Hunter Nisonoff — Curriculum Vitae

2611 Folsom St. Unit A, San Francisco 94110
201 484 9015 • hunter_nisonoff@berkeley.edu

Education

- **University of California, Berkeley** — **Berkeley, CA**
  PhD Computational Biology — *2019–2024 (Expected)*
- **Duke University** — **Durham, NC**
  B.S. Mathematics with a Minor in Chemistry, Magna Cum Laude — *2011–2015*

Experience

- **University of California, Berkeley** — **Berkeley, CA**
  Graduate Student Researcher — *August 2019 – Present*
  Machine learning researcher advised by Jennifer Listgarten and member of the Berkeley Artificial Intelligence Research Lab (BAIR). I develop machine learning models and algorithms for problems in protein engineering. My interests lean towards (1) collaborating closely with experimentalists to understand experimental constraints and opportunities for ML-enabled protein engineering (2) structure-based approaches to protein engineering and (3) Bayesian methods that enable uncertainty quantification for improved experimental design.
- **Octant Bio** — **Emeryville, CA**
  Graduate Student Intern — *May 2022–August 2022*
  Worked on the medicinal chemistry team building computational models of ligand-protein interactions as well as machine learning models of small-molecule properties. I remain a part-time consultant, working with chemists across three programs and I have been listed as an inventor on one patent application.
- **D. E. Shaw Research** — **New York, NY**
  Scientific Associate — *August 2016–August 2019*
  Conducted computational chemistry research spanning cheminformatics and biomolecular simulation. Developed a novel deep learning framework for inverting QSAR models, enabling efficient small-molecule design for drug discovery applications. This work resulted in a first-author publication. Additionally, spearheaded structure-based drug discovery projects targeting two therapeutic proteins, developing specialized computational methods for analyzing molecular dynamics simulations. One of these projects successfully advanced a therapeutic candidate into clinical trials.
- **Donald Lab, Duke University Department of Computer Science** — **Durham, NC**
  Research Associate — *August 2015–August 2016*
  Conducted research in the area of physics-based computational protein design on the development of novel algorithm for computing the partition function under the rigid-rotamer model.

Awards and Honors

- **ACS Editors' Choice**
  Designation given to feature scientific articles of broad public interest. Awarded to our paper "Coherent Blending of Biophysics-Based Knowledge with Bayesian Neural Networks for Robust Protein Property Prediction"
- **Newton Fellowship Recipient for 2021-2022**
  Provided partial tuition and stipend support for a graduate students working in the area of synthetic biology
- **2019 Hertz Fellowship Finalist**
  Selected as one of 41 finalists from a pool of 800 applicants
- **Graduation with High Distinction in Mathematics**
  Thesis: 'Efficient Partition Function Estimation in Computational Protein Design: Probabilistic Guarantees and Characterization of a Novel Algorithm'
- **Phi Beta Kappa National Honor Society**

Outreach

- **Be a Scientist Program** — **Berkeley, CA**
  Volunteer — *August 2019–May 2022*
  I mentored middle school students in the Berkeley Unified School District by helping them them design, implement, and analyze their own science experiment.

Publications

Hunter Nisonoff*, Junhao Xiong*, Stephan Allenspach*, and Jennifer Listgarten. Unlocking Guidance for Discrete State-Space Diffusion and Flow Models. *arXiv preprint arXiv:2406.01572*, 2024.

Yekaterina Shulgina*, Marena I Trinidad*, Conner J Langeberg*, **Hunter Nisonoff***, Seyone Chithrananda*, Petr Skopintsev*, Amos J Nissley*, Jaymin Patel, Ron S Boger, Honglue Shi, et al. RNA Language Models Predict Mutations that Improve RNA Function. *Nature Communications (In press)*, 2024.

