Supriya Chakraborty

Doctoral Researcher | Department of Biology, University of Miami
Research Volunteer | Alzheimer's Therapeutic Research Institute, University of Southern California
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RESEARCH PROFILE

Neurovascular researcher studying cerebral microvascular dysfunction in progranulin-associated frontotemporal dementia. My doctoral work integrates vascular phenotyping, protein assays, quantitative microscopy, and analysis of mouse microvessel and human FTD-GRN transcriptomes. My broader research interests center on immune–vascular interactions and blood–brain barrier regulation in neurodegenerative disease.

EDUCATION

Ph.D. in Biology, University of Miami — Jan 2023–May 2027 (expected)
Advisor: Oliver Bracko, Ph.D.
Dissertation: Cerebrovascular and neurovascular dysfunction in progranulin-deficient models of frontotemporal dementia

M.S. in Biological Sciences — 2019–2022
Indian Institute of Science Education and Research (IISER) Mohali, India

B.Sc. (Hons.) in Zoology — 2016–2019
Ramakrishna Mission Vivekananda Centenary College (RKMVC), Kolkata, India

PUBLICATIONS AND PREPRINTS

Preprints

Chakraborty S, Weick M, Franciosa SA, Tabrizi Z, Swinehart C, Rodriguez Moore G, Lee D, Bhatt NN, Cano A, Poorva P, Torices S, Rust R, Bracko O. Progranulin haploinsufficiency remodels the cerebral microvasculature and neurovascular unit. bioRxiv 2026.07.20.738719. Preprint; *Nature Communications* under revision. Article

Bhatt NN, Tabrizi Z, Janulis J, **Chakraborty S**, Weick M, Franciosa SA, Rodriguez Moore G, Agatemor C, Galvin JE, Bracko O. Reducing neutrophil sialic acid residues alleviates cerebral hypoperfusion in Alzheimer's models. bioRxiv 2026.09.23.753660. Preprint; *ATVB* under review 2026. Article

Peer-reviewed original research

Tabrizi Z, Lim XR, **Chakraborty S**, Harraz OF, Bracko O. Systemic Piezo1 activation improves cerebrovascular function in Alzheimer's disease. *Alzheimer's & Dementia* 2025;21(12):e71016. Article

Bhattacharya A, **Chakraborty S**, Das KL, Saha A, Sardar S, Mandal B, Mukherjee A, Mitra B. Temporal diversity of urban butterflies: a case study on the campus of Ramakrishna Mission Vivekananda Centenary College, Rahara, *West Bengal*. *The Pharma Innovation Journal* 2018;7(12):395–400.

Review

Chakraborty S, Tabrizi Z, Bhatt NN, Franciosa SA, Bracko O. A brief overview of neutrophils in neurological diseases. *Biomolecules* 2023;13(5):743. Article

TECHNICAL SKILLS

Vascular phenotyping and microscopy: BBB tracer permeability assays; confocal imaging; cryosectioning and immunostaining; vessel diameter and mural-cell coverage analysis; Fiji/ImageJ, VasoMetrics, Imaris, Nikon NIS-Elements.
Transcriptomics and quantitative analysis: Microvessel bulk RNA-seq analysis; single-nucleus pseudobulk analysis; cross-species comparisons; gene ontology enrichment and network module analysis; R for transcriptomic analysis; GraphPad Prism.
Molecular biology and protein biochemistry: Cloning; PCR and real-time PCR; RNA isolation; western blotting; co-immunoprecipitation; indirect and sandwich ELISA; affinity and size-exclusion chromatography; protein refolding.
In vivo neurovascular imaging and surgery: Two-photon microscopy in anesthetized mice; chronic cranial-window surgery; capillary flow and stalling analysis; *Grn*$^{+/-}$ and Alzheimer's disease mouse models.
Cell biology and immunology: Multicolor flow cytometry and FlowJo; mammalian cell-line maintenance; zebrafish husbandry and retinal injury models; intravitreal injection.

DOCTORAL RESEARCH

Doctoral Researcher, Bracko Lab, University of Miami Jan 2023–Present
Research Volunteer at USC since June 2026 following the PI's relocation; Ph.D. enrollment remains at Miami.

