MILO J. HOOPER

Mechanical Engineer (CV)

@ hooper@mit.edu 707-684-6479 Cambridge, MA milohooper.com github.com/auridian AI1XR (Extra)

EDUCATION

S.B. Mechanical Engineering

Massachusetts Institute of Technology

Aug 2017 – June 2021

Relevant Coursework

- **Spring 2021**
  - Thermal-Fluids Engineering II, Finite Element Methods
  - **Apprenticeship (Laboratory for Manufacturing and Productivity)**: Designing a desktop CNC mill
- **Previous Semesters**
  - **Mechanical**: Medical Device Design Capstone, Measurement & Instrumentation, Bio-Inspired Robotics, Design of Medical Implants, Analysis and Design of Feedback Control Systems
  - **Electronics**: Analog Electronics Lab, Numerical Computation
  - **Bio**: Biomaterials/Tissue Interactions, Biomechanics & Neural Control of Movement, Photonic Biochemical Sensing

EXPERIENCE

Medical Device Engineering Intern

Eli Lilly Cambridge Innovation Center

Summer 2020 Cambridge, MA

- Electronics and firmware for small connected drug delivery device
  - Circuit schematic and layout for sensor system interfacing with Arm processor + BLE and USB connections
  - Firmware in C++ and Python to control sensors, output data to phone app
  - Sourcing components and ensuring interoperability
- CAD/mech. design of dual chamber diaphragm pump for drug delivery device
  - Optimizing for as-small-as-possible form factor
  - Prototyping with 3D-printed and silicone molded parts
  - Testing pump performance in constrained volumetric filling

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

SKILLS

- Machine tools: thermoforming, mill and lathe, waterjet, laser cutter, 3d printer, hand tools
- Software: SolidWorks, LTSpice, Linux, LaTeX
- Languages: MATLAB, C++, Python 3, mbed (ARM), Arduino, Spanish (intermediate)
- Other: cryogenics handling, Extra class amateur radio license, registered VE with W5YI

LEADERSHIP

President, W1XM (UHF Repeater Assn. / MIT Radio Society) (Feb 2020-now)

- Major infrastructure renovations negotiations with MIT administration and facilities
- Lead fundraising effort and strategic updates meetings in-person and virtually
- Assist with installation of 2m EME Yagi array, repairs of 6m beam on rooftop station
- Administering virtual ham exams

PROJECTS

Oxygen Generator (Fall 2020)

- Ward-level, using pressure swing adsorption
- Low-cost fabrication; solenoid-driven dual sieve bed architecture;
- Attained 15 LPM output of 61% oxygen; further improvements in coming terms

Pericardial Adhesion Barrier (Spring 2020)

- Concept development + regulatory research
- Novel barrier utilizing NSAID eluting nanoparticles embedded in spray-on hydrogel to prevent postoperative adhesions

Jumping Leg Robot Experiment (Fall 2019)

- Telescoping leg on boom design for bio-inspired robotics project
- Determine optimal ratio of leg muscle and section lengths for maximal jump height

Benevolent Courier (Fall 2019)

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

Door RFID System (Summer 2019)

- Installed 13.56 MHz card reader and 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

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

PROJECTS (CONT.)

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 Project (Spring 2019)

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

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