human disease, particularly autoimmunity. My expertise is in building software tools and conducting analyses on immunological data.

EXPERIENCE

Associate Bioinformatics Specialist

La Jolla Institute for Immunology, Peters Lab

Feb 2020 – Present

La Jolla, CA

- Developed PEPMatch for the Immune Epitope Database (IEDB), an efficient and precise peptide/epitope search tool capable of accounting for residue substitutions in large sets of proteins. Successfully designed an accompanying benchmarking framework, deployed a user-friendly Django application for IEDB curators, and authored the manuscript for the tool.
- Led in-depth conservation analyses to investigate potential immune cross-reactivity across infectious diseases, allergies, and autoimmune disorders, contributing to a better understanding of immune responses.
- Created a comprehensive pipeline for the exploration and analysis of features of autoimmune antigens sourced from the IEDB, enhancing research capabilities in the field of autoimmunity.
- Rewrote the IEDB protein tree codebase, accurately assigning IEDB antigens to their respective genes and epitopes to parent proteins utilizing alignment tools and PEPMatch. This overhaul resulted in a 10x reduction in codebase size and significantly improved speed and accuracy.

Data Analyst

Sony Electronics

Mar 2018 – Aug 2018

San Diego, CA

- Developed an innovative data tracking system using Python to efficiently manage tens of thousands of electronic returns and exchanges.
- Formulated and executed a strategic plan to minimize financial losses for the company using the tracking system.
- Created automation of daily and weekly Excel reports with Python, enhancing overall efficiency and data accuracy.

Biostatistics and Calculus Teaching Assistant

Gordon College

Jan 2015 – May 2016

Wenham, MA

- Led groups of students through weekly course material, addressing questions and clarifying concepts.
- Graded assignments and exams for 50+ students each semester.

TECHNICAL SKILLS

Languages	: Python, Rust, SQL, Javascript, HTML/CSS
Libraries	: pandas, numpy, Biopython, matplotlib, seaborn, scipy, Django
Bioinformatics	: Alignment (BLAST, MMseqs2, DIAMOND, MUSCLE)
Databases	: SQLite, MySQL, PostgreSQL
Other	: Git, Docker, NextFlow, expertise in UniProt

EDUCATION

UCSD

Premedical Studies (No Degree)

San Diego, CA

Sep 2018 – Mar 2020

Gordon College

Bachelor of Science in Mathematics

Wenham, MA

Aug 2012 – May 2016

- (Manuscript Under Review) Marrama, D. et al. (2023). PEPMatch: a tool to identify short peptide sequence matches in large sets of proteins
- Roy, P. et al. (2022). Immunodominant MHC-II (Major Histocompatibility Complex II) Restricted Epitopes in Human Apolipoprotein B. Circulation research, 131(3), 258–276. <https://doi.org/10.1161/CIRCRESAHA.122.321116>
- Frankel, A. et al. (2022). Bioinformatic Analysis Underpinning the Frequent Occurrence of Immune Thrombocytopenic Purpura in COVID-19 Patients. The Israel Medical Association journal : IMAJ, 24(5), 320–326.
- Marrama, D. et al. (2022). Lack of evidence of significant homology of SARS-CoV-2 spike sequences to myocarditis-associated antigens. EBioMedicine, 75, 103807. <https://doi.org/10.1016/j.ebiom.2021.103807>
- Grifoni, A. et al. (2020). Targets of T Cell Responses to SARS-CoV-2 Coronavirus in Humans with COVID-19 Disease and Unexposed Individuals. Cell, 181(7), 1489–1501.e15. <https://doi.org/10.1016/j.cell.2020.05.015>