

Patricia Nano

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PROFESSIONAL EXPERIENCE

Assistant Professor, Dept. of Biosciences Rice University	2026 – present
Postdoctoral Fellow, Laboratory of Dr. Aparna Bhaduri University of California Los Angeles	2021 – 2026

EDUCATION

Ph.D. in Chemical & Systems Biology, Laboratory of Dr. James Chen Stanford University	2013 – 2021
B.S. in Biochemistry & Cell Biology Rice University Magna cum laude, Distinction in Research and Creative Works	2011 – 2013

RESEARCH EXPERIENCE

Postdoctoral Research Dept. of Biological Chemistry, University of California Los Angeles Advisor: Dr. Aparna Bhaduri	2021 – present
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- Innovated strategies to identify novel mechanisms driving cell type diversity
 - A classic driver of early neuronal identity, *FEZF2*, works in part by activating the autism-linked gene *TSHZ3* and enabling it to activate a specific module of 74 synaptic genes.
 - Glioblastoma-linked *YBX1* operates at a specific dose within excitatory neurons to promote molecular signatures unique to the pre-frontal cortex
- Established platforms to probe cell fate trajectories in the human brain at high resolution
 - Single-cell transcriptomic meta-atlases of the developing and adult human cerebral cortex
 - Novel gene co-expression methods to extract mechanistic hypotheses from omic-scale profiles
 - Pooled CRISPR screening in *in vitro* models of the human brain: primary cultures and organoids
- Applied tools in collaborations within research group and across other laboratories
 - Cell type heterogeneity across brain tumor patients; development of human-organoid tumor transplant models
 - Roles of metabolites and sub-cortical brain region inputs on cell type specification
 - Collaborations across UCLA, UCSF, Univ. of Michigan and Columbia University to examine human-specific microglia development; impact of hyperoxia on cell fate; links between neurogenesis and dementia; progression of H3K27M-linked brain tumors
- Leading bioinformatic teams within cross-institutional consortiums to comprehensively map the human brain at single-cell resolution:
 - Multi-omic atlases of the developing human and non-human primate brain (30 brain regions, 3 timepoints, 3 species)
 - Metabolomic and transcriptomic profiles of 16p11.2 deletion phenotypes in cortical development

- Structure-activity profiling of ARHGAP36, a regulator of neural development and tumorigenesis
 - Created deep-sequencing-based mutagenesis screening platform to identify novel regulatory sites
 - Conducted comparative proteomic analysis of ARHGAP36 mutants to identify activity-dependent binding partners
 - Determined novel, negative feedback mechanisms through an integrative approach of truncation mutant characterization, high-throughput mutagenesis screening, and comparative proteomics

Biochemistry & Systems Biology Undergraduate Research

2011 – 2013

- Rice University Honors Thesis (Advisor: Dr. Daniel Wagner)
 - Assessing the role of Wnt signaling in epidermal differentiation using the zebrafish model system
- Stanford University Summer Research Internship (Advisor: Dr. Joshua Elias)
 - Profiling nascent proteome dynamics using shotgun proteomics, bio-orthogonal non-canonical amino acid tagging and stable isotope labelling

