

Eduardo Charvel

San Diego, California

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Education

University of California, San Diego – GPA: 3.65

Expected 2027

Doctor of Philosophy in Bioinformatics and Systems Biology

- *MicroMBA Certificate @ Rady School of Management* 2026
- *HPC & Data Science Summer Institute @ San Diego Super Computing Center* 2023

San Diego State University – GPA: 3.63

2021

Bachelor of Science in Biology – Emphasis in Evolutionary Biology

Weber Honors College: Honors Interdisciplinary Studies Minor

Publications

- Giulio Formenti, Dominic E. Absolon, Linelle Ann L. Abueg, Francine Ackerman, Farooq O. Al-Ajli, Alexandre Aleixo, Agostinho Antunes, Dahiana Arcila, [...], **Eduardo Charvel**, [...], Erich D. Jarvis, the Vertebrate Genomes Project Consortium Phase I, “The Vertebrate Genomes Project Phase I: A global reference genome resource”, *bioRxiv* (2026). 2026-06.
- **Charvel, Eduardo**, Homère J. Alves Monteiro, Siavash Mirarab, and Vineet Bafna. "DipSkmer: Reference-free population genomics with diploid genome skims." *bioRxiv* (2026): 2026-06.
- **Charvel, Eduardo**, Isaac Thomas, Homère Alves Monteiro, Shahab Sarmashghi, Glenn Dunshea, Vineet Bafna, and Siavash Mirarab. "ReSkmer: modeling repeats allows k-mer-based alignment-free methods to calculate population genomic distances." *Genome Biology* (2026).
- Mai, Uyen, **Eduardo Charvel**, and Siavash Mirarab. "Expectation-maximization enables phylogenetic dating under a categorical rate model." *Systematic Biology* 73, no. 5 (2024): 823-838.

Software

- **Eduardo Charvel**, Shahab Sarmashghi, Eleonora Rachtman, Isaac Thomas, Homère J. Alves Monteiro, Vineet Bafna, and Siavash Mirarab. ReSkmer: v0.1.0. Zenodo, <https://doi.org/10.5281/zenodo.20058489>, 2026.

Achievements and Awards

- Field Museum Fellowship: Grainger Bioinformatics Center @ UCSD 2023
- San Diego Match Fellowship @ UCSD 2022
- Sloan Scholars Program @ UCSD 2022
- Initiative for Maximizing Student Development (NIH) @ SDSU 2021
- Binational Scholars Program @ SDSU 2021

Invited Talks

- **Charvel Eduardo**, Vineet Bafna, Siavash Mirarab. *Updated Skmer Improves Reference- and Alignment-Free Population Genomics*. Genome Skimming Symposium @ Botany. July 2025. Palm Springs, California.
- **Charvel Eduardo**, Vineet Bafna, Siavash Mirarab. *Genome Skimming Workshop*. Field Museum, Grainger Bioinformatics Center; June 2024. Chicago, Illinois.

Posters and Presentations

- **Charvel Eduardo**, Isaac Thomas, Homère J. Alves Monteiro, Vineet Bafna, Siavash Mirarab. *Modeling repeats allows k-mer-based, alignment-free methods to calculate population genomic distances*. SMCBE 2026; June 2026. Copenhagen, Denmark.
- **Charvel Eduardo**, Homère J. Alves Monteiro, Isaac Thomas, Vineet Bafna, Siavash Mirarab. *Alignment-Free Population Genomics: Handling Repeats and Diploidy in Genome Skims*, BEx Lite; June 2026. San Diego, California.
- **Charvel Eduardo**, Homère J. Alves Monteiro, Vineet Bafna, Siavash Mirarab. *Modeling Heterozygosity in Genome Skims Allows for Accessible Population Genomics through Alignment-Free, Assembly-Free Estimation of Nucleotide Diversity*. (Poster). Jacobs School of Engineering: Research Expo 2026; April 2026. San Diego, California.
- **Charvel Eduardo**, Homère J. Alves Monteiro, Vineet Bafna, Siavash Mirarab. *ReSkmer: Modeling Repeats Improves Low-Coverage, Alignment-Free Estimates of Genomic Distance*. Institute for Mathematical and Statistical Innovation; (Lightning Talk+Poster). August 2025. Chicago, Illinois.
- **Charvel Eduardo**, Homère J. Alves Monteiro, Daira Melendez, Vineet Bafna, Siavash Mirarab. *Genome Skimming: A Bioinformatics Approach to Assembly-Free Analysis of Genomic Information*. (Workshop). Ecological Society of America; August 2024. Long Beach, California.
- **Charvel Eduardo**, Vineet Bafna, Siavash Mirarab. *Skmer-2: Obtaining Reference-Free Pop-Gen Estimates Using Genome Skimming and Repeat Spectra*. (Lightning Talk). Botany; July 2024. Grand Rapids, Michigan.
- **Charvel Eduardo**, Vineet Bafna, Siavash Mirarab. *Genome Skimming: A Bioinformatics Approach to Assembly-Free Analysis of Genomic Information*. (Workshop). Botany; July 2024. Grand Rapids, Michigan.
- **Charvel Eduardo**, Vanderplank Sula, Flores-Renteria Lluvia. *Researching the Binational Distribution of the Desert Mountain Sage and the Genetics of its Subspecies*. (Presentation) Southern California Conference of Undergraduate Research; December 2021.
- **Charvel Eduardo**, Holder Mark, Sukumaran Jeet. *Shark and Tapeworm Co-Phylogeny Analysis Through Machine Learning Pipelines*. (Poster). SACNAS National Diversity in STEM Digital Conference; October 2021.
- **Charvel Eduardo**, Holder Mark, Sukumaran Jeet. *Host-Repertoire Analysis of Sharks and Tapeworms*. (Poster). SDSU Undergraduate Research Symposium; October 2021. San Diego, California.
- **Charvel Eduardo**, Holder Mark, Sukumaran Jeet. *Shark and Tapeworm Co-Phylogeny Analysis Through Machine Learning Pipelines*. (Poster). SDSU Student Research Symposium; March 2021. San Diego, California

