

Fareeda Elinam Abu-Juam

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EDUCATION

Joint Carnegie Mellon-University of Pittsburgh Computational Biology (CPCB) Program

University of Pittsburgh

Department of Systems and Computational Biology

Ph.D. in Computational Biology

Pittsburgh, PA

Expected May 2029

The College of Wooster

Department of Biochemistry and Molecular Biology

B.A. in Biochemistry and Molecular Biology, Summa Cum Laude

Minor in Computer Science

Wooster, OH

May 2024

RESEARCH EXPERIENCE

Graduate Student Researcher, Gur and Koes Labs

August 2024 – Present

Department of Systems and Computational Biology, University of Pittsburgh

- Develop and utilize covariance-based computational approaches for nanobody prediction and design with machine-learning integrations.
- Design machine-learning-based dimensionality reduction pipelines to identify key conformational states in protein simulations.
- Optimize collective-variable selection via machine learning to accelerate convergence and enhance sampling diversity in molecular-dynamics simulations.

Independent Capstone Project, Regan Lab

August 2023 – May 2024

Department of Biochemistry and Molecular Biology, College of Wooster

- Conducted an image analysis study to determine cellular response to tumor microenvironments and EMT signals.
- Defended results in an oral presentation to a committee of faculty and later presented to the campus community.
- Presented findings at the International Conference of Systems Biology of Human Disease.

MIT Summer Research (MSRP) Student, Davis Lab

June 2023 – August 2023

Department of Biology, Massachusetts Institute of Technology

- Restructured an existing denoising diffusion model for particle picking from cryo-EM micrographs with the goal of improving the quality of 3D reconstructions.
- Trained model on publicly available single-particle cryo-EM datasets, utilizing novel input data reconstruction methods to improve accuracy.
- Presented a poster and two talks to faculty and other students in the cohort detailing the project.

Summer Undergraduate Research Fellow, Steller Lab

June 2022 – August 2022

Strang Lab of Apoptosis and Cancer Biology, The Rockefeller University

- Researched the regulation of a key proteasome effector through biochemical assays.
- Planned and initiated future experiments to verify conclusions in cloned human cell mutants.
- Presented a poster to primary investigators and research associates at the university.

Computational Biology Lab Research Assistant, Regan Lab

May 2021 – May 2023

Department of Biochemistry and Molecular Biology, College of Wooster

- Coordinated with faculty and lab members to build and test a Boolean model of Apoptosis and Senescence.
- Evaluated scientific literature for testing and update of lab models.
- Analysed time-dependent responses of the model, updated its logic gates and evaluated model attractors for determination of model functionality.

PUBLICATIONS

Golcuk, M., **Abu-Juam, F.E.**, Basturk, D., Gursel, A.D., Buran, C.X., Akkaya, R.M., Yildiz, A., Gur, M., 2025.

Covariance-Based MD Simulation Analysis Pinpoints Nanobody Attraction and Repulsion Sites on SARS-CoV-2 Omicron Spike Protein. <https://doi.org/10.1101/2025.07.18.665531> (Pre-Print)

PRESENTATIONS

Probing The Relationship Between Partial Epithelial-to-Mesenchymal-Transition and Cell Shape in Epithelial Cells, Poster

June 2024

International Conference of Systems Biology of Human Disease: The Advent of Artificial Intelligence

Probing The Relationship Between Partial Epithelial-to-Mesenchymal-Transition and Cell Shape in Epithelial Cells, Poster **May 2024**
Independent Study Symposium, College of Wooster

Improving Particle Picking in Single-Particle Cryo-EM Through Denoising Diffusion Models, Poster and Talk **August 2023**
Massachusetts Institute of Technology

PI31 Regulation Involves Catalytic Activity of the Proteasome, Poster **August 2022**
The Rockefeller University

AWARDS & HONORS

ACM SIGHPC 2025 Computational & Data Science Fellow **July 2025**
University of Pittsburgh, Pittsburgh PA

- Recognized for academic and research success, and potential research contributions to computational science.

Vivien W. Chan Prize in Interdisciplinary Sciences **March 2024**
College of Wooster, Wooster OH

- Awarded to a student who shows dedication in pursuing post-graduate studies in an interdisciplinary field.

TriBeta Biology Honors Society Member, Xi Nu Chapter **April 2023**
College of Wooster, Wooster OH

Bernard S. and Sophie G. Gould Fellowship **June 2023**
Massachusetts Institute of Technology, Cambridge MA

- Competitively selected as one of 12 participants from a 50-person ten week-immersive biology summer internship.

