

EDUCATION

-
- Yale University** New Haven, CT. *Graduate Studies* *August 2026- expected May 2031*
- Incoming PhD Student, Interdisciplinary Neuroscience Program (INP)
 - NSF Graduate Research Fellow
 - Gruber Science Fellow
- Amherst College** Amherst, MA. *Undergraduate Studies* *August 2020- May 2024*
- *Bachelor of Arts, magna cum laude.* Neuroscience Major, GPA: 3.75/4.0
 - Thesis: Familiarity Alters the Bandwidth of Perceptual Awareness. Advisor: *Dr. Michael A. Cohen*
- Maastricht University** Maastricht, Limburg, The Netherlands. *Study Abroad* *January 2023- June 2023*
- Enrolled in The Faculty of Psychology and Neuroscience to pursue coursework in cognitive neuroscience. GPA: 4.0/4.0
- Milton Academy** Milton, MA. *Preparatory School* *Sept 2002- June 2020*

RESEARCH EXPERIENCE

-
- Stanford Medicine Postbaccalaureate Experience in Research Scholar** *July 2024- July 2026*
Stanford University School of Medicine, Palo Alto, CA
Department of Neurobiology under *Dr. Stephen Baccus*
- Developed convolutional neural networks to model neural activity in the primary visual cortex of mice, aiming to characterize the effects of locomotion and saccadic eye movements on visual encoding
 - Implemented an eye-tracking algorithm to quantify gaze dynamics during natural behavior and developed a shared repository for lab-wide analysis of neural data
 - Applied neuroscience principles to uncover internal mechanisms of artificial neural networks, moving beyond standard activation-based analyses and revealed novel computational structures used by the salamander retina
- Neuroscience Research Assistant** Amherst College, Amherst, MA *June 2023- May 2024*
Department of Psychology and Program in Neuroscience under *Dr. Michael A. Cohen*
- Led a visual perception study of 50+ participants to investigate the impact of familiarity with natural scenes on perceptual awareness of color and scene recognition
 - Conducted an in-depth literature review in preparation for my thesis, while also gaining introductory experience with MATLAB and executing human subject experiments
- Summer Research Assistant** Boston Children's Hospital and Harvard Medical School, Boston, MA *June 2022- August 2022*
Division of Genetics and Genomics, under *Dr. Christopher A. Walsh*
- Performed a genetic assay to functionally validate gene expression changes resulting from single point mutations in transcription factor binding sites identified in post-mortem schizophrenia brain samples
 - Designed and executed a project genotyping post-mortem Batten disease patients, which included designing primers, running gel electrophoresis, and sequencing to detect genetic variants
- Research Assistant** Amherst College, Amherst, MA *September 2021- December 2022*
Program in Neuroscience, under *Dr. John P. Roche*
- Investigated the development and plasticity of neuronal synapses in *Drosophila melanogaster*, with a focus on the exocyst complex and its role in bouton formation and synaptic function
 - Received introductory training in immunohistochemical staining, genetic crossing of flies, and upkeep of *Drosophila*

PUBLICATIONS

-
- Weddington, J.C., Au, D.D., Melander, J.B., Faragalla, Y., **Alaoui, Z.**, Baccus, S.. Parallel construction of object motion from retina to cortex. *bioRxiv*. *July 2026*
 - ***Alaoui, Z.**, *Melander, J.B., *Au, D.D., *Faragalla, Y., Weddington, J.C., Liu, S., Baccus, S. Eye movements cause an overestimation of locomotion-induced modulation in mouse visual cortex. Manuscript In Preparation. *June 2026*
(* denotes co-first author)
 - Bekele, B.A., **Alaoui, Z.**, Mofor, N.A., Memudu, A.E. Mentorship as a Mechanism for Equity, Retention & Scientific Innovation in Neuroscience-Related Careers. *Oxford Open Neuroscience*. *June 2026*
 - Au, D.D., Melander, J.B., Weddington, J.C., Faragalla, Y., **Alaoui, Z.**, Liu, S., Xu, Q., Baccus, S.. Single-camera, calibration-free gaze estimation using corneal reflections. *bioRxiv*. *June 2026*
 - *Melander, J.B., ***Alaoui, Z.**, Liu, S., Ganguli, S., Baccus, S. Causal Interpretation of Neural Network Computations with Contribution Decomposition (CODEC). *ICLR 2026*. *April 2026*

- Cohen, M. A., Sung, S., & **Alaoui, Z.** (2024). Familiarity Alters the Bandwidth of Perceptual Awareness. *Journal of cognitive neuroscience*, 36(8), 1546–1556. *August 2024*

PRESENTATIONS

-
- Causal Interpretation of Neural Network Computations with Contribution Decomposition (CODEC). Poster Presentation, The Fourteenth International Conference on Learning Representations, Rio De Janeiro, Brazil *April 2026*
 - Eye-tracking to correct gaze shifts in a natural virtual reality system for recording mouse visual cortical activity, Poster Presentation, Society for Neuroscience 2025, San Diego, CA *November 2025*
 - Running Alters Eye Movements, Not Cortical Processing In Mice, Oral Presentation at Postbaccalaureate Experience Research Capstone Symposium, Stanford, CA (1 of 5 selected from 20) *May 2025*
 - Relative Contributions of Locomotion, Gaze Dynamics, and Visual Encoding to Neural Responses in Primary Visual Cortex. Oral Presentation at Postbaccalaureate Experience Research in Progress Talk, Stanford, CA *January 2025*
 - Familiarity Expands the Bandwidth of Perceptual Awareness, Poster Presentation, Annual Biomedical Research Conference for Minoritized Scientists, Pittsburgh, PA *November 2024*
 - Familiarity Alters the Bandwidth of Perceptual Awareness, Program in Neuroscience Thesis Defense, Amherst, MA *May 2024*
 - Somatic Mutations in Enhancer Regions in Schizophrenia, Boston Children's Hospital Department of Genetics and Genomics Summer Undergraduate Research Presentation, Boston, MA *August 2022*