Research Experience

Mirarab Lab: Evolutionary Biology and Phylogenomics – San Diego, CA

Advisor: Dr. Siavash Mirarab and Vineet Bafna
PhD Candidate

June 2022 – Present

- Improving the reference-free distance estimation tool Skmer (Sarmashghi, 2019) by developing new equations that model repetitiveness and diploidy.
- Collaborating with the Field Museum and the Minderoo foundation to improve methods to detect eDNA for population health tracking and marine conservation.

Center for Plant Conservation – San Diego, CA

Advisor: Dr. Katie Heineman
Biodiversity Informatics Research Fellow

Summer 2022

- Modeled how ecological, geographical, and morphological factors play a role in as a predictor seed RNA decay, seed longevity, and germination rates in seed banks.
- Participated in seed collection and habitat restoration field work.

Flores-Renteria Lab: Plant Evolutionary Ecology – San Diego, CA

Advisors: Dr. Lluvia Flores-Renteria and Dr. Sula Vanderplank
Volunteer Researcher

2020 – 2022

- Explored the subspecies delimitation of two binationally distributed endemic *Salvia* species: *S. pachyphylla* and *S. brandegeei*.
- Conducted field research, performed DNA extractions, PCR, and Sanger sequencing, in order to conduct phylogenetic and population genetic analyses.
- Assessed the risk of extinction of rare and endemic plants and submitted them to be protected by the Mexican government.

Sukumaran Lab: Computational Evolutionary Biology – San Diego, CA

Advisor: Dr. Jeet Sukumaran
Research Assistant I

2019 – 2021

- Researched the role of biogeography on the host-parasite coevolution of elasmobranchs and tapeworms through Bayesian ancestral host reconstruction.

Teaching Experience

BNFO 283: Student Talks – San Diego, CA

Teaching Assistant

[3 quarters] 2025 – 2026

- Brainstormed responsibilities and logistics for a new TA position for Student Talks, a course meant to teach incoming PhD students on how to best give research presentations.
- Scheduled student talks, organized student enrollment, developed and distributed feedback forms for student presentations.
- Led series of talks based on the book “Marketing for Scientists: How to Shine in Tough Times” by Marc Kuchner centered around public speaking and growing your brand as a scientist.

Outreach

SACNAS Graduate Student Officer – San Diego, CA

ENLACE Summer Program Mentor – San Diego, CA

Mentor

Summer 2024

- Participated in an international collaboration with high school students from Mexico to introduce them to programming, high performance computing, phylogenetics, and bioinformatics research.
- Helped mentees come up with an independent research project that would contribute to real bioinformatics and phylogenomics research.

GradAMP Mentor – San Diego, CA

Mentor

Summer 2024

- Mentored UCSD engineering students on creating successful applications to graduate school.

Officer: College of Sciences Student Council Representative – San Diego, CA

Organization Member

January – May 2019

- Supervised and organized school-wide events that showcased careers in STEM and encouraged students to engage with the San Diego State University science community.
- Contacted people in the field of veterinary medicine to organize volunteering events and invite professionals to speak to the association.
- Collaborated with animal rescue non-profits such as Friends of Cats, Feral Cat Coalition, Tigers and Bears, Small Companions, and others, to provide animal care and other services.