# Seyed Iman Hosseini Zavaraki

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Physics and Computer Engineering Graduate
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Github: https://github.com/ImanHosseini

Born: December 25, 1995—Tehran, Iran

## Current position

*PhD Student*, Computer Science, New York University

## Areas of specialization

Programming Languages & tech: fluent in Python, Java, C# and C/C++[1], familiar with Go, Javascript, OpenGL, CUDA, ARM[2] and x86 Assembly, Prolog, OCaml
JavaCup's Iranian Java Developers Java Developer Certificate
OS: Windows, Linux
Mathematics: Probability and Statistics, Combinatorics, Engineering Mathematics (PDEs, Linear Algebra, Fourier Analysis, Orthogonal Polynomials, Vector Calculus, etc), also familiar with: Abstract Algebra, Group Theory
Physics: Analytical Mechanics, Electrodynamics & Wave Theory, Thermodynamics, Statistical Physics, Quantum Mechanics, Relativity, Numerical Methods
Computer Science/Engineering: Algorithm Design and Analysis, Computer Architecture[3], Computer Networks, Theory of Computation and Automata, Computer Graphics, Computational Geometry, Operating Systems, Compiler Design, Binary Analysis, Source Analysis with libclang

## Experience

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|---|---|
| since 2013 | Coaching Olympiad contestants |
| 2014 | Teaching assistant for Probabilty and Statistics course for two semester, devised course project |
| since 2014 | Tutoring Mathematics and Physics courses for university students |
| 2014, 2015 | Devised theoretical and experimental questions for the final round of national physics Olympiad |
| 2018 | Teaching assistant for secure software systems course |
| 2016 - 2018 | Research Assistant at the University's AI lab (working on complex systems, and influence maximization) |
| since 2018 | Member at the University's S4Lab working on binary program analysis, contributing to the blog and presenting talks |
| 2017 | Summer internship (Computer Science) at University College Dublin under supervision of Dr.Brett Becker. Worked on implementing phenomD model -graviational waves- in collaboration with Dr. John Regan from DCU |

[1] From K&R C all the way to modern C++ [17]
[2] See my JAA project
[3] x86 and ARM assembly, utilizing SSE/AVX/Neon extensions for performance

2018 (Summer) Software Developer Praktikant at Vispiron Systems (Munich), I was part of the Embedded CoC and worked on infrastructure and algorithms for an autonomous vehicle project. We were using GTA-V game as an environment to test SLAM and self-driving algorithms. Most of my work was done in C++, C but I also worked with Python. [4]

2018 October-January I was an intern software developer at the Central Bank of Iran. It counted as part of my credits for my Computer Engineering program. I worked on optimizing various .NET software for analysis of financial data (e.g. calculating inflation rate) and on inter-operability in .NET ecosystem using the CLR.

2019-2020 Volunteer in CSAW'19 and Challenge designer/judge in CSAW'20 CTF (CSAW is the most comprehensive student-run cyber security event in the world[5])

## Education

2014 - 2019 Bachelor of Science, Computer Engineering, Sharif University of Technology (GPA 3.5/4)

2015 - 2019 Bachelor of Science, Physics, Sharif University of Technology (GPA 3.5/4)

2019 - present I am currently studying Computer Science at New York University (due graduate 2025 - I am funded by NYU School of Engineering fellowship). I am co-advised by Dr. Nasir Memon and Dr. Brendan Dolan-Gavitt at NYU Center for Cybersecurity.

## Grants, honors & awards

2011, 2013 Passed the first level examination of National Computer Olympiad

2012 Passed the first level examination of National Mathematics Olympiad

2013 Passed the first level examination of National Astronomy Olympiad

2013 Gold Medal in National (Iran) Physics Olympiad [6]

2013 - 2019 Member of the National (Iran) Elites Foundation

2014 Ranked 7th in the selection course for Iran's team at the International Physics Olympiad

2016 Finished 64th in the world (out of 2500 competing teams) in the IEEEXtreme programming contest (as team SMI) [featured in national news [7]]

2019 School of Engineering Fellowship, New York University

2017-2020 cybersecurity competition experience, including qualifying in DARPA FETT CTF [8], Praetorian Tech challenges[9] and 8 points in Fireye's 2020 Flareon [10]

## Language

Farsi (native)
English (fluent, IELTS score: 8 [Writing: 7 Speaking: 7.5 Reading: 8.5 Listening 8.5])
GRE: Verbal: 161 (88th percentile), Quantitive: 166 (90th percentile), Writing: 4.5 (82th percentile)

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[4] Ref letter: https://drive.google.com/file/d/1Kp-VJgKhXa-v_rNijg0J-ca9y5fmizIS/view?usp=sharing

[5] csaw.io

[6] The olympiad contests in Iran are very competitive, famous past winners include Maryam Mirzakhani, the first female Fields medalist

[7] https://www.irinn.ir/fa/news/184768/شش‌حرد-فیزیک-دردسر-امیرکبیر-و-۵۰-دانش‌آموز-ایرانی-المپیادی

[8] https://www.darpa.mil/news-events/darpa-finding-exploits-to-thwart-tampering

[9] https://www.praetorian.com/hall-of-fame

[10] https://www.fireeye.com/blog/threat-research/2020/08/announcing-the-seventh-annual-flare-on-challenge.html

# Projects

You can view some of the projects I've done (either as hobby or course project) in my blog or github, including the following:
**JAA**: My bachelor's thesis, Java Arm Accelerator is an open source framework for accelerating JVM bytecode by translating it to native Arm instructions. It was used to make a proof-of-concept Verilog implementation of a simple co-processor to function alongside an Arm chip. The framework is easily extendable for addition of other architectures, and employ optimization techniques; as it is now, it generates Arm native executables which run roughly 15x faster than running on JVM.
**ClothSim**: Various implementations (Android, Go, Javascript) of cloth simulation algorithm. Uses Verlet integration and an array of springs and masses, no additional library is used besides OpenGL for rendering.
**GoLexer**: A lexer (for a custom DSL) in Go. Used to show how elaborate goroutines are for producer-consumer pattern and Jackson Structured Programming, to make a lexer.
**SWars**: A prototype for multiplayer realtime spaceship game. Client is multiplatform as it is implemented with ElectronJS, server runs on windows as it is implemented with C++ and uses Winsock2. The server has a performant multithreaded architecture. (e.g. a thread for the physics calculations, separate threads for send/recv to the clients)
**OBIN** A toy binary analysis tool (coded in python), it is an elfparser&disassembler that parses 32bit and 64 bit elf, and disassembles the code using the Capstone engine. Can do simple analysis of the code: generates callgraph and can check whether a given sequence of function calls or syscalls can possibly happen. Wrote a blogpost on it for NYU OSIRIS Lab[11].
**Praetorian Tech Challenges** Solving Praetorian security's tech challenges, including solving the machine learning challenge. (https://www.praetorian.com/hall-of-fame)[12]
... and more!



[11] https://blog.osiris.cyber.nyu.edu/2019/12/11/OBIN-Binary_analysis/
[12] submissions in private repo, available upon request