AWARDS and HONORS

-
- Sundial Immortal Dragons Award, Sundial Initiative & NextBioLeader** *June 2026*
Inaugural trainee award; selected as the sole recipient recognizing exceptional potential for leadership in academia and biomedical research.
- National Science Foundation, Graduate Research Fellowship Program (GRFP)** *April 2026*
Awarded the NSF Graduate Research Fellowship, one of the most prestigious fellowships in STEM, providing three years of financial support for graduate research in systems and computational neuroscience.
- Gruber Science Fellowship, Yale University** *April 2026*
The most prestigious award offered by Yale's Graduate School of Arts and Sciences, recognizing outstanding accomplishments and exceptional promise in scientific research.
- Financial Assistance Award, International Conference on Learning Representations (ICLR)** *March 2026*
Selected for competitive financial assistance to attend ICLR 2026 in Rio de Janeiro, recognizing early-career promise in machine learning research.
- Knight-Hennessy Scholarship Finalist** *March 2026*
Selected as a finalist for the Stanford University Knight-Hennessy Scholarship, placing among the top 150 applicants from a pool of over 5,000 worldwide. The Scholarship recognizes leadership, independence of thought, and civic purpose.
- Trainee Professional Development Award, Society for Neuroscience** *August 2025*
Selected for a competitive award recognizing promising early-career neuroscientists. Includes complimentary registration and \$1,000 travel stipend to attend Neuroscience 2025 in San Diego.
- Mentee, Black in Neuro Mentorship Program** *May 2025*
Selected for the 2025–2026 cohort of the Black in Neuro Mentorship Program, aimed at supporting and advancing Black scholars in neuroscience and related fields through one-on-one mentorship and professional development.
- Travel Award, Annual Biomedical Research Conference for Minoritized Scientists** *October 2024*
Awarded to support attendance at the conference, recognizing my commitment to promoting diversity and inclusion in biomedical research.
- Associate Member, Sigma Xi, The Scientific Research Honor Society** *May 2024*
Selected by the Amherst College chapter for excellence in research, recognizing outstanding contributions to scientific inquiry and innovation.
- Fulbright U.S. Student Program Open Research Award, The Netherlands, Alternate** *January 2024*
Selected as an alternate for a prestigious international research award supporting independent study abroad, fostering cross-cultural exchange and academic collaboration in the Netherlands. Planned research focused on multisensory processing and recurrent neural interactions in the mouse brain
- Amherst College Kauffman Fellowship in Biomedical Research** *June 2022*
Competitive fellowship awarded to fund biomedical research outside of Amherst College.

Tuskegee Airmen Scholarship Recipient

June 2020

Annual scholarship awarded by the Tuskegee Airmen Scholarship Foundation to deserving students, dedicated to preserving the history of African American Veterans who served during World War II.

ADDITIONAL EXPERIENCE

Diversity Outreach Intern Amherst College, Amherst, MA

May 2021- May 2024

- Chosen as a student intern to assist in organizing weekend admission events for underrepresented student groups and contribute to initiatives aimed at enhancing diversity within the college.

Statistics and Experimental Design Teaching Assistant Amherst College, Amherst, MA

February 2021- December 2023

- Graded homework and exams, and held weekly review sessions to assist students with exam preparation and problem sets

INVITED TALKS

- Academics and Research at Amherst College Roundtable *February 2026*
- Amherst College Strategic Access Initiatives Multigenerational Alumni Panel *August 2025*
- Milton Academy Science & Engineering Club Guest Speaker *March 2025*
- Academics and Research at Amherst College Roundtable *February 2025*

LEADERSHIP AND COMMUNITY INVOLVEMENT

- Chair of Milton Academy Reunion Planning Committee and Class Agent *August 2024- present*
- BELONG Organizing Committee, Wu Tsai Neurosciences Institute *November 2025- July 2026*
- Stanford Pen Pals, Member *November 2024- July 2026*
 - STEM mentorship for high school students
- Stanford Postbaccalaureate Experience in Research Admissions Committee *February 2024- July 2026*
- Presynaptic Mentor *September 2022- May 2024*
 - Peer mentoring program for first-year prospective neuroscience students
- Amherst Black Student Union, Member *September 2021- May 2024*
- Social Media Director of Amherst College Rugby Club *September 2021- December 2023*
- Member of President's Task Force on Anti-Racism at Amherst College *September 2021- June 2022*
- Co-Founder of 'Three Pounds of Sage': *September 2021- January 2022*
 - Podcast on trends within neuroscience, philosophy, and consciousness studies
- Muslim Student Association, Executive Board Member *April 2021- December 2022*

SOFTWARE

Expert: Python (incl. PyTorch, NumPy, Matplotlib, SpikeInterface, Sklearn, etc). **Introductory:** MATLAB (Psychtoolbox-3), SPSS