Morgan Rivers

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Work

The Charles Stark Draper Laboratory, Cambridge, MA

Electro/Atom-Optic Development Engineer MTS II January 2020 – Present

- Modelling nonlinear ring resonator system using split step method algorithm in Matlab
- Design of GUI allowing custom optical designs using depth first search algorithm

Electro/Atom-Optic Development Engineer MTS I October 2017-January 2020

- Prototype optical sensor performance characterization.
- Construction of ring-resonator based optical atomic clocks for precision timekeeping.
- CAD design and benchtop construction of free space and fiber-coupled optical setups.
- Experimental data collection, storage, and reduction with Matlab and Labview.
- Design, construction, and testing of precision high bandwidth low noise transimpedance amplifier and design and implementation of PID control loops.

Electro-Optics and Instruments Intern Jan. 2016, June – Aug. 2016, Jan. 2017

- Created designs for electrical cable and fiber optical routing for portion of a prototype cold atom inertial sensor using SolidWorks Pro Routing Tool.

Tufts Human Robot Interaction Lab, Medford, MA

Artificial Intelligence Research Intern June – Aug. 2015

- Helped a team program a PR2 Robot to perform primitive tasks learned from a single human demonstration. (See "Publication" above.)
- Designed and implemented algorithms for logical flow of robot's goals and subsequent goal-based movements.

Education

Massachusetts Institute of Technology Spring 2019 – Spring 2020

Advanced Scholar Program – grad classes for credit; non-degree awarding

Tufts University, Medford MA Class of 2017

- BS in Engineering Physics, concentration in Computer Science with a minor in Music.
- GPA: 3.53. Magna Cum Laude. School of Engineering Dean's List each year.
- President, oSTEM (out in STEM) for queer STEM students.

Selected Coursework

6.634[J] Nonlinear Optics, MIT Spring 2019

- Final Paper: Microresonator Optical Freq Combs for Atomic Timekeeping: A review.

8.321 Quantum Theory I, MIT Fall 2019

8.311 Electromagnetism I, MIT Spring 2020

Electronic Musical Instrument Design, Tufts Spring 2016

- Invented the Glass Harp MIDI Controller: https://youtu.be/yLkjby2U0QE.

Special Topics: Computational Physics, Tufts Spring 2014

- Modeled the time dependent Schrödinger equation as member of three-person team.

Publications

Wilson, J. R., Krause, E., Scheutz, M., & Rivers, D. M. (2016, May). *Analogical Generalization of Actions from Single Exemplars in a Robotic Architecture*. In *Proc. of the 2016 Int.nat. Conf. on Autonomous Agents & Multiagent Systems* (pp. 1015-1023). Presented results at oSTEM, Pittsburgh, November 2015.

Maurice, V., Newman, Z. L., Dickerson, S., Rivers, M., Hsiao, J., Greene, P., ... & Johnson, C. (2020, August). *Miniaturized optical frequency standard for next-generation portable optical clocks*. Opt. Express 28, 24708-24720 (2020)

Skills

Programming
Experienced with languages such as Matlab, Mathematica, Labview, Python, Java, C/C++, Arduino.

Laboratory
Experienced with oscilloscopes, lockin amplifiers, polarimeters, function generators, laser diode controllers and temperature controllers. Comfortable with laser alignment, fusion splicing, optical fiber handling, surface mount soldering and 3D printing.

CAD
Fluent in SolidWorks modeling and CAD drawing