Systems Approaches in Cancer Biology Scholar Award **October 2022**
Association of Cancer Systems Biologists, Marine Biological Laboratory, Woods Hole MA

- Recognized as a rising scholar in systems biology with a travel and stay award as one of eight inaugural scholars at the conference.

Department of Chemistry First Year Recognition Award **April 2021**
Department of Chemistry, College of Wooster

LEADERSHIP & SERVICE ROLES

Treasurer **August 2025 - Present**
Graduate Student Association (GSA), CPCB

- Manage program finances across two universities, including oversight of funds and tracking monthly expenses to ensure efficient resource use.
- Serve as liaison between university business offices and the Graduate Student Association governing board.
- Coordinate and support program events, from planning logistics to budget management.

Mentor **June - July 2025**
Hillman Scholars Program, Hillman Cancer Center

- Mentored a high school sophomore for 8 weeks to simulate and analyze a 600,000-atom molecular system.
- Trained the student in Bash/Linux and efficient use of HPC resources, leading to independent proficiency.
- Supervised simulation analyses and coached the student on presenting scientific data, culminating in a submission to a national conference.

Minorities in STEM (MiSTEM) Alumni Panelist **April 2025**
MiSTEM Club, College of Wooster

- Presented to 10 – 15 undergraduate students, offering practical advice on pursuing postgraduate studies and launching STEM careers.
- Shared personal strategies for successfully navigating research internships and maintaining healthy work-life balance as a college student.
- Highlighted key campus resources and external opportunities to guide students in accessing support for research, internships and career planning

Scientific Communication Team Member**August 2024 – Present***BioZone, CPCB*

- Coordinate with a team of scientists to write, edit and record footage to communicate scientific discoveries in clear, accessible language for publication to social media sites.
- Produce short-form video content highlighting key findings for platforms such as Twitter, Instagram, YouTube and BlueSky.
- Generate creative concepts and storylines to effectively communicate complex scientific topics to diverse audiences.

SSI Intern**May 2023 – May 2024***STEM Success Initiative (SSI), College of Wooster*

- Co-managed the STEM Success Initiative and collaborated with the director to supervise training 50 tutors, oversee program operations and organize monthly workshops.
- Pioneered the first STEM student advisory board in charge of communicating students' needs to a faculty board of college department heads.
- Coordinated with a team of 50 students and STEM faculty to provide tutoring in introductory STEM courses.

Organic Chemistry Laboratory Teaching Assistant**August 2022 – May 2023***Department of Chemistry, College of Wooster*

- Supervised 20 undergraduate students in a 3-hour organic chemistry lab.
- Assisted checking the assembling, manipulating, and dismantling of laboratory apparatus.
- Engaged with students about experimental procedures, calculation methods, and significance of results.

Student Leadership in STEM Panel, Panelist**April 2023***Inclusive Excellence in STEM Conference, DePauw University*

- Addressed 20 – 30 students on measures to employ as a student leader in respective communities.
- Coordinated with a team of 5 other students to curate key talking points for the panel.
- Selected to represent the College of Wooster STEM Success Initiative on this student led panel.

STEM Zone Intern for Python Computing Class**August 2021 – December 2022***STEM Success Initiative (SSI), College of Wooster*

- Planned and promoted events to retain and support underrepresented students in STEM.
- Guided 25 students in an introductory Python Computing class through weekly office hours.
- Served as a point of communication between faculty and students on areas of general class confusion.

African Students Union, College of Wooster**August 2020 – May 2024***Secretary, August March 2021 – May 2022**Co Vice-President, May 2022 – May 2023**Co-President, May 2023 – May 2024*

- Managed club finances by leading executive board workshops and curating annual itemized budgets to cater to > 100 members.
- Collaborated with 3+ campus organizations and administrative bodies to organize alumni panels, and cultural shows that amplified Black, African and Diaspora voices
- Worked closely with a team of organizers to plan college-wide events, recruiting and coordinating over 30 student performers and managing rehearsal schedules to ensure seamless event execution

LABORATORY & TECHNICAL SKILLS**Programming:** Python, C/C++, HTML, CSS, R, Bash**Research Skills:** DNA Isolation, RNA Isolation, RT-PCR, PCR, Protein Purification, Western Blot, Bacterial Transformation, Gel Electrophoresis, Fluorescence Microscopy, IR & NMR spectroscopy, Spectrophotometry, Plant tissue Culture, HPLC, Boolean modelling, Mammalian Tissue Culture**Languages:** English with native fluency, French with working proficiency and Twi with working proficiency