

Mohammad Sonji

Prospective PhD Student

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Research Interest and Current Work

I am broadly interested in Systems, especially: High-Performance Computing, Architecture, and Compilers. Within these domains, I have a strong interest in subfields such as Parallel Computing, Accelerators (mainly GPUs, both in terms of hardware and software), High-Performance/Heterogeneous/Cloud Computing, application performance and execution prediction, as well as performance variability.

Currently I am working on:

- Modeling application performance variability
- Serverless Graph Processing Framework on GPUs

Education

2022 - 2023 : **Master of Science, Computer Science**, American University of Beirut
CGPA: 3.7, 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.

I was awarded a scholarship for outstanding academic performance every semester.

Experience

Research

June, 2022 - present : **Research Assistant**, American University of Beirut, AUB & Hewlett Packard Labs, HPE
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, 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.

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

Operating Systems: Linux/Unix, Windows

Tools: Docker, Kubernetes, Knative

Compilers

Cloud Computing

Deep Learning

Version Control

Certificates

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

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