

Mai Al Shaaban

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EDUCATION

Brandeis University

Jan. 2024 – May 2026

B.S. in Applied Mathematics and Computer Science

Waltham, MA

**Transferred from Southern Illinois University–Edwardsville (SIUE), Aug. 2022 – Dec. 2023*

Relevant Coursework: Algorithms, Big Data and Numerical Methods, Scientific Computing, Machine Learning (Including Deep Learning), Data Structures, Computer Systems, (Real & Fourier) Analysis, Probability.

RESEARCH EXPERIENCE

Research Assistant, Machine Learning in Computational Fluid Dynamics

Sept. 2025 – Present

Jackson State University, Texas A&M University, and University of Texas at Arlington

Remote

- Collaborative work with faculty across three institutions on machine learning methods for computational fluid dynamics (CFD).

Senior Honors Thesis, Computational Neuroscience

Sept. 2025 – Present

Brandeis University, Department of Mathematics & Volen National Center for Complex Systems

Waltham, MA

- Modeling basal ganglia transitions from goal-directed to habitual learning using behavioral data from mice, with differential-equation-based and Reinforcement Learning (RL) approaches to capture dopamine-dependent striatal dynamics.

Research Student, Undergraduate Mathematics Research at Yale (SUMRY)

June 2025 – August 2025

Yale University, Department of Mathematics

New Haven, CT

- Selected as one of 19 students (10 non-Yale) to participate in this highly competitive research program.
- Appointed **Evaluation Chair** to represent students and provide feedback on program as a whole at the end.
- Led daily research discussions for the Machine Learning in Computational Fluid Dynamics (CDF) group of 4.
- Developed a complete pipeline from scratch to preprocess and analyze complex CFD simulation data, identifying vortex structures and extracting features for modeling.
- Applied methods (POD, NMF) to reduce dimensionality and uncover patterns in high-dimensional data.
- Designed deep learning transformers-based models to predict time series of fluid flow features from simulation metadata; Integrating learned models with Navier–Stokes solvers to speed up simulations while preserving physical consistency and accuracy.
- Led two Community Seminars throughout the program: *Women in Mathematics & Forbidden Mathematics*
- Recruited to collaborate with CFD research groups at Jackson State University, Texas A&M, and the University of Texas at Arlington.

Research Assistant

Feb 2024 – April 2024

Brandeis University Guided Reading Research Program (GRP)

Waltham, MA

- Collaborated with a fellow undergraduate student and a PhD scholar to study Clifford Algebra concepts.
- Participated in weekly meetings to discuss abstract algebra topics and track research progress.
- Developed skills in communicating mathematical concepts through discussions and a final presentation to members of the Math department.

Undergraduate Research Assistant

Jan 2023 – Dec 2023

Southern Illinois University Edwardsville (SIUE) School of Business

Edwardsville, IL

Undergraduate Research and Creative Activities (URCA) Program

- **Evaluating Pension Plan Performance in Missouri and Illinois:**
 - * Conducted research on pension plans with a professor in the Economic and Finance department.
 - * Collected and analyzed data, identifying the 5 best/worst plans based on 20-year investment returns.
- **Research on Personifying Alexa and AI Code Effectiveness:**
 - * Worked with a professor in the Computer Management and Information Systems department.
 - * Researched Alexa personification's impact on reviews; Scripted data from local and global seller websites (BestBuy, Amazon, ASDA, Tesco, FlipKart).
 - * Contributed to a project on AI code effectiveness on GitHub with another department professor.

PUBLICATIONS

1. Yong Yang, Caixia Chen, Yonghua Yan, **Mai Al Shaaban** *Computational Analysis of Two Micro-Vortex Generator Configurations for Supersonic Boundary Layer Flow Control*. Journals, Processes, vol. 13, no. 9, 10.3390/pr13092818, 2025. DOI

TEACHING EXPERIENCE

- Teaching Assistant** (Fundamentals of Computer Systems (aka Operating Systems)) August 2025 – Present
Brandeis Michtom School of Computer Science Waltham, MA
- Design and co-lead bi-weekly recitations and host weekly hours to support students in this challenging course.
 - Grade 3 quizzes and assignments, together accounting for 90% of students' final course grades.
 - Provide structured feedback to the course instructor through regular meetings on student progress.
- Teaching Assistant** (Advanced Programming Techniques in Java) July 2025 – Aug 2025
Brandeis Michtom School of Computer Science Remote
- Sole TA selected to support the course alongside the instructor, providing comprehensive student assistance.
 - Hosted weekly 5-7 virtual office hours to help students with the materials.
 - Graded programming assignments, contributing 40% - 50% of the students' course grades.
 - Contributed in grading students final oral exam.
 - Met regularly with the course instructor to align on expectations and share feedback from a TA's perspective.
- Teaching Assistant (aka Enrichment Sessions Leader)** Aug 2023 – Dec 2023
SIUE Department of Mathematics and Statistics Edwardsville, IL
- Led 2 weekly sessions for Calculus I students, testing their understanding of materials in groups.
 - Graded worksheets, contributing 10% - 15% to students' course grades on a weekly basis.
 - Collaborated with faculty and the enrichment sessions coordinator to align sessions with the curriculum.

