Oranti Ahmed Omi

Neuroscience PhD Candidate | Cellular and Molecular Biology

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Education

Doctor of Philosophy, Neuroscience | University of Georgia

August 2021 – Present | Expected graduation May–June 2027 | GPA: 3.86
Research focus: Cellular Biology | Advisor: Karl Lechtreck, PhD

Graduate Certificate in Clinical Trials Design and Management | University of Georgia

January – December 2026 | In progress
Coursework: Clinical Trial Design and Management, Ethical Issues in Research, Project Management for Clinical Trials, and Applied Pharmaceutical Biotechnology.

Bachelor of Science, Biomedical Engineering | Military Institute of Science and Technology

Bangladesh | 2016 – 2019 | CGPA: 3.88

Research Experience

University of Georgia | Graduate Research Assistant, Cellular Biology

February 2022 – Present | PI: Karl Lechtreck, PhD

- Investigate the regulation and ciliary function of LF5, the Chlamydomonas counterpart of human CDKL5, to understand cellular mechanisms relevant to CDKL5 deficiency disorder (CDD), a neurodevelopmental condition associated with early-onset epilepsy.
- Established the lab's first CRISPR genome-editing workflows, designing and optimizing protocols to generate mutant and endogenously tagged Chlamydomonas strains, enabling experiments on gene function, protein localization, and ciliary transport.
- Designed, optimized, and troubleshot kinase phosphorylation assays to investigate kinase activity and regulation.
- Integrated molecular genetics, protein biochemistry, and live-cell imaging to provide evidence that LF2 kinase activity is required for LF5 phosphorylation.
- Developed a Python workflow to automate fluorescence profiling from ciliary kymograms and compare protein distribution across strains.
- Trained undergraduate and graduate researchers in CRISPR experimental design, protocol execution, and troubleshooting, supporting independent experiment planning and interpretation.
- Collaborated with UMass Chan researchers on CDKL5/LF5 biology, contributing to a co-first-author PLOS Biology publication; presented findings at national and international conferences.

University of Georgia | Graduate Research Assistant, Physiology and Pharmacology

August 2021 – February 2022 | PI: Jae-Kyung Lee, PhD

- Applied mouse brain cryosectioning, perfusion, immunohistochemistry, BV2 cell culture, and ELISA to investigate neuroinflammatory mechanisms in mouse and cellular models.

Military Institute of Science and Technology | Undergraduate Researcher, Biomedical Engineering, Bangladesh

January – December 2019 | PI: Major Md Maruf Hasan, PhD

- Profiled Th1, Th2, and Th17 cytokine expression in peripheral blood mononuclear cells using flow cytometry, finding elevated IFN-γ expression in children with autism compared with controls.

Institute for Developing Science and Health Initiatives | Research Intern, Bangladesh

December 2018 – January 2019

- Performed DNA/RNA extraction, PCR, ELISA, and sample preparation in projects on beta-thalassemia mutation analysis and respiratory infections among Rohingya refugees.

Publications

Peer Reviewed Publications

- Hou, Y.*, Omi, O. A.*, Stuck, M. W., Cheng, X., Walker, B., Lam, Y.-W., Schmoker, A. M., Nguyen, S. N., Gonzalez-Perez, M. P., Ballif, B. A., Lechtreck, K. F., Witman, G. B., and Pazour, G. J. (2025). Activation of the ciliary kinase CDKL5 is mediated by the cyclin-dependent kinase CDK20/LF2 to control flagellar length. PLOS Biology, 23(12), e3003560. *Equal contribution.
- Saha, P., Tasnim, A., Omi, O. A., Rahman, T., and Ashrafuzzaman, M. (2020). Photosweep: An Engineering Approach to Develop Cost Effective Sterilization System for Hospitals. In Advances in Decision Sciences, Image Processing, Security and Computer Vision (pp. 31–38). Springer.

Manuscript in Preparation

- Butler, J., Sun, K., Omi, O. A., Zhang, G., Saravanan, S., Blackburn, E. E., Huang, G., Docampo, R., Wang, J., Yang, P., Lorentzen, E., and Lechtreck, K. Regulation of radial spoke transport by the IFT adapter ARMC2. Manuscript in preparation.

Technical Skills

- Molecular Biology and Genetics: CRISPR/Cas9 genome editing, cloning, plasmid design, PCR mutagenesis, PCR/qPCR, DNA/RNA isolation, bacterial transformation.
- Protein Biochemistry: In vitro kinase and substrate phosphorylation assays, SDS-PAGE, Western blotting, immunoprecipitation, Phos-tag electrophoresis, mass spectrometry data analysis, ELISA.
- Cell Biology and Imaging: Mammalian cell culture, mouse brain cryosectioning, perfusion, immunohistochemistry, immunofluorescence, TIRF, high-speed video, DIC, brightfield, phase-contrast, and live-cell microscopy.
- Analysis and Software: Python for image analysis, MATLAB, ImageJ/Fiji, GraphPad Prism, SnapGene, Benchling, Linux terminal, high-performance computing, RNA-seq analysis, genome annotation, sequence alignment, and phylogenetics.

Selected Presentations

Oral Presentations

- South Eastern Microscopy Conference, University of Georgia (2026).
- Chlamydomonas Conference (Chlamy2025), Münster, Germany (2025).
- Cilia Group Meeting, virtual (2024).
- Cilia Group Meeting, virtual (2023).
- Neuroscience Retreat, UGA (2023).
- International Conference on Emerging Trends in Engineering, Hyderabad, India (2019).

Poster Presentations

- FASEB SRC The Biology of Cilia and Flagella, St. Paul, Minnesota (2024).
- Cellular Biology Departmental Retreat, UGA (2024).
- Developmental Biology Fall Symposium, UGA (2023).
- Chlamy2023, Princeton University, New Jersey (2023).

Teaching and Mentoring

Teaching Assistant | University of Georgia

Cellular Biology, CBIO 3400 | August – December 2024

- Facilitated breakout discussions and exam review sessions; graded assignments and final exam questions.

Physiology and Pharmacology, VPHY 3400 | 2021 – 2022

- Supported course administration, grading, and exam preparation; led a discussion on the central nervous system and dopamine signaling.

Leadership and Service

Cellular Biology Graduate Student Association | University of Georgia

Co-President, January 2023 – January 2024 | Treasurer, January 2022 – January 2023

- Organized workshops, symposia, retreats, and community events; coordinated speakers and logistics and managed budgets, expenses, and reimbursements.

Secretary | Bangladeshi Student Association, UGA | January 2023 – January 2024

- Coordinated cultural events, communications, logistics, and budget requests for a community of approximately 120 individuals.

Science Outreach

STEM Outreach | Stonewall Tell and Barrow Elementary Schools, Georgia | 2024–2025

- Led hands-on microscopy activities introducing cells, microorganisms, and infectious disease concepts.

Neuroscience for Kids | Thomas Lay Afterschool Program, Athens, Georgia | 2022

- Taught brain and nervous system concepts through interactive activities for elementary students.

Awards and Honors

- Graduate School Travel Awards, University of Georgia (2025 and 2024).
- Graduate Assistantship, University of Georgia (2021 – Present).
- MIST Dean's List Scholarship (2016 – 2019).