# Marc Bacvanski

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## Education

**Northeastern University: Bachelor of Sciences in Computer Science** Class of 2023

**Khoury College of Computer Sciences** **GPA: 3.9**

- **Relevant Coursework:** Artificial Intelligence, Software Engineering, Algorithms and Data Structures, Mathematics of Data Models, Computer Systems, Embedded Design for Robotics, Object Oriented Design, Foundations of Cybersecurity, Science Journalism, Bostonography (Data science course analyzing Boston's data)
- **Honors and Awards:** Dean's scholarship & Dean's list 2019-present, 1st place at Northeastern Interdisciplinary Case Competition, 1st place at Husky Health Innovation Challenge
- **Activities:** President of TAMID finance & consulting group, Revolve hip hop dance team, competitive programming club

## Courses & Certifications

- **CS-191x: Quantum Mechanics and Quantum Computation, 2020:** EdX course from UC BerkeleyX, credential 18fb330fda7e47ec834dafaa682a5a0b. Grover's algorithm, Shor's algorithm, Hamiltonians, spin qubits.
- **Qiskit Certificate of Quantum Excellence, 2020:** certificate from IBM Qiskit Global Summer School 2020.
- **Deep Learning (5 course series), 2020:** Specialization certificate for Deep Learning on Coursera by deeplearning.ai, credential UW7XJ2WBD4A2. CNNs, RNNs, sequence models, and deep learning strategies.

## Experience

**SWE Intern (Reality Labs) – Meta.** May 2022 - Present

**Software Intern – QuEra Computing.** Jan 2022 - May 2022

- Developed full stack software for a **Rydberg atom based quantum simulator / quantum computer,** working with both low level **quantum controls** and **high level software** to provide service to AWS Braket
- **Enabled reliable configuration of large, arbitrary qubit geometries** by developing and implementing novel atom sorting and arrangement algorithms
- **Streamlined holography pipeline**, including automated Zernike optimization techniques for SLMs
- Contributed to Bloqade: an open source, high performance Julia-based emulator for quantum computation and quantum simulation on the neutral atom platform

**SWE Intern (AI & Data Developer Experience) – Facebook.** May 2021 - Aug 2021

- Developed infrastructure enabling transfer learning for AI models used in advertising, Instagram feed, reels, etc.
- Architected and implemented a detection, alerting, and diagnosis system for NE (Normalized Entropy) explosions during model training workflows
- **Saving over $113MM of yearly lost revenue** by automatically detecting and mitigating failed AI training workflows

**Quantum Computing Researcher – University of Waterloo.** Feb 2021 - June 2021

- Research as part of the University of Waterloo's Institute for Quantum Computing (IQC), in the Transformative Quantum Technologies (TQT) group
- **Developing novel algorithms to arrange and configure the world's largest Rydberg atom arrays, enabling large-scale trapped atom quantum computers and quantum simulators**

**Software Engineering Intern – Vicarious Surgical.** Jan 2021 - May 2021

*Vicarious Surgical develops virtual reality enabled surgical robots for minimally invasive surgery.*

- Designed and implemented a Python-based aggregation and analysis platform for high volume surgical robot data
- **Drove improvements in surgical robot reliability** through creating data visualization and exploration tools in React

- **Automated surgical video analysis** through developing computer vision software tooling to capture tool usage and sub-second electrosurgery activation

### Venture Analyst – Northeastern's IDEA Venture Accelerator. Jan 2020 - Jan 2021

*IDEA is Northeastern's student-run venture accelerator that provides resources and support for entrepreneurs.*

- **Conducted holistic business analysis** of ventures applying for the bimonthly $10k gap fund
- **Delivered actionable team insights** through work with Salesforce reporting
- Advised and worked closely with idea-phase ventures, focusing on ideation and customer discovery

### Lead Software Developer – Deuce Technologies. Jun 2018 - Aug 2019

*Deuce Technologies is a stealth stage startup headquartered in Silicon Valley.*

- **Pioneered development of alpha prototype** that led company to be accepted into a startup accelerator
- **Directed software design, architecture, and development** of a multifaceted social network system
- **Managed a team of 5 software developers** to deliver multi-platform features on critical business deadlines
- Worked extensively with GraphQL, Algolia, Node.js, Firebase/Firestore, and React Native

