

Matt Bowring

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[Website](#) | [Github](#) | [LinkedIn](#)

Education

Purdue University (3.7 GPA)

2024 - Present

M.S. Mechanical Engineering

Remote

- Designed a [novel mixed-signal PCB](#) for solving combinatorial optimization problems using phase dynamics of coupled oscillators; Simulated circuit components and characterized Lyapunov stability with LTspice and MATLAB; Developed schematics and layouts in Altium Designer; Benchmarked performance with waveform capture and analysis using MATLAB; Developed C++ firmware using SPI for problem encoding and solution readout.

The University of New Hampshire (3.8 GPA)

2017 - 2021

B.S. Mechanical Engineering

Durham, NH

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

Experience

The MathWorks

2022 - Present

Software Engineer (Math/PDE)

Natick, MA

MATLAB, C++, Python, CMake, Git, Perforce, Jira, Confluence

- Lead development of [MATLAB's quantum computing library](#); Implement the core features to build, simulate, and run programs on quantum hardware hosted by AWS and IBM; Design compilers for assembly code generation, web server interfaces, and numeric functions for matrix decompositions and computing expectation values; Develop functional/performance tests, and manage quality engineering and integration with industry partners; Experiment with third-party quantum computing frameworks (Qiskit, PennyLane, CUDA-Q).
- Consult for industry customers and implement quantum algorithms for optimization, image processing, and reinforcement learning.

The MathWorks

2021 - 2022

Application Engineer

Natick, MA

MATLAB, Python, Simulink, 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.

Projects

Website

2024 - Present

- Blog about personal engineering interests using Hugo and Tailwind CSS; 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, JAX, and NixOS.

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; Modelled and integrated parts using SolidWorks; Ran CFD simulations in Ansys to improve driveshaft power; 3D-printed airfoils and made silicon mold in vacuum chamber to experiment with casting.

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.