ATREYO PAL

(312) 539-9256 · atreyo.pal@yale.edu · Profile - Noonan Lab

EDUCATION

Yale University 2020 – 2025 (EXPECTED)
Ph.D. Candidate in Genetics

Dissertation: Resolving the 3D interactome of Human Accelerated Regions (HARs) during Human and Chimpanzee Neurodevelopment

The University of Chicago 2016 – 2020
B.A. in Physics, B.S. in Biological Sciences (Genetics Specialization)
University Honors in Physics and Biology

RESEARCH EXPERIENCE

Lo Graduate Research Fellow, **Noonan Lab** 2021 – PRESENT
Yale University School of Medicine

- *IDENTIFIED GENE TARGETS AND PATHWAYS REGULATED BY HUMAN ACCELERATED REGIONS (HARS) ACROSS HUMAN AND CHIMPANZEE NEURAL PROGENITORS AND NEURONAL CELL TYPES AT A HIGH-RESOLUTION USING EMPIRICALLY GENERATED 3D INTERACTION MAPS AND CHROMATIN PROFILES*
- *CHARACTERIZED HUMAN-SPECIFIC TRANSCRIPTOMIC AND EPIGENETIC CHANGES IN 2D CELL CULTURE AND 3D CORTICAL AND THALAMIC ORGANOIDS DUE TO HAR KNOCKOUTS AT SINGLE-CELL RESOLUTION*
- *EMPLOYED MACHINE LEARNING METHODS TO PREDICT GENE TARGETS OF HUMAN-SPECIFIC REGULATORY ELEMENTS (HAQERS, HLINARS, HGES, HCONDELS) IN SPECIFIC NEURODEVELOPMENTAL CELL TYPES*

Graduate Research Fellow, **Dimitrova Lab** JUL–OCT 2020
Yale University School of Medicine
SINGLE CELL TRANSCRIPTOMIC ANALYSIS OF P53-DEPENDENT METABOLIC SHIFTS IN LUNG CARCINOMA MOUSE CELLS.

BSCD Ecology and Evolution Research Fellow, **Basu/Shubin Lab** 2019 – 2020
University of Chicago Genetic Medicine

- *STUDIED FIN DEVELOPMENT ACROSS FISH SPECIES USING SCRNA-SEQ TO UNDERSTAND THE MOLECULAR MECHANISM BEHIND THE 'FIN-TO-LIMB' HYPOTHESIS.*
- *USED TRAJECTORY INFERENCE TO RECONSTRUCT DEVELOPMENTAL TRAJECTORIES HIGHLIGHTING CELL FATES DURING FIN DIFFERENTIATION, AND IDENTIFY CONSERVED DEVELOPMENTAL PATHWAYS.*

Jeff Metcalf SURF Research Fellow, **Edsinger Lab** JUN–AUG 2018
Marine Biological Laboratory, Woods Hole, MA
PERFORMED NOVEL GENE EDITING (VIA CRISPR MICROINJECTIONS) FOR VISUAL PATHWAY GENES IN LOLIGO SQUID.

Stone-Edge Observatory Research Intern, **Berthoud Lab** JUN–AUG 2017
Yerkes National Observatory, Lake Geneva, WI
DESIGNED AN END-TO-END, AUTOMATIZED TELESCOPE DATA REDUCTION PIPELINE (IN PYTHON) TO PROCESS RAW ASTRONOMICAL DATA INTO ACCURATE JPEG IMAGES.

AWARDS & HONORS

Lo Graduate Fellowship for Excellence in Stem Cell Research, Yale University	2024
Yale Genetics and Genomics Retreat Best Poster Prize	2022, 2024
EMBO Workshop on Gene Regulatory Mechanisms in Neural Fate Decisions Poster Prize	2023
University of Chicago *Summa Cum Laude*	2020
Midstates Consortium for Biological Sciences and Psychology Best Talk Award	2019
BSCD Ecology and Evolution Fellowship	2019
Jeff Metcalf SURF Fellowship	2018
Stone Edge Observatory Grant Fellowship	2017
Dean's List	2016 – 2019

