Noah Pettinari

he/him/his

+1 (707) 266-4745 | noah.pettinari@gmail.com | Portfolio

Education

Bachelor of Science in Physics

University of Oregon, June 2022

Minors in Biology and Mathematics

Summa Cum Laude, Departmental Honors

Professional Experience

Computational Associate II **August 2022 - August 2024**

The Broad Institute of MIT and Harvard, Nehme and McCarroll Labs

- Independently developed computational pipelines for analyzing single-cell genetic perturbation (CROP-seq) experimental data in iPSC-derived brain cells compatible with existing publicly available Drop-seq software.
- Analyzed high throughput single-cell RNA sequencing data from 15+ Census-seq and Drop-seq experiments and 200+ single-cell transcriptomic libraries to elucidate the genetic basis for psychiatric diseases such as schizophrenia, chemical perturbation response, and genetic perturbation response.
- Implemented a standardized pipeline for processing and analyzing high-throughput bulk RNA-seq (SMART-seq2) data to identify effects of various drugs at varying dosages and timed exposures.
- Performed latent factor analyses to identify coordinated gene expression programs induced by various drug and genetic perturbations in an array of iPSC-derived and primary tissue cell types.
- Collaboratively developed an analytical framework to identify correlative links between genotypic variation and drug response to antipsychotics and proinflammatory cytokines using pre-existing single-cell analysis tools and eQTL discovery.
- Identified sources of regulatory variation in the human genetic response to chemical perturbations to elucidate the effect
- Maintained and validated cell line identities of over 1,000 cell lines via periodic concordance validations to ensure systematic robustness of cell cultures and minimize experimental variability.
- Coordinated data concordance, management, and deposition projects between labs to ensure compliance with NIH standards for human genetics data sharing protocols with iPSC cell lines.
- Created, implemented, and utilized standardized training procedures for computational associates to better improve the onboarding process and ensure quick learning and lab compliance standards.

Biophysics Research Assistant **June 2019 - June 2022**

UO Physics Department, Parthasarathy Lab

- Conducted experiments with BSL2+ microbes associated with vertebrates to elucidate metabolic species interactions and promote DNA engineering, cultivation, and editing of 6+ bacterial strains.
- Performed image analysis using Python and MATLAB to develop 3 image-based assays for quantifying zebrafish gut microbial interactions and interspecies competition pathways.
- Designed and constructed 2 microbial assays and 1 light sheet fluorescence microscope for imaging fluorescent microbes and measuring phenotypic expression and dynamics.
- Collaborated with 2 independent research groups of 5+ scientists on interdisciplinary projects that led to 3 presentations at university conferences and 1 publication in a world renowned journal.

RISE Physics Research Intern **July 2021 - September 2021**

WWU-Münster, Nonlinear Photonics Group

- Developed and constructed a two-photon polymerization via direct laser writing microscope for engineering of biocompatible cell assays using a near-infrared femtosecond pulse laser.
- Established 5+ protocols for biocompatible polymer gel chemicals that allowed for measurement of mechanical properties of yeast cells, enzymes, and hydrogel compatibility testing.
- Designed and troubleshooted a custom-built GUI interface of microscope hardware products to streamline and simplify data acquisition by a factor of 10.
- Tested polymerization efficiency on polymer hydrogels to troubleshoot and repair microscope faults.

Library Student Assistant III **January 2019 - June 2022**

University of Oregon Libraries

- Implemented and organized 3+ regular workshops for peers and library patrons that increased library engagement by 20% and use of library resources by 30%.
- Assisted with 10+ organizational projects to optimize library workflow by >40%.
- Forged relationships with library donors to continue and increase financial support of library spaces for an additional 3 years, which led to a 20% increase in library resource availability and usage.

Skills

Computational: High-performance computing, bioinformatics software, multivariate statistical analysis, machine learning, Github, image analysis, biophysical modeling, simulations

Bioinformatics: Differential gene expression, gene set enrichment, latent factor analysis, quantitative trait loci (QTL) analysis, genetic colocalization, SNP heritability, transcriptomics processing and analysis, single-cell analysis, gene regulatory network analysis (SCENIC),

Microscopy: Two-photon microscopy, light sheet fluorescence microscopy, DIC microscopy, epifluorescence microscopy, confocal microscopy, optical systems design and construction

Qualitative: Experimental project design, communicative team player with experience managing several experimental groups at a time, troubleshooting, creative problem solving, highly motivated

Software: Python, R, Bash, Git, MATLAB, C/C++, ImageJ/Fiji

Biological Assays: Strain engineering, BSL2 bacterial cell culturing, BSL2 aseptic technique, autoclaving, media preparation, writing and following SOPs, microbial assay development, zebrafish gut microsurgery

Publications

Sundarraman, Deepika, Edouard A. Hay, Dylan M. Martins, Drew S. Shields, **Noah L. Pettinari**, and Raghuveer Parthasarathy. "Higher-Order Interactions Dampen Pairwise Competition in the Zebrafish Gut Microbiome." *Mbio* 11, no. 5 (October 2020): e01667-20. https://doi.org/10.1128/mBio.01667-20.