PUBLICATIONS AND PREPRINTS

Publications

1. Mil J, Soto JA, Krall AS, Pelligia J, Frigui S, Fong OS, Sathe L, Matulionis N, Day F, Stiles L, Montales KP, Azizad DJ, Gonzalez CE, Fazzari E, Li MX, **Nano PR**, Martija AA, Perez-Ramirez CA, Nguyen CV, Wick B, Ge W, Kan RL, Andrews MG, Haeussler M, Wells MF, Christofk HR, Bhaduri A. Metabolic atlas of early human cortex reveals glycolytic remodeling and pentose phosphate pathway control of cell fate transitions. **Cell**. 2026 Aug 4. doi: 10.1016/j.cell.2026.07.023.
2. Diaz-Salazar C, Kim J, Krzisch M, Yoo J, **Nano PR**, Bhaduri A, Jaenisch R, Paredes M, Polleux F. Human-specific SRGAP2 paralogs synchronize neonatal microglial maturation and synaptic development. **Neuron**. 2026 Jul 22. doi: 10.1016/j.neuron.2026.07.007.
3. Ramsey AC, Tang XY, Macias MJ, **Nano PR**, Lu R, Benito B, Lau CM, Park J, Zhang J, Beatty W, Mukhtar T, Kriegstein AR, Bhaduri A, Marsan E, & Huang EJ. TGF β signaling promotes astroglial activation and TDP-43 proteinopathy in organoid models of frontotemporal lobar degeneration. **J Clin Invest**. 2026 Jun 16. doi: 10.1172/JCI190035.
4. Ge W, Kan RL, Yilgor C, Fazzari E, **Nano PR**, Azizad DJ, Shinglot H, Li M, Ito JY, Tse C, Tum HA, Scholes J, Baisiwala S, Patel KS, Nathanson DA, & Bhaduri A. Human organoid tumor transplantation identifies functional glioblastoma-microenvironment communication mediated by PTPRZ1. **Cell Rep**. 2026 Jan 27. doi: 10.1016/j.celrep.2025.116848.
5. Nowakowski TJ, **Nano PR**, Matho KS, Chen X, Corrigan EK, Ding W, Gao Y, Heffel M, Jayakumar J, Kaplan HS, Kronman FN, Kovner R, Mannens CCA, Song M, Steyert MR, Venkatesan S, Wallace JL, Wang L, Werner JM, Zhang D, Yuan G, Zuo G, Ament SA, Colantuoni C, Dulac C, Fan R, Gillis J, Kriegstein AR, Krienen FM, Kim Y, Linnarsson S, Mitra PP, Pollen AA, Sestan N, Tward DJ, van Velthoven CTJ, Yao Z, Bhaduri A, Zeng H. The new frontier of human and mammalian brain development. **Nature**. 2025 Nov 5. doi: 10.1038/s41586-025-09652-1.
6. **Nano PR**, Fazzari E, Azizad D, Martija AA, Nguyen CV, Wang S, Giang V, Kan RL, Yoo J, Wick B, Haeussler M & Bhaduri A. Integrated analysis of molecular atlases unveils modules driving developmental cell subtype specification in the human cortex. **Nature Neuroscience**. 2025 Apr 21. doi: 10.1038/s41593-025-01933-2.
 - Highlighted in Nature Neuroscience News & Views: *Gene programs driving cortical neuron specifications* (He & Treutlein, 2025)
 - Selected for Nature Collection: *A year of stem cell and developmental biology* (2025 Jun 06)

7. Adameyko I, Bakken T, Bhaduri A, Chhatbar C, Filbin MG, Gate D, Hochgerner H, Kim CN, Krull J, La Manno G, Li Q, Linnarsson S, Ma Q, Mayer C, Menon V, **Nano P**, Prinz M, Quake S, Walsh CA, Yang J, Bayraktar OA, Gokce O, Habib N, Konopka G, Liddelow SA & Nowakowski, TJ. Applying single-cell and single-nucleus genomics to studies of cellular heterogeneity and cell fate transitions in the nervous system. **Nature Neuroscience**. 2024 Dec 03. doi: 10.1038/s41593-024-01827-9
8. Pun M, Pratt D, **Nano PR**, Joshi PK, Jiang L, Englinger B, Rao A, Cieslik M, Chinnaiyan AM, Aldape K, Pfister S, Filbin M, Bhaduri A & Venneti S. "Common molecular features of H3K27M DMGs and PFA ependymomas map to hindbrain developmental pathways." **Acta Neuropathologica Communications**. 2023 Feb 9;11(1):25. doi: 10.1186/s40478-023-01514-z.
9. **Nano PR**, Bhaduri A. "Evaluation of advances in cortical development using model systems." **Developmental Neurobiology**. 2022 Jul;82(5):408-427. doi: 10.1002/dneu.22879.
10. **Nano PR**, Bhaduri A. "Mounting evidence suggests human adult neurogenesis is unlikely." **Neuron**. 2022 Feb 2;110(3):353-355. doi: 10.1016/j.neuron.2022.01.004.
11. **Nano PR**, Nguyen CV, Mil J, Bhaduri A. "Cortical Cartography: Mapping Arealization Using Single-Cell Omics Technology." **Frontiers in Neural Circuits**. 2021 Dec 10;15:788560. doi:10.3389/fncir.2021.788560.
12. **Nano PR**, Johnson TK, Kudo T, Mooney NA, Ni J, Demeter J, Jackson PK, Chen JK. "Structure-activity mapping of ARHGAP36 reveals regulatory roles for its GAP homology and C-terminal domains." **PLoS One**. 2021 May 17;16(5):e0251684. doi: 10.1371/journal.pone.0251684.

