

# Mohammad Sonji

Prospective PhD Student

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## Research Interest

I am broadly interested in Systems, especially: High-Performance Computing, Architecture, and Compilers. My current research focuses at the intersection of Heterogeneous High-Performance Computing and Serverless Computing specifically Function as a Service (FaaS).

## Education

- 2022 - 2023 : **Master of Science, Computer Science, American University of Beirut**  
CGPA: 3.7, Advisor: **Professor Izzat El Hajj**, Thesis title: Predicting If Executing Applications Are Near Completion
- 2018 - 2021 : **Bachelor of Science, Computer Science, Beirut Arab University**  
CGPA: 3.76, Class rank: 3<sup>rd</sup>, Graduated with honors

## Experience

### Research

- June, 2022 - present : **Research Assistant, American University of Beirut, AUB & Hewlett Packard Labs, HPE**  
In collaboration with Hewlett Packard Labs (HPE) led by **Dr. Dejan Milojicic** and his team, I worked on multiple research projects related to application performance and execution prediction, GPUs integration for serverless graph processing applications.  
Advisor: **Dr. Izzat El Hajj**, Assistant Professor, Department of Computer Science, AUB

### Teaching

**Teaching Assistant, American University of Beirut, AUB**

- Fall 23-24 : CMPS221: Computer Organization & Design
- Spring 22-23 : CMPS202: Intermediate Programming with Data Structures
- 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: MPI, Pthreads, CUDA**  
**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**

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## 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

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## Extracurricular Activities

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