PROFESSIONAL EXPERIENCE

- Data Science Intern** May 2024 – Dec 2024
Juvena Therapeutics Remote
- Documented data preparation processes to enable optimal analysis and visualization, performing data collection, preprocessing, cleaning, and integration across 10+ in-house and public databases for 3 major company research projects on disease studies.
 - Generated actionable insights for biologists and pharmacists by applying statistical modeling, clustering, and exploratory data analysis with optimized visualization tools.
 - Improved team alignment and project visibility by providing weekly updates to the supervisor, presenting bi-monthly to the data science team, and delivering a final summary presentation to the company.
- Data Scientist** Jan 2025 – May 2025
Brandeis University Branda App Development Team Waltham, MA
- Worked with a fellow to integrate transportation data from WhatEvent and MBTA into the Branda app, using machine learning to enhance real-time transit recommendations.
 - Presented findings to the team and supported development by translating data insights into improved app features.
- Inter-library Loan Student Supervisor (Previously Assistant)** Jan. 2024 – Present
Brandeis Goldfarb Library Waltham, MA
- Promoted at the start of Fall 2025 to serve as Student Supervisor in the Inter-library Loan office.
 - Process hundreds of lending and borrowing requests between Brandeis and partner universities worldwide.
 - Handle high-volume digital requests for specific articles/book chapters, ensuring timely delivery to faculty/students.
- Resident Assistant** March 2023 – Dec 2023
SIUE Housing Edwardsville, IL
- Fostered a safe environment, conducted mediation sessions, and enforced policies while supporting 37 residents in the first semester (2 buildings) and 64 residents in the second semester (3 buildings).
 - Collaborated with RAs, pro-staff, and faculty for events, and attended a weekly class on leadership and interpersonal skills.

LEADERSHIP AND MENTORSHIP EXPERIENCE

- Student Union Executive Board Member**
Head Treasurer (Now) & Deputy Treasurer (Previously) Jan. 2024 – Present
Brandeis University Student Union (SU) Waltham, MA
- Selected to serve as Co-Head Treasurer for the 2025–2026 academic year, co-overseeing financial operations for approximately 200 student clubs, co-managing SU finances, and co-leading the SU treasurers team of 12.
 - Processed over 240 club payments across three semesters and coordinated with the university budget office.
 - Monitor budget progress and provide financial reports through regular meetings with the budget analyst.
 - Represent the treasury at Student Union retreats and meetings.
 - Conduct training sessions for club treasurers on financial procedures.
 - Lead semester-end budget reconciliation for all clubs.

Vice President (Now) & Event Coordinator (Previously) <i>Girls Who Code (GWC) Brandeis Chapter</i>	Jan. 2025 – Present Waltham, MA
<ul style="list-style-type: none"> Elected to serve as Vice President for the 2025–2026 academic year. Preparing for the 1st conference at Brandeis organized by a students' club on Sep. 13th, 2025. Organized GWC Galentine's Day event (featured in the Student Engagement February 2025 Newsletter). Planned, coordinated, and executed events, collaborating with internal clubs while ensuring requirements are met, managed timelines, and handled last-minute changes. 	
Undergraduate Departmental Representative <i>Brandeis University, Department of Mathematics</i>	2025–2026 Academic Year Waltham, MA
<ul style="list-style-type: none"> Selected to represent undergraduates in departmental discussions on curriculum and community activities. Organize events, seminars, faculty talks, and information sessions on diverse mathematical topics. Collaborate closely with 2 peer UDRs and faculty/staff to strengthen community connections. 	
Mentor <i>Brandeis University Department of Mathematics</i>	Feb 2025 – April 2025 Waltham, MA
<ul style="list-style-type: none"> Mentored 5 students weekly in 50-minute sessions, advising on math majors, courses, and career opportunities. Helped students pick degree paths and find summer jobs, internships, and other university programs. Used my experience to guide students in their academics and career plans as a Math Department mentor. Led talks on math degree options helping students match their goals with available courses and resources. 	
Team Lead (Now) & Mentor (Previously) <i>Syrian Youth Empowerment (SYE)</i>	May 2023 – Present Remote
<ul style="list-style-type: none"> Mentored 3 students through the one-year program, providing 1:1 guidance on college admissions, and typically mentor 2 new students annually each cycle. Organize weekly/bi-weekly meetings to track progress, ensure deadlines were met, and assist with application submissions. Along with monitoring important dates and setting reminders. Promoted to Team Lead to supervise a group of mentors and mentees and support their overall progress. 	