Presentations

Pettinari, Noah, Milena Andzelm, Jim Nemesh, Matthew Tegtmeyer, Adrianna Maglieri, Marina Hogan, Kiku Ichihara, Steve McCarroll, and Ralda Nehme (2024). Identifying sources of regulatory variation in the human neuronal response to interferons. Stanley Center for Psychiatric Research Scientific Advisory Board (SAB) Meeting 2024, Cambridge, MA. Poster.

Andzelm, Milena and **Noah Pettinari** (2024). Human Genetic Variation in the Neuronal Response to Interferons. Broad Institute Cellular Models Meeting, Cambridge, MA. Presentation.

Pettinari, Noah, Milena Andzelm, Matthew Tegtmeyer, Jim Nemesh, Steve McCarroll, and Ralda Nehme (2023). Identifying context-dependent eQTLs in stem-cell derived neurons. Broad Institute Annual Retreat, Boston, MA. Poster.

Pettinari, Noah, Matthew Tegtmeyer, Milena Andzelm, Dhara Liyanage, Jim Nemesh, Marina Hogan, Kiku Ichihara, Ralda Nehme, and Steve McCarroll (2023). Latent factor analysis of neural cell type responses to *in vitro* perturbations. Stanley Center for Psychiatric Research Scientific Advisory Board (SAB) Meeting 2023, Cambridge, MA. Poster.

Pettinari, Noah and Raghuveer Parthasarathy (2021). Bacterial range expansion and the Fisher speed: a discrepancy in nutrient-rich media. University of Oregon Undergraduate Research Symposium, Eugene, OR. https://youtu.be/xfx2LYk63-A. Poster.

Pettinari, Noah and Raghuveer Parthasarathy (2020). Characterizing the relationship between bacterial motility and range expansion. University of Oregon Undergraduate Research Symposium, Eugene, OR. https://youtu.be/HGtZQec32WY. Poster.

Scholarships, Awards, and Grants

2022 Phi Beta Kappa Honors Society

2021 Audria M. Edwards Scholarship
DAAD RISE Intern
Clarence and Lucille Dunbar Scholarship
Mercer Family Foundation Scholarship
General University Scholarship

2020 Presidential Undergraduate Research Scholarship
Presidential Undergraduate Research Scholars Research Stipend
Thomas E. Mattson Scholarship
Grace Morris Scholarship
General University Scholarship

2019 Clarence and Lucille Dunbar Scholarship

2018 Scholarships for Oregon Scientists II
Audria M. Edwards Scholarship
Maria C. Jackson and General George A. White Scholarship
PathwayOregon Grant
Summit Scholarship

Organizations, Outreach, and Community Service

2023-2024 **Broad RATs United Union**, *Coordinating Committee*
Collaborated with fellow organizers and interfaced with United Electrical, Radio, and Machine Workers of America (UE) to initiate, plan, strategize, and organize a union of 500+ entry-level researchers at the Broad Institute of MIT and Harvard to advocate for better working conditions.

2023-2024 **Broad Institute Scientists in the Classroom Program**, *Volunteer*
Collaborated with Broad and Cambridge public schools faculty to develop middle school biology lesson plans to promote engagement with fundamental biological topics including genetics and bioethics.

2023-2024 **Broad Institute Meet-a-Scientist Program**, *Volunteer*

2018-2022 **Society of Physics Students**, *Student Member*

2021-2022 **Out in STEM University of Oregon Chapter**, *Vice President of Finance*
Worked with club leadership to create and lead events related to professional development targeted towards LGBTQ+ students in STEM fields. Managed club finances and budget.

2019-2020 **Eugene Math Festival**, *Volunteer*

Access Network, *Network Fellow*

2019 **LaTeX Workshop**, *Organizer*

Co-organizer: Cameron Cunningham

Developed and led a curriculum for a one day workshop covering the basics of the LaTeX typesetting language.

2019 **The North Star Project**, *Volunteer*

Supervisor: Rachael Klaiss

Assisted with professional development and diversity activities for incoming first-year students in STEM.