MILO J. HOOPER

Mechanical Engineer

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EDUCATION

S.B. Mechanical Engineering

Massachusetts Institute of Technology

Aug 2017 – May 2021

Coursework

- **Fall 2019**
  - Bio-Inspired Robotics, Measurement & Instrumentation
- **Spring 2020**
  - Analysis & Design of Feedback Control Systems, Design of Medical Devices and Implants, Mechanics and Materials II
- **Previous Semesters**
  - **Mechanical**: Mechanics and Materials I, Dynamics and Controls I & II, Design & Manufacturing I, Thermal-Fluids Engineering I, Biomechanics and Neural Control of Movement
  - **Electronics**: Analog Electronics Laboratory, Numerical Computation, Computation Structures

EXPERIENCE

Electrical Eng. Researcher

Research Laboratory for Electronics

Fall 2019 Cambridge, MA

- Design and testing of active battery cell balancing topologies using charge pumps and cell current shuttlers
- Circuit simulation and optimization for efficiency and current throughput

Mechanical Eng. Researcher (Space Enabled Research Group)

MIT Media Lab

Summer 2019 MIT, Cambridge, MA

- Designed and machined parts for centrifuge in order to centrifugally cast liquid paraffin for rocket fuel applications.
- Developed electronic control system for small-scale centrifuge with speed and voltage control modes
- Debugged microcontroller components and C++ control code to optimize for performance and reliability

Mechanical Eng. Researcher (Implosion Fabrication Group)

Institute for Soldier Nanotechnologies

Summer 2018 MIT, Cambridge, MA

- Designed and machined z-axis alignment mechanism for ultrafast nanolithography system using SolidWorks and mill/lathe
- Generated MATLAB patterns for laser configuration testing and to provide error data for calibration purposes in various geometries

PUBLICATIONS

- Co-Author, "An Investigation of the Centrifugal Casting of Paraffin Wax on Earth and in Microgravity," Joint Propulsion Conference, Summer 2019, American Institute of Aeronautics and Astronautics

SKILLS

- Machine tools: mill, lathe, waterjet, laser cutter, 3d printer, motorized hand tools
- Software: SolidWorks, LTSpice, Linux, LaTeX
- Programming: MATLAB, C++, Python 3, Arduino, mbed (ARM)

PROJECTS

Benevolent Courier (Fall 2019)

- Python web scraper for rapid delivery of time-sensitive Mailman email to bypass server delays.

Door RFID System (Summer 2019)

- Installed 13.56 MHz card reader + Arduino access control system + door strike to use my MIT ID to enter my dorm room

Electric Scooter (Spring 2019)

- Built a custom scooter using Razor E100 steel frame, A123 $LiFePo_4$ batteries, Kelly Controller, key ignition, continuous throttle; added front and rear braking
- Top speed: 20 mph; can go up steep inclines
- Construction involved welding, wiring and soldering, angle grinding
- Next steps are welding steel rear fender and constructing trailer hitch + assembling 80/20 trailer to tow stuff

6.101 Project (Spring 2019)

- Idea: use eye muscle EMG for 2-axis servo pointer control
- Involved 4th order Chebyshev filtering, use of instrumentation amps, PWM signals generated from comparators and 555 timer sawtooths

2.007 Robot (Spring 2019)

- 4-ft lifting lead screw actuated scissor lift
- Waterjet lift linkages, robot base frame & 3d printed adapters to mount servos and casters

Homemade Furniture (Fall 2018)

- Cut/sanded/assembled coffee table from wood scraps
- Built ultrawide sitting-standing motorized desk from plywood scrap + lead screw-actuated base + 80/20 desktop stiffening frame

Android Apps (Summer 2017)

- Part of Sigmaware app development group
- Design, testing, code optimization, and project ideation for games using Unity framework
- Apps on Google Play: Rebound, Paranoia, Gap Attack, Breakdown