Pre-prints

13. Venkatesan S, **Nano P**, Werner J, Malaiya S, Herb B, Gao Y, Wang L, Bhaduri A, Nowakowski TJ, Colantuoni C, Ament SA, Gillis J. A consensus atlas of human brain development defines cell type-specific maturation trajectories across the lifespan. **bioRxiv**. 2026 Jul 17. doi: 10.64898/2026.07.16.738788.
14. **Nano PR**, Jaklic DC, Giang V, Soto JA, Mil J, Wang S, Martija A, Wick B, Haeussler M, Bhaduri A. Intrinsic coordination of dynamic molecular signatures shape the human prefrontal cortex. **bioRxiv**. 2026 May 13. doi: 10.64898/2026.05.13.724991.
15. Martija A, Bristow BN, Rana D, Bollu S, Fazzari E, Baisiwala S, Nguyen CV, Ge W, Kan RL, Azizad DJ, Li MX, **Nano PR**, Cho H, Perryman T, Nathanson DA, Patel KS, Bhaduri A. Glutamatergic neuron-tumor synapses shape human glioblastoma cell states through radial glia plasticity. **bioRxiv**. 2026 May 14. doi: 10.64898/2026.05.14.725216.
16. Fazzari E, Azizad DJ, Yu K, Ge W, Li MX, **Nano PR**, Baisiwala S, Martija A, Kan RL, Caston J, Diafos LN, Tum HA, Tse C, Bayley NA, Haka V, Cadet D, Perryman T, Soto JA, Wick B, Veerappa A, Guda C, Powers LW, Jain V, Aksu M, Everson RG, Bergsneider M, Raleigh DR, Gregory SG, Crouch EE, Patel KS, Liao LM, Nathanson DA, Deneen B, Bhaduri A. A neurovascular progenitor sits at the nexus of glioblastoma lineage trajectories. **bioRxiv**. 2026 Feb 25. doi: 10.1101/2024.07.24.604840.
17. Fazzari E, Azizad DJ, Li MX, Ge W, Baisiwala S, Cadet D, **Nano PR**, Kan RL, Perryman T, Tum HA, Tse C, Wick B, Varona Arguelles C, Patel KS, Liao LM, Prins RM, Nathanson DA, Bhaduri A. Predictable clonal hierarchies from restricted progenitors provide a framework for cell type-specific therapies in glioblastoma. **bioRxiv**. 2026 Feb 23. doi: 10.64898/2026.02.21.707071.
18. Nguyen CV, Martija AA, **Nano PR**, Soto JA, Jaklic DC, Mil J, White R, Martin JM, Rana D, Geschwind DH, Bhaduri A. Thalamic NRXN1-Mediated Input to Human Cortical Progenitors Drives Upper Layer Neurogenesis. **bioRxiv**. 2025 Apr 25. doi: 10.1101/2025.04.25.650717. **In press at Science**.

PROFESSIONAL TALKS AND SEMINARS

*Invited speaker , Annual Regenerative Medicine Essentials Course, Wake Forest University	2026
*Invited speaker , 10X Genomics Los Angeles Single Cell and Spatial Biology Symposium	2026
<u>Selected abstract</u> , Society for Neuroscience Annual Meeting, Nanosymposium	2025
*Invited speaker , Boston Children's Hospital, Data Science Webinar	2025
<u>Selected abstract</u> , BME UNITE Future Faculty Seminar	2025
*Invited speaker , Texas Children's Hospital Feigin Rising Stars Research Symposium	2025
<u>Selected abstract</u> , Functional Genomics of Human Brain Development & Disease Gordon Conference	2025
<u>Selected abstract</u> , Society for Neuroscience Annual Meeting, Nanosymposium	2024
*Invited speaker , UCLA Molecular Biology Institute Annual Retreat	2024
*Invited speaker , Christopher Reeve Hot Topics in Stem Cell Biology Data Blitz	2023

FUNDING RECORD

Generated preliminary data and figures that established feasibility of the following:

