

Youssef Elmougy

+1 (516) 506-9832 | youssefelmougy@yahoo.com | www.yelmougy.com |  [youssefelmougy](#) | Egyptian Citizen

811 Juniper St. NE, Atlanta, GA 30308, United States

OBJECTIVE

Motivated and talented PhD student (expected graduation in July 2025) with a strong background in **high performance computing** (HPC), **cloud computing**, and **machine learning** (ML) / **deep learning** (DL). Seeking a research-oriented software position to leverage my skills in advancing projects within HPC, cloud computing, and ML/DL.

EDUCATION

- **Ph.D. in Computer Science** Aug 2022 - PRESENT
Georgia Institute of Technology Atlanta, GA
 - Research concentrated in HPC, Systems, and AI/DL. Working in the Habanero Extreme Scale Software Research Lab. Advisor: Vivek Sarkar. Expected Graduation: July 2025.
 - Thesis: Scalable Asynchronous Actor-based Approaches for Distributed-Memory Parallel Applications.
- **M.S. in Computer Science** Jan 2022 - Dec 2022
Georgia Institute of Technology Atlanta, GA
 - Specialization in High Performance Computing. GPA: 3.6/4.0. IEEE-HKN Student Member.
- **B.S. in Computer Science** Aug 2017 - Dec 2021
Georgia Institute of Technology Atlanta, GA
 - Specialization in Artificial Intelligence and Computer Modelling. GPA: 3.8/4.0. IEEE-HKN Student Member. Graduated with Highest Honors.
 - Transferred from Hofstra University (attended Aug 2017 - May 2020) with 4.0/4.0 GPA as a Presidential Scholarship Recipient.

RESEARCH EXPERIENCE

- **Graduate Research Assistant** May 2022 - PRESENT
Habanero Extreme Scale Software Research Lab, Georgia Institute of Technology Atlanta, GA
 - Increasing resiliency and performance of the HCLib Actor-based runtime system by extending automatic communication termination protocols, distributed graph generation, and multithread execution.
 - Building large-scale distributed graph algorithms, including triangle centrality, jaccard index, page rank, pattern matching, genome comparisons, internet network topology analysis, deep learning, and GNN.
 - Implementing a distributed and shared-memory parallel Actor-based runtime system for cloud computing, allowing for HPC on the Cloud.
 - Optimizing and fine tuning the runtime system using an architecture-aware approach, such as evaluating intra-node core, socket, NUMA, and software-level buffer bindings.
- **Graduate Research Intern** May 2024 - Aug 2024
NVIDIA - NV Research Santa Clara, CA
 - Worked within the Programming Systems and Applications Research Group to analyze the performance limitations of NVIDIA's state-of-the-art libraries for graph analytics. Mentor: Michael Garland.
 - Designed and implemented new scalable algorithmic approaches to improve performance and reduce code complexity of these graph libraries using the CUDASTF task-based programming system.
 - Collaborated with NVIDIA product teams to guide research & development of algorithms and software.
- **Graduate Research Intern** May 2023 - Aug 2023
Lawrence Berkeley National Lab San Francisco, CA
 - Worked within the Performance and Algorithms Research Lab on hybrid communication techniques and increasing fault tolerance of distributed learning for deep learning workflows. Mentor: Khaled Ibrahim.
 - Built a hybrid AllReduce and Parameter Server approach to parameter distribution/update and collective communication for distributed training using PyTorch DDP and RPC.

• Research Assistant

Aug 2020 - Dec 2021

Automated Algorithm Design, Georgia Institute of Technology

Atlanta, GA

- Worked within Stocks subteam of AAD to alter the use of machine learning techniques in developing hybrid algorithms for stock price prediction. Mentor: Jason Zutty.
- Programmed stock trading related primitives, objective functions, and genetic programming frameworks built on top of EMAD.

• Research Assistant

May 2019 - May 2020

Hofstra University

Hempstead, NY

- Worked on systems and cloud infrastructure research. Mentor: Jianchen Shan.
- Research on diagnosing and optimizing the performance interference caused by CPU sharing in multi-tenant GPU clouds. Presented at ASPiRe Symposium '19, published paper in IPCCC '21.

PUBLICATIONS [🎓]

