Luke Qi

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Education

Massachusetts Institute of Technology Sep. 2017 – Jun. 2021
Candidate for S.B. in Physics, S.B. in Electrical Engineering *Cambridge, MA*

- GPA: 5.0/5.0
- Coursework: Quantum Information Science II, Photonics, Experimental Physics, Analog Electronics Lab, Machine Learning, Quantum Mechanics, Signal Processing, Electromagnetics and Applications, Statistical Mechanics

Research and Industry Experience

Photonics and Modern Electro-Magnetics Group Feb. 2021 – Present
Undergraduate Researcher *Cambridge, MA*

- Studying quantum walker protocols immersed in non-Abelian gauge fields
- Deriving quasienergy dispersions and topological phase transitions of an effective Hamiltonian

Nanostructures and Computation Group Feb. 2021 – Present
Undergraduate Researcher *Cambridge, MA*

- Developing a fast approximate Maxwell solver for layered photonic devices with delta function permittivities and periodic boundary conditions

MIT Quanta Lab Aug. 2019 – Present
Keel Foundation Undergraduate Research and Innovation Scholar *Cambridge, MA*

- Launched a collaboration with Gonzalo Muga's theory group to develop robust ion shuttling protocols
- Created an end-to-end numerical simulation pipeline to optimize voltage waveforms for quantum computers
- Built remote laser shutter controllers and characterized the system's high-voltage amplifier

Trace Matters Scientific Feb. – Aug. 2019
Hardware Engineer *Somerville, MA*

- Built a backend data acquisition system used directly in the company's prototype mass spectrometer
- Implemented a quadropole mass filter controller and low-latency communication with front-end server

MIT Aerospace Controls Laboratory Sep. – Dec. 2018
Undergraduate Researcher *Cambridge, MA*

- Implemented human detection algorithms on a system with one Velodyne lidar and six RGB cameras
- Built a full computer vision pipeline to extract human trajectories and collected data throughout Boston

The Aerospace Corporation Jun. – Aug. 2018
Technical Intern II in the Innovation Lab *Los Angeles, CA*

- Developed computer vision algorithms that work in space using Point Cloud Library and AR tags
- Programmed Arduino robots using PID controls and IR communication to demonstrate swarm robotics techniques

Published Work

Taghioskoui, M., Qi, L. *Low-Pressure ICP-MS for Planetary Trace Elemental Analysis.* Harsh-Environment Mass Spectrometry Workshop, 16-19 September 2019, Myrtle Beach, SC.

Qi, L., et al., 2016, *New Observations of Near-Earth Asteroid 138847 (2000 VE62),* M.P.S. 721480/M.P.C. 100734.

Projects

Sigma-Delta Analog-to-Digital Converter | *Analog Electronics Laboratory* May 2020

- Designed and simulated in LTSpice, PCB layout done with KiCAD

Leadership

MIT Ridonkulous Dance Team | *Captain, VP External* Fall 2018 – Fall 2020

- Elected captain in charge of creating and executing the team's competition set and leading tri-weekly practices

Technical Skills

Software: Python: (PyTorch, SciPy, NumPy), Julia, MATLAB, SPICE, Xilinx Vivado, ROS, KiCAD, Linux
Hardware: Pynq System-on-a-Chip, Arduino, Oscilloscopes, VNA, PCB design, FPGA programming