

Mohammad Sonji

Computer Science PhD Candidate

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Research Interest

I am broadly interested in Systems, especially: **High-Performance Computing and Architecture**. Within these fields, I have a strong interest in sub-fields such as:

- **Parallel/Heterogeneous/Cloud Computing**
- **Performance Variability and Performance Modeling**

Education

- 2024 - 2029 : **Doctor of Philosophy, Computer Science, University of Virginia**
Advisor: **Dr. Adwait Jog**, Assistant Professor, Department of Computer Science, UVA
- 2022 - 2023 : **Master of Science, Computer Science, American University of Beirut**
CGPA: 3.78, Thesis title: Predicting If Executing Applications Are Near Completion
Advisor: **Dr. Izzat El Hajj**, Assistant Professor, Department of Computer Science, AUB
- 2018 - 2021 : **Bachelor of Science, Computer Science, Beirut Arab University**
CGPA: 3.76, Class rank: 3rd, Graduated with honors.

Experience

Research

- August, 2024 - **Research Assistant, University of Virginia, UVA**
present : I joined **Dr. Adwait Jog's** Insight Computer Architecture Lab as a research assistant.
- June, 2022 - **Research Assistant, American University of Beirut, AUB & Hewlett Packard Labs, HPE**
- July, 2024 : I joined **Dr. Izzat El Hajj's** team in collaboration with Hewlett Packard Labs (HPE) led by **Dr. Dejan Milojicic** and his team.

Teaching

Teaching Assistant, University of Virginia, UVA

Fall 25 : CS4444: Introduction to Parallel Computing

Teaching Assistant, American University of Beirut, AUB

Fall 23-24 : CMPS221: Computer Organization & Design

Spring 22-23 : CMPS202: Intermediate Programming with Data Structures

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Fall 22-23 : CMPS224/CMPS396AA: GPU Computing

Spring 21-22 : CMPS200: Introduction to Programming

CMPS212: Intermediate Programming with Data Structures

Selected Academic Projects

2022 : **GPU Computing**

I designed a CUDA application in C/C++ for computing the Jaccard similarity among vertices in a graph, implementing four distinct versions of the code, each integrating one or more novel optimizations.

I was able to achieve the fastest execution time among my classmates.

2022 : **Compiler Construction**

Using the LLVM compiler and its Clang frontend, I implemented the following tasks in C++:

- Source-to-source compiler as a recursive AST visitor in Clang
- Code generator as a non-recursive AST visitor in Clang
- Aggressive Dead Code Elimination optimization.

Publications

UVA

ISPASS'25 **Dissecting Performance Overheads of Confidential Computing on GPU-based Systems**, Yang Yang, Mohammad Sonji, Adwait Jog , In the Proceedings of IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS), Ghent, Belgium, 2025

AUB

iWAPT'25 **Predicting Performance Variability**, M. Baydoun, M. Sonji, P. Bruel, D. Milojevic, E. Frachtenberg, I. El Hajj, In the Proceedings of IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW), 2025

GrAPL'25 **Serverless Graph Analytics on Multi-Instance GPU**, M. Sonji, M. Baydoun, A. Dhakal, G. Rattihalli, D. Milojevic, I. El Hajj, In the Proceedings of IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW), 2025

Awards

2024 : **Fellowship**, UVA

2024 : **Henri Qais Naccache Best Thesis Award**, AUB

2018-2021 : **Scholarships**, BAU

Technical skills

Parallel, Distributed, & GPGPU Programming: CUDA, MPI, Pthreads

Imperative Programming Languages: C, C++, Python, JAVA, Bash

Logic Programming Languages: Prolog

Functional Programming Languages: Scheme

Assembly: MIPS, RISC-V

Operating Systems: Linux/Unix, Windows

Cloud: Docker, Kubernetes, Knative

Nvidia GPUs Partitioning features

Serverless Computing

Deep Learning

Version Control

Certificates

2025 : **Basic Responsible Conduct of Research Course**, UVA, CITI PROGRAM

2022 : **Physical Science Responsible Conduct of Research**, AUB, CITI PROGRAM

2022 : **Attendance of multiple graduate workshops**, AUB, Graduate Council

2020 : **Lebanese Collegiate Programming Contest**, ACM, LCPC

2020 : **Internet and Computing Core Certification (IC3)**, Certiport Inc.

2019 : **Lebanese Collegiate Programming Contest**, ACM, LCPC

Extracurricular Activities

2018 - 2020 : **Volunteer**, Red Cross youth sector