

# Seyed [Iman HOSSEINI] ZAVARAKI

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I have a wide range of interests spanning HPC, GPU performance, compilers, automated analysis reverse engineering of software. Being a physics graduate & gold medalist in Iran's National Physics Olympiad, I have a solid background in mathematics. I am very enthusiastic about GPUs & have experience with CUDA, but am also familiar with OpenCL, OpenGL & Vulkan<sup>1</sup> I am currently in my second summer internship at NVIDIA working on HPC compilers. I am proficient in OpenMP, OpenACC & MPI.

I am problem-driven & will wield any programming language, tool or theorem to solve problems. I have developed production code with C/C++, C#, Java & Python. My BS project was a transpiler from JVM bytecode to native ARM<sup>2</sup> as a co-processor (Java & Verilog). I have used typescript to make FRIDA scripts and for making a vscode extension for my work on neural decompilation.<sup>3</sup>

## EDUCATION

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2019-*	<b>PhD</b> , Computer Science, New York University, USA
2022	<b>MS</b> , Computer Science, New York University, USA
2015-2019	<b>BS</b> , Theoretical Physics, Sharif University of Technology, Iran
2014-2019	<b>BS</b> , Computer Engineering, Sharif University of Technology, Iran

## EXPERIENCE

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2022 May-Aug 2023 May - *	<b>Compiler Developer Intern, NVIDIA CORPORATION, USA</b>  At HPC Compilers team. Worked on a performance feature for GPU offloading (investigation, design, implementation) which delivered enhancements in execution time across the board for all means of parallelism & all languages supported by NVHPC compilers. Made tools to help me in my work, which found use beyond my project. Also contributed to triaging & fix for a few bugs. Presented my work both internally & at company-wide intern poster session.
2019-*	<b>Lab Member, NYU OSIRIS LAB, USA</b> The Offensive Security, Incident Response, and Internet Security Lab is a student-run cybersecurity research lab. It runs CSAW <sup>a</sup> CTF. I sometimes play CTFs with them, sometimes write blogposts. <sup>b</sup> <ul style="list-style-type: none"><li>▶ 2020 : Authored challenges for CSAW'20 CTF<sup>c</sup></li><li>▶ 2021 : Member of CSAW'21 Applied Research Program Committee, Authored challenges for the CTF<sup>d</sup></li></ul> <hr/> <p><i>a.</i> <a href="https://csaw.io/">https://csaw.io/</a> <i>b.</i> <a href="https://blog.osiris.cyber.nyu.edu/2019/12/11/OBIN-Binary_analysis/">https://blog.osiris.cyber.nyu.edu/2019/12/11/OBIN-Binary_analysis/</a> <i>c.</i> <a href="https://blog.osiris.cyber.nyu.edu/2020/12/01/cuda-reversing/">https://blog.osiris.cyber.nyu.edu/2020/12/01/cuda-reversing/</a> <i>d.</i> <a href="https://github.com/osirislab/CSAW-CTF-2021-Finals/tree/main/rev/sfc">https://github.com/osirislab/CSAW-CTF-2021-Finals/tree/main/rev/sfc</a></p>
2019-*	<b>Research Assistant, NYU CENTER FOR CYBERSECURITY, USA</b> Member of MESS Lab <sup>a</sup> , a security lab focusing on Machine Learning, Embedded Systems, and Software/Systems Security. <hr/> <p><i>a.</i> <a href="https://messlab.moyix.net/">https://messlab.moyix.net/</a></p>
2018 Oct-Jan	<b>Software Developer Intern, CENTRAL BANK OF IRAN, Iran</b> This counted as part of my credits for the Computer Engineering program. I worked on optimizing various .NET software for analysis of financial data & interoperability within .NET ecosystem using the CLR.

