Matt Bowring

603-247-0061 | matt@gigabug.org | [Website](#) | [Github](#) | [LinkedIn](#)

Education

M.S. Mechanical Engineering 2024 - Present
Purdue University Remote
B.S. Mechanical Engineering 2017 - 2021
The University of New Hampshire (3.8 GPA) Durham, NH

- Awarded over $100,000 in scholarships for personal quadcopter project.
- QuadSAT Swarm Engineering Lead; Makerspace mentor; STEMbassadors member

Professional Experience

Software Engineer 06/2022 - Present
The MathWorks (Math/PDE Team) Natick, MA
Tools: MATLAB, C++, Python, CMake, Git, Perforce, Jira, Confluence

- Lead development of the [MATLAB Support Package for Quantum Computing](#); Implement core features for building, simulating, and running programs on remote quantum hardware hosted by AWS and IBM; Design compiler and assembly code generation, web server interfaces, and numeric algorithms to compute expectation values and matrix decompositions; Develop functional/performance tests, direct quality engineering, and coordinate integration with industry partners; Experiment with third-party quantum computing frameworks.
- Consult industry customers and develop models for their quantum computing applications in combinatorial optimization and classification; Implement quantum algorithms for internal use, documentation examples, and conferences.

Application Engineer 05/2021 - 6/2022
The MathWorks (Control, Design, and Automation Team) Natick, MA
Tools: MATLAB, Simulink, Python, Git, Jira, Confluence

- Developed functionality to construct the Hamiltonian for arbitrary amino acids folding on a lattice using multi-variable reduction and binary encoding methods; Developed an interface to remote quantum annealing hardware and benchmarked problems to analyze trade-offs in encoding methods; Simulated energy spectra of single qubit dynamics in various coupling schemes of electromagnetic fields.
- Trained a recurrent graph network on the QM7-X dataset to predict low-energy molecular configurations with high accuracy. Developed an OpenBabel interface for easy processing of atomic properties into feature matrix embeddings.

Personal Projects

Ising Machine 2024 - Present
- Research novel hardware architectures to solve combinatorial problems using coupled electronic oscillators; Control my test instruments (waveform generator, oscilloscope, etc.) and simulate dynamics using MATLAB and Simulink; Program integrated circuit chips using an Arduino with C++; Develop breadboard prototypes and design circuit schematics with KiCAD and Multisim.

Website 2024 - Present
- Use Hugo and Tailwind CSS to write about personal engineering interests and exercise UI/UX design; Own and manage domain through Cloudflare Pages.

Compute Server 2024 - Present
- Build Linux/Windows machines and configure them on personal network for remote access using Tailscale; Experiment with Pytorch, CUDA, and JAX (diffrax, thermox).

Machine Learning 2020 - 2021
- Trained a recurrent network to predict dash-camera misalignment using OpenCV and Pytorch; Developed a Bayesian network to predict trends in popular mobile game using NetworkX and Pytorch.

Jet-X Engineering 2020 - 2021
- Lead student team to design an air intake for mock jet turbine; Designed parts in SolidWorks and ran CFD simulations in Ansys to improve driveshaft power; 3D-printed airfoils and made silicon mold in vaccum chamber.

Quadcopter 2019 - 2021
- Integrated the PX4 flight control software with Raspberry Pi to enable waypoint tracking for quadcopters. Implemented ROS/MAVROS communication, telemetry, and interfaced the Gazebo physics environment for software-in-the-loop simulation with Python. Tuned flight controller and analyzed DC motor response using MATLAB; 3D-printed frame, soldered electrical components, and conducted field tests.