TECHNICAL SKILLS AND LANGUAGES

Programming Languages: Java, Python, C/C++, JavaScript, R, MATLAB, LaTeX
Libraries: pandas, NumPy, SciPy, Matplotlib, scikit-learn, TensorFlow, Keras, PyTorch, Seaborn
Developer Tools: Google Cloud Platform, VS Code, Visual Studio, PyCharm, Eclipse, Paraview
Other Technical Tools: Workday, Latte, Moodle, Google Suite (Slides, Docs, Sheets, Calendar), Canva, Calendly
Spoken Languages: Arabic (Native), French (Upper-Intermediate)

HONORS AND AWARDS

- The Computational Neuroscience Training Grant Fellowship, \$14,100 (March 2025), *Declined*
- Student Leader of the Month (October 2025).
- Provost's Undergraduate Research Fund (Fall 2025).
- Math Mentor Award (Spring 2025).
- Bertha A. Sigilman Endowed Scholarship (2024 - 2025 academic year).
- Student Leader Prize - Awarded for supporting SU treasury and club finances (Spring & Fall 2024, Spring 2025).
- Dean's List Scholar (Fall 2022, Spring & Fall 2023, Spring 2024, Spring 2025).
- AMY Fund Scholar - Recognized for academic excellence and community involvement (2023).
- Recognized twice with a prize for involvement in SIUE Undergraduate Research program (URCA) (2023).
- Selected as one of only 5 SIUE student representatives at the National Honors College Honors NHCH Conference in Chicago (2023).
- Member and President of The National Society of Collegiate Scholars (NSCS) SIUE Chapter (2023).
- Honored with a certificate for presenting a paper in the Central States Communication Association (CSCA) Undergraduate Honors Research Conference (2022).

CONFERENCES & PRESENTATIONS

Joint Mathematics Meetings (JMM) 2026, Abstract (Accepted) <i>AMS/MAA Joint Mathematics Meetings</i>	Jan. 2026 Washington, DC
<ul style="list-style-type: none"> <i>Estimating Flows of Partial Differential Equations using Time-Series Analysis.</i> Abstract 	
Joint Mathematics Meetings (JMM) 2026, Abstract (Accepted) <i>AMS/MAA Joint Mathematics Meetings</i>	Jan. 2026 Washington, DC
<ul style="list-style-type: none"> <i>Machine Learning-Based Vortex Evolution in 3D High-Speed Flows.</i> Abstract 	
MIT Undergraduate Research Technology Conference (URTC), Institute of Electrical and Electronics Engineers (IEEE), Poster <i>Massachusetts Institute of Technology</i>	Oct. 2025 Cambridge, MA
<ul style="list-style-type: none"> <i>Machine Learning-Based Vortex Evolution in 3D High-Speed Flows.</i> Conference Site, Details 	

The 10th Annual Meeting of Society of Applied and Industrial Mathematics (SIAM), Central States Section, Mini-symposium talk (Accepted) <i>University of Arkansas</i>	Oct. 2025 <i>Fayetteville, AR</i>
• <i>A spatiotemporal decomposition-based prediction method for High-Speed Complex Fluid Dynamics.</i> Abstract	
Young Mathematicians Conference (YMC), Talk <i>The Ohio State University</i>	Aug. 2025 <i>Columbus, OH</i>
• <i>Estimating Flows of Partial Differential Equations using Time-Series Analysis.</i>	
Jane Street NYC Math Day, Poster <i>Jane Street</i>	July 2025 <i>New York, NY</i>
• <i>Machine Learning-Based Vortex Evolution in 3D High-Speed Flows.</i>	
Yale & Williams Math Programs Combined Mini Conference, Talk <i>Yale University</i>	Aug. 2025 <i>New Haven, CT</i>
• <i>Estimating Flows of Partial Differential Equations using Time-Series Analysis.</i>	
SUMRY Community Seminars, Organizer/Speaker <i>Yale University</i>	Jun.–Aug. 2025 <i>New Haven, CT</i>
• <i>Women in Mathematics.</i>	
• <i>Forbidden Mathematics.</i>	
Brandeis Mathematics Guided Reading Program, Talk <i>Brandeis University</i>	Apr. 2024 <i>Waltham, MA</i>
• <i>Clifford Algebra Overview.</i> Program Website	
AI-Powered Women Conference <i>Massachusetts Institute of Technology (MIT)</i>	Sep. 2025 <i>Cambridge, MA</i>
• Attendee. Conference Website	
The 33rd Annual Technology Conference <i>Harvard Business School</i>	Apr. 2025 <i>Cambridge, MA</i>
• Attendee. Conference Website	
National Collegiate Honors Council (NCHC) Annual Conference <i>NCHC</i>	Nov. 2023 <i>Chicago, IL</i>
• Attendee. Conference Website	
Central States Communication Association (CSCA) Conference <i>CSCA</i>	Apr. 2023 <i>St. Louis, MO</i>
• Paper Presenter: "The Fantasy of Small World" Conference Website	