Matt Bowring

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Website | Github | LinkedIn

Education

Purdue University (3.7 GPA)   2024 - Present
M.S. Mechanical Engineering   Remote

- Designed and fabricated 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; Wrote embedded C++ firmware for problem encoding and solution readout using SPI.

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

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

Experience

The MathWorks   2022 - Present
Software Engineer (Math/PDE)   Natick, MA
MATLAB, C++, Python, CMake, OpenMP, Git, Perforce

- Lead development of MATLAB's quantum computing library; Design and implement core features to build, simulate, and run programs on quantum hardware hosted by AWS and IBM; Develop a compiler for assembly code generation, numeric functions for tensor operations and expectation values, and infrastructure for server communication; Maintain functional/performance tests and manage integration with industry partners; Benchmark against other third-party quantum computing libraries (Qiskit, Pennylane, CUDA-Q).
- Develop quantum algorithms for optimization, imaging, and reinforcement learning in collaboration with industry customers (Lockheed Martin, L3Harris, Merck, etc.); Contributed research code that trains quantum network to segment images for SPIE publication.

The MathWorks   2021 - 2022
Application Engineer   Natick, MA
MATLAB, Python, Simulink, Git

- Developed server interface to quantum annealing hardware; Designed quadratic form Hamiltonians for arbitrary amino acids folding on a lattice to benchmark various constraint 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; Modeled 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.