### President of Computer Science Club – Mountain View High School. Aug 2016 - Jun 2019

- **Grew club** from infancy to over 60 active members
- **Led teams and participated in app development** for teachers, students, and school using React and Firebase
- Applications developed are currently used by over 3000 students and teachers per month

### Founder, Lead Hackathon Organizer – MVHacks. Nov 2015 - May 2019

*MVHacks is a registered 501(c)(3) nonprofit organization that organizes high school hackathons.*

- **Secured financial sponsorships** for MVHacks 2017, a 100 student hackathon at Hacker Dojo
- **Led organizing team** for MVHacks 2.0, a 12-hour, 150+ student hackathon at Cisco Systems
- **Planned event logistics, led outreach, secured $22,000 of financial sponsorships** (Google, Microsoft, LinkedIn, Ford Research Labs, Cisco, and more)

### Bioinformatics Trainee – NASA Ames Research Center (Moffett Field). Jun 2017 - Jul 2017

- **Learned to analyze gene data** and apply omics-based bioinformatics research to space biological science
- **Developed research proposal** applying data analyses from the GeneLab Data Repository

### Hardware Intern – Electric Imp. Jun 2017 - Nov 2017

*Electric Imp is a late stage Internet of Things startup that develops an enterprise grade secure IoT platform.*

- **Optimized assembly processes** of wireless gateway nodes to achieve 63% higher throughput
- **Managed orders, assembled, and tested** battery powered sensor nodes and other online products

### Software Development Intern – Zizmos. Jun 2016 - Feb 2017

*Zizmos is an early stage startup building a distributed seismic network with earthquake early warning capability.*

- **Designed and developed infrastructure monitoring system** to detect failures of distributed cloud infrastructure components including MongoDB, RabbitMQ, and Node.js servers
- **Worked with a worldwide team on Android app** with earthquake early warning and visualization
- **Developed simulation toolkit** for generating real time earthquake data
- **Developed cloud-based, automated stress and scalability testing suites** for real-time systems by simulating failures and finding scalability bottlenecks. Zizmos has thousands of earthquake detection sensors worldwide

### Course Development Contractor – YouthStartup. Apr 2016 - Jun 2016

- **Developed CS course materials** for youth computer science classes in MIT App Inventor
- **Applied bleeding-edge Linux virtualization** technologies to enable Android development on Chromebooks

## Awards

- 2019, 2020, 2021, 2022: **Dean's Scholarship & Dean's List** at Northeastern University
- 2021: **Undergraduate Research Award** from the University of Waterloo's Institute for Quantum Computing (IQC)
- 2019: **1st Place, Northeastern Health and Innovation Case Competition**
- 2019: **1st Place, Northeastern University Case Competition**

- 2018: **National Merit Scholarship, Commended** and **Member of the California Scholarship Federation**
- 2016, 2017, 2018: **Best UI, Best Community Service, Most Creative App at MVHS App Competition**
- 2017: **University of Toronto Special Award**
- 2017: **2nd Place at Synopsis Science & Engineering Fair**
- 2017: **Certificate of Achievement Award from ASEI Silicon Valley Emerging Technology**
- 2017: **Top 10 Hackathon Project** at SM Hacks hackathon
- 2016: **1st Place at Synopsis Science & Engineering Fair**
- 2016: **Entrepreneurial and Startup Award** from Sudhakar Muddu Foundation for most startup-worthy project
- 2016: **Wolfram Alpha Special Award** at Los Altos Hacks hackathon
- 2016: **FIRST Robotics Regional Championship Winner** with robotics team
- 2014: **3rd Place at Synopsis Science & Engineering Fair**
- 2014: **U.S. Navy Office of Naval Research Naval Science Award**
- 2014: **ACM 2nd Place Award**

# Software Skills

**Deep Learning:** Convolutional neural networks, Recurrent neural networks, Keras, Tensorflow, NumPy
**Languages:** Python, Java, C++, C, Julia, Go, JavaScript & Node.js (also familiar with R, C#, Verilog)
**Technologies:** GraphQL, MongoDB, Firebase / Firestore, Algolia, ElasticSearch, Redis, Cassandra, Linux, Git
**Cloud:** Microservices, Google Cloud, AWS, Heroku, REST, Internet of Things