# Matt Bowring

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## Experience

**Software Engineer** 06/2022 - Present
The MathWorks (Math/PDE Team) Natick, MA

- Sole developer and maintainer of the MATLAB Support Package for Quantum Computing; Contribute features for building quantum circuits, state-vector simulation, and OpenQASM generation to run on quantum hardware hosted by AWS and IBM. 4000+ downloads from academic and industry customers with more than 250k total executions on quantum hardware.
- Contribute MATLAB scripts of quantum algorithms (VQE, QAOA, etc.) for documentation, external conferences, and Github; Design interfaces to third-party C++ libraries using CMake and MATLAB MEX; Meet weekly with industry partners to discuss on-going feature integration; Review and assist with documentation, quality engineering and marketing efforts; Participate in book clubs for quantum computing and numerical computing.
- Develop MATLAB scripts for industry customers researching quantum methods for constrained combinatorial optimization and classification. Meet regularly to discuss technical aspects and logistics for publishing external blogs and other material.

**Application Engineer** 05/2021 - 6/2022
The MathWorks (Control, Design, and Automation Team) Natick, MA

- Supported 100s of customers with control engineering applications using MATLAB and Simulink. Collaborated with development teams to reproduce and resolve issues; Presented on customer applications to product teams, mentored interns and occasionally interviewed applicants.
- Developed MATLAB scripts to build Hamiltonian for arbitrary course-grained protein folding on a lattice. Evaluated problems on D-Wave quantum annealer to compare binary fold encoding methods; Wrote MATLAB scripts to compute energy spectra of single qubit modelled in various coupling schemes of electromagnetic fields; Implemented methods to decompose controlled quantum gates with additional qubits in MATLAB.
- Implemented and evaluated discrete-time dynamic graph network on QM7-X dataset to predict minimum energy molecule configurations using MATLAB. Collaborated with Deep Learning Toolbox developers with association from Cornell University to extend upon previous network that only classified equilibrium configurations.

## Education

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

- Worked with student team to improve quadcopter path tracking using software-in-the-loop simulations of PX4 flight controller in Gazebo environment; Wrote MATLAB scripts modelling the controller to facilitate PID gain tuning; Deployed model on testbed quadcopter using ROS Python framework and analyzed flight data; Modelled isolated DC motor under disturbance using op-amp PID controller.
- Lead student team in designing air intake for propulsion of mock jet engine using ANSYS and SolidWorks in collaboration with Jet-X Engineering; Ran CFD simulations of airflow to optimize driveshaft power of the turbine; Designed and 3D printed airfoils to be cast in aluminum using silicone mold created in vacuum chamber.
- Worked on projects using OpenCV, Pytorch, and NetworkX Python libraries for camera calibration and graph clustering; Wrote MATLAB scripts to simulate temperature fields, material stresses, combustion engine cycles, rigid body motion, and RLC circuits for various academic projects.
- Tutored courses in thermodynamics, numerical computing, and mechanics; Mentored weekly at Makerspace to assist with 3D printers, laser cutter and other equipment; Volunteered weekly for STEM outreach with elementary students; Maintained routine weightlifting and attended hiking clubs.