Md Ali

+1 312.882.5544 • mdali251@yahoo.com • linkedin.com/in/md-aliev/ • alihmd.com

Integrity First • Always Loyal • Never Stop Learning

Summary

Md Ali is a self-starter, motivated individual who is a firm believer in continuous learning. He is fluent in Russian, Bengali, and is currently learning Chinese. He is currently conducting research within the HExSA lab at Illinois Institute of Technology where he works under Dr. Kyle Hale and Dr. Stefan Muller. He has a keen research interest in Systems, Programming Languages, and Quantum Computing as well as an acute interest in Algorithms and Computation Theory. He is currently a Ph.D. student in Computer Science and a research aide at Argonne National Laboratory, has obtained an M.S. degree in Applied Cybersecurity and Digital Forensics, and also holds two B.S. degrees in Physics and Applied Mathematics.

Work Experience

PhD Research Aide – Argonne National Laboratory May 2022 – Present
Lemont, IL

- Working under Dr. Yuri Alexeev to find an optimal tensor contraction on Argonne developed tensor network quantum simulator QTensor.
- This involves developing a parallel optimizer written in Julia to find an optimal tenor contraction sequences for large problems running on Polaris and Aurora supercomputers.
- The kernel utilizes Julia and presents our findings on a Jupyter notebook, where the overall goal is to find the optimal tensor contraction sequences for quantum supremacy Sycamore and QAOA quantum circuits to demonstarte quantum advantage.

Doctoral Research Assistant – Illinois Institute of Technology August 2020 – Present
Chicago, IL

- Researching in the HExSA labs at Illinois Institute of Technology under the advisement of Dr. Kyle Hale. In the HExSA lab, the various research projects that I am involved in are in regards to distributed computing, operating systems, and programming languages.
- Conducted research under Dr. Stefan Muller, utilizing WCET (Worst Case Execution Time) such as OTAWA and RAML that analyze ARM binaries with OCaml programs that effectively generates an approximation of code execution timing in higher level languages such as Python, C++, etc. This provides a cost effective way of looking at higher level languages without having to run them or have any errors that may need to be checked manually that will also be costly. This includes program verification of sequential and concurrent programs. This automation are comparable to manually checking each case inside OCaml programs and we are currently working on expanding this work for other various programs.
- Currently researching a dynamic environment in the regards to edge computing that leverages programming language techniques and using virtual machines as a test bay to simulate a dynamic environment. This consists of utilizing a custom interpreter as well as a stack machine to calculate the cost in a real world scenario.

Mathematics & Science Instructor – Brightmont Academy January 2021 – March 2022
Northfield, IL

- Mathematics & Science instructor ranging from 6th – 12th grade in a variety of classes. All classes were taught at an accredited academy in a private one-on-one setting. This also included writing reports on each student and making sure they were pacing on schedule in each topic with excellent understanding of the subject being instructed. Courses were taught in a remotely as well as in person setting. The course technology was completed through google meets and offered private tutoring in a one-on-one settings.
- The courses that were instructed are Algebra I, Algebra II, Honors Geometry, Pre-Calculus, AP Calculus, Environmental Science, Biology, AP Biology, AP Chemistry, and AP Physics.

Graduate Researcher & Teaching Assistant – Illinois Institute of Technology August 2019 – July 2020
Chicago, IL

- Researched human trafficking and child predators that utilized encryption, stenography, and social engineering techniques to conduct their criminal activities under the advisement of Dr. Louis McHugh. This involved statistical analysis with many clear net and deep web pages that included hidden messages and computer forensics that are able to decrypt the encrypted drives.
- Conducted a mini research project into supply chain attacks, where he conducted a case study into the various methodology that make a supply chain attack successful across Eastern Europe.

- Teaching assistant for, "Data Networks and the Internet" that involved grading, evaluating, and lecturing during the Fall 2020 and Spring 2020. This role required to be technically proficient in network design, theory, and implementation. This included an in depth knowledge of various network topologies, TCP/UDP ports, and the OSI model.
- Teaching assistant for "Enterprise Server Admin" that involved grading, evaluating, and lecturing during the Spring of 2020. This role required him to be knowledgeable in Windows 2012/R2 servers. This included on how to set up, implementation, and troubleshoot the server.

Undergraduate Researcher & Lab Instructor – Texas State University May 2016 – May 2019
San Marcos, TX

- Mini research project utilizing C++ to theoretically calculate and model the decay of cube satellites in the atmosphere. This resulted in constructing a GUI interface to make the program user friendly. This included having weekly meetings to discuss about the project and current astrophysics phenomenons that may have any affect on the cube satellites.
- Laboratory instructor for introductory physics lab 1 and 2. This involved grading and lecturing about basic physics concepts in a hands on environment. This included concepts from mechanics to electrodynamics concepts.

Undergraduate Research Fellow – Early Universe, Cosmology, & Strings August 2016 – August 2018
San Marcos, TX

- Published a research paper regarding general relativist invariants of black holes, wormholes, and the Alcubierre metric. This involved analyzing FORTRAN code and converting the code into C++ and Python. This involved of hand calculation of tensors to confirm that we were receive the correct responses from the computer code. The publication included mathematical models and detailed proofs about the metric involved.
- Research regarding the investigation of negative probabilities and quasi-distribution. This involved heavily using R simulation specifically with the gold slit experiment. Quantum mechanics with R to statistically calculate the negative probability of a proton passing through both slits instead of one. The model was then showcased to a panel of research professor for approval in a independent research course where funding was given which was approved.

Education Certifications

Illinois Institute of Technology • Chicago, IL August 2020 – Present
Doctor of Philosophy • *Computer Science*

Illinois Institute of Technology • Chicago, IL June 2019 – August 2020
Masters of Science • *Applied Cybersecurity & Digital Forensics*

Texas State University • San Marcos, TX August 2015 – May 2019
Bachelor of Science • *Physics & Applied Mathematics*

Pentest+ • CompTIA In Progress
Professional IT Certification • *Pentesting Specialization*

Volunteer Experience

- ACM SIGPLAN Conference on Systems, Programming, Languages, and Applications: Software for Humanity Student Volunteer – Association for Computing Machinery
- Women in Cybersecurity (WiCys) Mentor 2020 – Illinois Institute of Technology

Achievements & Organizations

- ACM Student Member 2021 – Illinois Institute of Technology
- IEEE Student Member 2020 – Illinois Institute of Technology
- Illinois Tech Alumni Association Member 2020 – Illinois Institute of Technology
- Texas State Alumni Association 2019 – Texas State University
- Sigma Pi Sigma Physics National Honor Society 2019 – Texas State University
- Mathematical Association of America 2019 – Texas State University
- Mathematics Excellence Award 2019 – Texas State University
- Society of Physics Students 2015 – Texas State University