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1. <https://github.com/osirislab/CSAW-CTF-2021-Finals/tree/main/rev/glootie>

2. <https://github.com/ImanHosseini/JAA>

3. [https://messlab.moyix.net/papers/btc\\_bar22.pdf](https://messlab.moyix.net/papers/btc_bar22.pdf)

Summer 2018	<b>Software Developer Intern, VISPIRON SYSTEMS, Germany</b> I was part of the Embedded CoC and worked on infrastructure and algorithms for an autonomous vehicle project. Designed & implemented a low-latency networking protocol to stream car data (LiDAR+Video). Also worked on software for thermal camera mounted inside the car.
Summer 2017	<b>Computer Science Intern, UNIVERSITY COLLEGE DUBLIN, Ireland</b> Under supervision of Dr. Brett Becker, worked on implementing phenomD model of -gravitational waves- in collaboration with Dr. John Regan from DCU
2016-2019	<b>Research Assistant, SHARIF UNIVERSITY OF TECHNOLOGY, Iran</b> <ul style="list-style-type: none"> <li>▶ until 2018 : Sharif AI Lab, worked on complex systems &amp; influence maximization</li> <li>▶ 2018-2019 : Sharif S4Lab<sup>a</sup>, worked on binary program analysis &amp; instrumentation, contributed to S4Lab blog &amp; talks</li> </ul> <hr style="width: 20%; margin-left: 0;"/> <p><sup>a</sup>. <a href="http://s4.ce.sharif.edu/">http://s4.ce.sharif.edu/</a></p>
2015-2019	<b>Teaching Assistant, SHARIF UNIVERSITY OF TECHNOLOGY, Iran</b> <ul style="list-style-type: none"> <li>▶ Probability &amp; Statistics course, graded quizzes, devised &amp; graded the course project</li> <li>▶ Secure Software Systems course, participated in assignment design &amp; grading</li> </ul>
2013-2019	<b>Instructor, YOUNG SCHOLARS CLUB &amp; NODET HIGH SCHOOLS, Iran</b> <ul style="list-style-type: none"> <li>▶ Coaching Physics Olympiad contestants, Topics covered : Calculus, Linear Algebra, Analytical Mechanics, Perturbation Theory, Electrodynamics, Thermodynamics</li> <li>▶ Devised theoretical &amp; experimental questions for National Physics Olympiad exams</li> </ul>

## GRANTS, HONORS & AWARDS

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2022	1st place in SC22 Parallel Programming Marathon in Dallas <sup>a</sup>
2022	2nd place in DEFCON CTF finals in Las Vegas, as member of team Katzebin
2021	Finished 3rd in the A-HUG Hackaton <sup>b</sup> , a week-long cloud Hackaton for Arm-based HPC systems hosted by AWS and Arm which involved porting and optimization of HPC applications for Arm Neoverse-N1 processors.
2020	Cybersecurity competition experience : Finished Praetorian Tech Challenges, Qualified for DARPA FETT CTF <sup>c</sup> , scored 8 points in Fireye's Reverse Engineering competition (Flareon) <sup>d</sup>
2019,2022	Science Alliance Membership at New York Academy of Sciences (NYAS), sponsored by NYU
2019	Awarded NYU School of Engineering PhD Fellowship
2016	Finished 64th in the world (out of 2500 competing teams) in the IEEEExtreme programming contest (as Team SMI) - featured in Iranian national news
2014	Finished 7th in the selection examination for Iran's team at the International Physics Olympiad
2013-2019	Member of the National (Iran) Elites Foundation
2013	Gold Medal in the National Physics Olympiad
2011-2013	Passed 1st level examination of the annual National Physics, Computer, Mathematics & Astronomy Olympiads all 3 years of high school

<sup>a</sup>. <https://drive.google.com/file/d/1QWYNKNznvgMhd4cUrNaUiiJ5Ec6wAWcP/view?usp=sharing>

<sup>b</sup>. <https://community.arm.com/arm-community-blogs/b/high-performance-computing-blog/posts/aws-arm-ahug-hpc-cloud-hackathon>

<sup>c</sup>. <https://www.darpa.mil/news-events/darpa-finding-exploits-to-thwart-tampering>

<sup>d</sup>. <https://www.mandiant.com/resources/blog/announcing-the-seventh-annual-flare-on-challenge>

## PUBLICATIONS

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1. Iman Hosseini and Brendan Dolan-Gavitt. Beyond the c : Retargetable decompilation using neural machine translation. *NDSS Workshop on Binary Analysis Research (BAR)*, Hybrid Event, San Diego, CA. 2022