C=CONFERENCE, J=JOURNAL, P=POSTER, S=UNDER SUBMISSION, 📄=GITHUB, 🏆=AWARD

- [S.1] Youssef Elmougy, Akihiro Hayashi, Vivek Sarkar. (2024). **HybridFusion: A Parameter Update Framework for Scalable and Efficient Distributed Deep Learning**. Under submission.
- [C.1] Aniruddha Mysore, Youssef Elmougy, Akihiro Hayashi. (2024). **On the Cloud We Can't Wait: Asynchronous Actors Perform Even Better on the Cloud**. In *VIVEKFEST Symposium at SPLASH*.
- [C.2] Akihiro Hayashi, Shubhendra Singhal, Youssef Elmougy, Jiawei Yang. (2024). **Enabling User-level Asynchronous Tasking in the FA-BSP Model - Case Study: Distributed Triangle Counting**. In *VIVEKFEST Symposium at SPLASH*.
- [C.3] 📄 Youssef Elmougy, Akihiro Hayashi, Vivek Sarkar. (2024). **Asynchronous Distributed Actor-based Approach to Jaccard Similarity for Genome Comparisons**. In *ISC HPC*.
- [C.4] 🏆 Youssef Elmougy, Akihiro Hayashi, Vivek Sarkar. (2024). **A Distributed, Asynchronous Algorithm for Large-Scale Internet Network Topology Analysis**. In *IEEE/ACM CCGRID*. Winner of TCSC SCALE Award.
- [C.5] 📄 Youssef Elmougy, Ling Liu. (2023). **Demystifying Fraudulent Transactions and Illicit Nodes in the Bitcoin Network for Financial Forensics**. In *ACM SIGKDD*.
- [C.6] 🏆 Youssef Elmougy, Akihiro Hayashi, Vivek Sarkar. (2023). **Highly Scalable Large-Scale Asynchronous Graph Processing using Actors**. In *IEEE/ACM CCGRID*. Winner of TCSC SCALE Award.
- [C.7] Youssef Elmougy, Weiwei Jia, Xiaoning Ding, Jianchen Shan. (2021). **Diagnosing the Interference on CPU-GPU Synchronization Caused by CPU Sharing in Multi-Tenant GPU Clouds**. In *IEEE IPCCC*.
- [C.8] Youssef Elmougy, Oliver Manzi. (2021). **Anomaly Detection on Bitcoin, Ethereum Networks Using GPU-accelerated Machine Learning Methods**. In *IEEE ICCTA*.
- [J.1] 📄 Sri Raj Paul, Akihiro Hayashi, Kun Chen, Youssef Elmougy, Vivek Sarkar. (2023). **A Fine-grained Asynchronous Bulk Synchronous Parallelism Model for PGAS Applications**. In *Journal of Computational Science*.
- [P.1] Aniruddha Mysore, Kaushik Ravichandran, Youssef Elmougy, Akihiro Hayashi, Vivek Sarkar. (2023). **Accelerating Actor-based Distributed Triangle Counting**. In *SC*.

PROFESSIONAL EXPERIENCE

• HPC Teaching Assistant

Jan 2024 - May 2024

Georgia Institute of Technology

Atlanta, GA

- TA for CSE 6220 - Introduction to High Performance Computing.
- Engaged with students on topics of theoretical complexities, parallel and distributed computing, and communication efficient algorithms through weekly office hours. Prepared MPI-based HPC projects.

• Robotics Teaching Assistant

Aug 2021 - May 2022

Georgia Institute of Technology

Atlanta, GA

- TA for CS 3630 - Introduction to Perception and Robotics.
- Engaged with students on topics of robotics planning, control and localization through weekly office hours. Prepared Cozmo and Vector robots for Labs.

• SEAS IT Technician

May 2019 - May 2020

EdTech, Hofstra University

Hempstead, NY

- Provide technical support to faculty members in the DeMatteis School of Engineering and Applied Science.
- Primary support includes specialized software installation and configuration, hardware setup, and classroom technology support.

• Data Analytics and Web Developer Intern

Jan 2019 - May 2019

FORKaiA

Irvine, CA

- Gathered specifications based on technical needs. Defined a data analysis process, and identified patterns and trends in datasets. Worked on the apps: Namebeat, Heirgraphics, Aura App.

REVIEWER

- **IEEE Transactions on Knowledge and Data Engineering.** 2024
- **ACM Transactions on Internet Technology.** 2022 - 2023
- **IEEE Cloud Summit 2021.** 2021

HONORS AND AWARDS

- **International Scalable Computing Challenge Award (SCALE 2024) [🏆]** 2024
IEEE TCSC (Technical Committee on Scalable Computing) at the IEEE/ACM CCGrid Conference
- **Innovative Use of High Performance Computing Award [🏆]** 2023
The National Energy Research Scientific Computing Center (NERSC) and the U.S. Department of Energy (DOE) Office of Science
- **Inspiration Award** 2023
At the 2023 Monte Jade Innovation Competition for the "Streaming Digital Innovation into Services with Blockchain" project
- **International Scalable Computing Challenge Award (SCALE 2023) [🏆]** 2023
IEEE TCSC (Technical Committee on Scalable Computing) at the IEEE/ACM CCGrid Conference
- **Microsoft Azure Grant for \$10,500** 2023
IDEaS Cloud Hub at Georgia Tech
- **Phi Beta Kappa Book Award** 2019
Phi Beta Kappa Association of New York
- **Presidential Scholarship recipient** 2017 - 2020
Hofstra University

RELEVANT GRADUATE COURSEWORK

- CS 6210: Advanced Operating Systems
- CS 7210: Distributed Computing
- CSE 6220: High Performance Computing
- CS 6290: High Performance Computing Architecture
- CS 7641: Machine Learning
- CS 7643: Deep Learning
- CS 7637: Knowledge-Based Artificial Intelligence
- CS 6390: Foundations of Programming Languages
- CS 6515: Graduate Algorithms
- CS 6454: Qualitative Methods in Human-Computer Interaction

SKILLS

Programming: C++/C/C#, Python, CUDA, Java/JavaFX, FLEXSIM, MATLAB, HTML/CSS, ROS, Coq, GIT

Libraries: MPI, OpenSHMEM, UPC, Conveyors, Slurm, cuGraph, CUB, CUDASTF, Thrust, NCCL, CCCL

ML Frameworks: PyTorch, TensorFlow, HuggingFace, Scikit Learn

Virtualization: Docker, Singularity, KVM, Linux

Cloud: AWS, GCP, Azure

Languages: English, Arabic, French