- Designed and led a first-author study of cerebral microvascular dysfunction and neurovascular-unit remodeling in *Grn*$^{+/-}$ mice, integrating in vivo imaging, transcriptomics, protein measurements, and histology.
- Quantified red blood cell velocity, capillary flux, and leukocyte-associated stalls; characterized increased capillary stalling and reduced cerebral blood flow in progranulin-deficient mice.
- Isolated cortical microvessels for RNA-seq; compared mouse vascular transcriptomes with human FTD-GRN single-nucleus datasets using pseudobulk analysis to evaluate conserved endothelial signatures.
- Assessed BBB permeability and tight-junction proteins alongside vascular adhesion molecules and mural-cell coverage; characterized molecular changes despite largely preserved permeability in the assays used.
- Established the laboratory's western blot workflow as its first Ph.D. student.
- Performed ELISA assays on human buffy coat samples for a collaborative preprint on neutrophil sialylation and cerebral hypoperfusion in Alzheimer's disease models.
- Contributed in vivo imaging and analysis to a published study of systemic Piezo1 activation in Alzheimer's disease models.

EARLIER RESEARCH EXPERIENCE

Graduate Researcher, IISER Mohali, India Jan 2020–Jul 2022

- Tissue Regeneration Lab (Rajesh Ramachandran, Ph.D.), 2021–2022: Investigated Hippo–YAP signaling and nanoparticle administration in retinal regeneration using zebrafish and mouse injury models, intravitreal injection, and confocal imaging.
- Immunology and Immunopathology Lab (Sharvan Sehrawat, Ph.D.), 2021: Studied galectin-3 in CD8+ T-cell migration using multicolor flow cytometry; produced and purified single-domain antibodies against zebrafish MHC class I and CD8.
- Immunology Lab (Arunika Mukhopadhyay, Ph.D.), 2020: Studied Salmonella immunomodulatory proteins using recombinant expression, western blotting, and ELISA.
- RNA Biology Lab (Shravan Kumar Mishra, Ph.D.), 2020: Investigated Dbr1 in circular RNA formation.

Undergraduate Researcher, RKMVC College, India Jan 2017–Aug 2018
Studied urban butterfly communities through seasonal field sampling; contributed to a journal article and conference presentations.

SELECTED POSTER PRESENTATIONS

- *Blood-brain barrier breakdown contributes to neurovascular unit dysfunction in a mouse model of progranulin-deficient frontotemporal dementia.* Society for Neuroscience Annual Meeting, November 2025.
- *Investigating microvascular dysfunction in frontotemporal dementia using a progranulin-deficient mouse model.* Alzheimer's Association International Conference, July 2024.
- *Exploring microvascular dysfunction in frontotemporal dementia: insights into blood-brain barrier integrity and cerebral blood flow using a PGRN mouse model.* Neuroscience Research Day, Neuroscience Graduate Program, University of Miami, December 2023.
- *Alternative proposal for combating pollen-induced allergy by introducing non-allergic butterfly parks in urban areas: a case study.* ALLERCON-2017: 7th National Conference on Respiratory Allergy and Immunology, January 2018. First Prize.

TEACHING AND MENTORING

Trained three undergraduate researchers and mentored a Neuroscience Honors thesis student, Bracko Lab, University of Miami.

Teaching Assistant, HHMI-supported Biology/Chemistry Laboratory Program, University of Miami
BIL 153: Introductory Biology/Chemistry Laboratory I (Fall 2023 and Fall 2025); **BIL 163:** Introductory Biology/Chemistry Laboratory II (Spring 2026).

Course Instructor, Immunology Summer School, RKMVC College 2023

AWARDS AND HONORS

First Prize, poster presentation, ALLERCON-2017 2018

SERVICE AND OUTREACH

Judge, Undergraduate Research Symposium (LSSF), Florida International University 2024
Graduate Student Representative, IISER Mohali Chess Club 2021
Volunteer, World Wide Fund for Nature India, Chintamani Kar Bird Sanctuary 2019