PUBLICATIONS

1. **Pal A**, Noble MA, Morales M, Pal R, Baumgartner M, Yang JW, Yim KM, Uebbing S, Noonan JP. Resolving the three-dimensional interactome of Human Accelerated Regions (HARs) during human and chimpanzee neurodevelopment. bioRxiv.(preprint) 2024. (under review at *Cell)*
2. Noble MA, Ji Y, Yim KM, Yang JW, Morales M, Abu-Shamma R, **Pal A**, Poulsen R, Baumgartner M, Noonan JP. Human Accelerated Regions regulate gene networks implicated in apical-to-basal neural progenitor fate transitions. bioRxiv.(preprint) 2024. (under review at *Nature Neuroscience)*

RESEARCH PRESENTATIONS

Talk - *American Society of Human Genetics (ASHG)* 2023
Talk - *Yale Stem Cell Center Conference* 2023
Talk - *3MT Competition Semi-finals, Yale University* 2022
Talk - *Yale Supergenomics Meet* 2022
Talk - *Midstates Consortium for Biological Sciences and Psychology* 2019

Poster - *EMBO Workshop on Gene Regulatory Mechanisms in Neural Fate Decisions* 2023
Poster - *CSHL Conference on Development & 3D Modeling of the Human Brain* 2022
Poster - *Yale Genetics and Genomics Retreat* 2021 – 2023
Poster - *UChicago Undergraduate Research Symposium* 2019
Poster - *MBL Research Symposium* 2018
Poster - *Yerkes Summer Research Demonstration* 2017

TEACHING & MENTORING

TA - *Yale, Introduction to Genetics* 2024
Workshop Lead - *Yale Physics and Engineering REU (Python)* 2023 – 2024
TA - *Yale, Methods for Genomic Analysis (TA & course design)* 2022
TA - *UChicago, Organic Chemistry* 2019
TA - *UChicago, Fundamentals of Genetics* 2018

Instructor - *Yale Young Global Scholars* 2021 – 2023
Mentor - *Zack Andalman, B.S. (Line emission in tidal disruption events)* 2023
Mentor - *Yale Education Tutoring Initiative* 2021 – 2022
Student Advisor - *UChicago, Honors Calculus* 2017 – 2020

LEADERSHIP & ADVOCACY

Organizer, Trainee-Faculty Interaction Sessions, Yale Genetics 2021 – 2024
President, Society of Physics Students, UChicago 2019 – 2020
Organizer, Microaggression Seminar, UChicago Physics Department 2019
Co-Chair, Conference for Undergraduate Women in Physics, Midwest Region 2019

SKILLS & TRAINING

Wet lab: Chromosome capture assays (3C, HiC, C-HiC), CUT & RUN/ CUT & TAG, RNA-Seq, ATAC-Seq, scRNA-Seq, scATAC-Seq and sc-multiome assays, probe design for oligo pulldowns/ gRNAs for targeted CRISPRi or CRISPRa experiments involving genes and regulatory elements, 2D cell culture (iPSCs, iPSC-derived NSCs and neurons), 3D brain organoid culture, experience with cell lines from human, chimpanzee and bonobo species.

Dry lab: Analysis pipelines for assays mentioned above, integration of generated interaction map datasets with published HiC, HIChIP datasets, and analysis of target gene sets among published single cell atlases (scRNA-Seq and scATAC-Seq), incorporation of human variant data from databases such as gNOMAD, utilizing machine learning models to predict gene targets of regulatory elements.

Languages/ software: Python, R (and RStudio), Linux Shell, Java, Javascript, LaTeX, GitHub, Microsoft Office, Google: Sheets, Slides, Docs.

REFERENCES

James Noonan, Ph.D.
Albert E. Kent Professor, Yale Department of Genetics
333 Cedar Street, New Haven CT, 06510
james.noonan@yale.edu

Anindita Basu, Ph.D.
Associate Professor, Genetic Medicine, University of Chicago
5841 S. Maryland Ave, Chicago IL, 60637
onibasu@uchicago.edu