- R01MH132689 funded by NIH/ NIMH [5 years] 2024 – 2029
Elucidating Regulation of Cell Fate Specification in Human Cortical Development to Understand Etiology of Neurodevelopment Disorders (PI: Aparna Bhaduri)
- Supplement for 5UM1MH130991-03 funded by NIH/ NIMH [5 years] 2022 – 2027
A Multidisciplinary Center for Developing Human and Non-human Primate Brain Cell Atlases (PI: Arnold Kriegstein, Aparna Bhaduri, Alexander Pollen, Nenad Sestan, Hao Huang, Jon Levine)

UCLA Dept. of Biological Chemistry Zamenhof Scholarship	2025 – 2026
UCLA CIRM/Broad Stem Cell Research Center Training Program [3 years]	2022 – 2025
UCLA Intercampus Medical Genetics Training Program (T32GM008243) [1 year]	2021 – 2022
Stanford Center for Molecular Analysis and Design Fellowship [1 year]	2017 – 2018
Stanford ChEM-H Predoctoral Training Program at Chemistry/Biology Interface [1 year]	2016 – 2017
Stanford University Robert and Ruth Halperin Graduate Fellowship [3 years]	2013 – 2016
Barry Goldwater Scholarship [2 years]	2011 – 2013

HONORS AND AWARDS

Leading Edge Fellow	2025
Finalist, Simons Foundation Autism Research Initiative Fellows-to-Faculty Award	2025
First place, UCLA Broad Stem Cell Research Center Trainee Elevator Speech Contest	2023
Honorable Mention, NSF Graduate Research Fellowship Program	2014
Inductee, Phi Beta Kappa Honor Society	2013

LEADERSHIP & SERVICE

Initiatives led under NIH BRAIN Initiative Cell Atlas Network (BICAN)	2023 – present
• Data Analysis, Multidisciplinary Center for Developing Human and Non-Human Primate Brain Cell Atlases ○ developing bioinformatic infrastructure for single-cell, multi-omic profiling of individual samples processed across 4 institutes • Joint Analysis Sub-Group ○ mapping cell type maturation across developmental stage and species by establishing a uniform bioinformatic analysis pipeline of BICAN datasets	

- Trainee Perspective Piece; Developmental Working Group
 - coordinated a group of 12 postdoctoral scholars and graduate students from labs in the BICAN Developmental Working Group
 - created forward-looking review piece highlighting the value-add of BICAN to the field (*in press at Nature*)

Peer Reviewer 2022 – present

- Cell, Nature, Nature Neuroscience, Nature Genetics, Communications Biology

Co-lead, Joint Analysis Group for Scalable and Systematic Neurobiology of Psychiatric and Neurodevelopmental Disorder Risk Genes (SSPSyGene) Consortium 2024

- Applied bioinformatic and infrastructure principles from BICAN Joint Analysis Sub-group to establish a team for standardizing iPSC-based models for genetic perturbation of neurodevelopmental disease risk genes

Selection Committee Member, NIH BRAIN Initiative Cell Atlas Network Collaboration Award 2024
Society for Neuroscience Membership 2021 – present

TEACHING AND MENTORING EXPERIENCE

Mentoring

Research mentor to four undergraduates and four rotation students, UCLA 2021 – present

Research mentor to one undergraduate and one rotation student, Stanford University 2017

Career mentor to 9 undergraduates, AMGEN/Stanford Summer Research Program 2015 – 2016

- 5 admitted to PhD programs (ex: Stanford Univ. and UW Madison)

Academic Mentor, Wiess Residential College Mentors Society, Rice University 2012 – 2013

Teaching

Session Host, Genomic Analysis, CIRM Trainee Networking Conference 2024

Guest Expert in Organoid/CRISPR Tools, Intro to Current Literature in Neuroscience, UCLA 2022

Teaching Assistant, Concepts and Applications in Chemical Biology, Stanford University 2016

Teaching Assistant, Experimental Bioscience Lab, Rice University 2012 – 2013

Outreach

Application Review Panelist, AMGEN/Stanford Summer Research Program 2016

Panelist, UC Davis Biology Undergraduate Scholars Program 2014

Guest Speaker, Science Outreach Forum, Western Mindanao State University, Philippines 2013

ADVANCED COURSEWORK

Faculty Application Bootcamp, Chan Zuckerberg Institute 2025

Gene Regulatory Networks for Development Course, Marine Biological Laboratory 2017