Noam Prywes, Naiya R Philips, Luke M Oltrogge, Sebastian Lindner, Yi-Chin Candace Tsai, Benoit de Pins, Aidan E Cowan, Leah J Taylor-Kearney, Hana A Chang, Laina N Hall, . . . , **Hunter Nisonoff**, . . . , and David F Savage. A Map of the Rubisco Biochemical Landscape. *Nature (In press)*, 2024.

Jose Manuel Martí, Chloe Hsu, Charlotte Rochereau, Chenling Xu, Tomasz Blazejewski, **Hunter Nisonoff**, Sean P Leonard, Christina S Kang-Yun, Jennifer Chlebek, Dante P Ricci, et al. Gentangle: Integrated Computational Design of Gene Entanglements. *Bioinformatics*, 40(7):btae380, 2024.

Hunter Nisonoff, Yixin Wang, and Jennifer Listgarten. Coherent Blending of Biophysics-Based Knowledge with Bayesian Neural Networks for Robust Protein Property Prediction. *ACS Synthetic Biology*, 12(11):3242–3251, 2023.

Peter H Yoon, Petr Skopintsev, Honglue Shi, Lin-Xing Chen, Benjamin A Adler, Muntathar Al-Shimary, Rory J Craig, Zheng Li, Jasmine Amerasekera, Marena Trinidad, **Hunter Nisonoff**, . . . , and Doudna, Jennifer. Eukaryotic RNA-guided Endonucleases Evolved From a Unique Clade of Bacterial Enzymes. *Nucleic Acids Research*, 51(22):12414–12427, 2023.

Alexander M Taylor, Bret R Williams, Fabrizio Giordanetto, Elizabeth H Kelley, André Lescarbeau, Kelley Shortsleeves, Yong Tang, W Patrick Walters, Alfonso Arrazate, Christine Bowman, . . . , **Hunter Nisonoff**, . . . , and Lindsay Willmore. Identification of GDC-1971 (RLY-1971), a SHP2 Inhibitor Designed for the Treatment of Solid Tumors. *Journal of Medicinal Chemistry*, 66(19):13384–13399, 2023.

Jack B Greisman, Lindsay Willmore, Christine Y Yeh, Fabrizio Giordanetto, Sahar Shahamadtar, **Hunter Nisonoff**, Paul Maragakis, and David E Shaw. Discovery and Validation of the Binding Poses of Allosteric Fragment Hits to Protein Tyrosine Phosphatase 1B: From Molecular Dynamics Simulations to X-ray Crystallography. *Journal of Chemical Information and Modeling*, 63(9):2644–2650, 2023.

Chloe Hsu, **Hunter Nisonoff**, Clara Fannjiang, and Jennifer Listgarten. Learning Protein Fitness Models from Evolutionary and Assay-Labeled Data. *Nature Biotechnology*, pages 1–9, 2022.

Amirali Aghazadeh, **Hunter Nisonoff**, Orhan Ocal, David H Brookes, Yijie Huang, O Ozan Koyluoglu, Jennifer Listgarten, and Kannan Ramchandran. Epistatic Net Allows the Sparse Spectral Regularization of Deep Neural Networks for Inferring Fitness Functions. *Nature Communications*, 12(1):1–10, 2021.

Youjin Lee, Derek Bogdanoff, Yutong Wang, George C Hartoularos, Jonathan M Woo, Cody T Mowery, **Hunter Nisonoff**, David S Lee, Yang Sun, James Lee, et al. XYZeq: Spatially Resolved Single-Cell RNA Sequencing Reveals Expression Heterogeneity in the Tumor Microenvironment. *Science Advances*, 7(17):eabg4755, 2021.

Paul Maragakis*, **Hunter Nisonoff***, Brian Cole, and David E. Shaw. A Deep-Learning View of Chemical Space Designed to Facilitate Drug Discovery. *Journal of Chemical Information and Modeling*, 60(10):4487–4496, 2020. PMID: 32697578.

Pablo Gainza, **Hunter Nisonoff**, and Bruce R Donald. Algorithms for Protein Design. *Current Opinion in Structural Biology*, 39:16–26, 2016.

* Co-first author