

Shaun FEDRICK

Robotics Engineer

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 github.com/sfedrick  Portfolio

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PROFESSIONAL EXPERIENCE

current
Jan 2022

Mechatronics Engineer | Motion Planning and Controls , ASML, Wilton,Ct

Currently I work to implement robotic (Controls, Machine learning, Kinematics, and Computer vision) software and hardware changes onto a 6 dof, precision, robotic reticle stage. This involves writing software in matlab, python and C++ for a 6 dof robotic reticle stage to simulate the new feature. I then implement the function onto a fleet of stages within a cross sectoral team.

- > Designed, developed, and tested a software algorithm in matlab to optimize pretension values for pull only actuators and to optimize controller parameters using a MIL (machine in the loop) approach. The algorithm was then implemented in C++ to function on a 6 dof robotic reticle stage.
- > Refactored a code base designed to simulate the dynamics of a 6 dof robotic reticle stage. Transferred this code base into a modern version control system (git) to aid software collaboration along with adding a new feature to said code base.
- > Created a motion planning application in python that utilized multithreading to position the 6 dof reticle stage into several desired positions .
- > Lead the development of two new mechatronic tools that will enable automatic testing of electronics, hardware, and control methodologies of a 6 dof robotic reticle stage.
- > Designed, developed, and tested a software algorithm in python to keep motor coils warm while preventing movement of the robot in order to minimize thermal stresses due to bonding layers undergoing a phase transition as the motor coils cooled under no load. The algorithm was then implemented in C++ to function on a 6 dof robotic reticle stage.

Dec 2021
May 2021

GRASP Lab | Graduate Student Researcher (Robotics) , UNIVERSITY OF PENNSYLVANIA, Pennsylvania

I used a phase change material coupled with a heated insert to create a latching mechanism to add directionality to an origami robot. I then designed and implemented a controller in C++ that ran on a micro controller in real time to control the mechanism .

- > Designed and optimized a nonlinear controller using Matlab and Python
- > Created a simulation and optimization of a mechanical Design of the latch insert using Python.
- > Wrote a controller in C++ to control the latching mechanism.
- > See DOI:10.1109/ICRA40945.2020.9196534 for more information on the robot.

May 2020

Fluid dynamic research | Student Researcher, HAVERFORD COLLEGE AND UNIVERSITY OF PENNSYLVANIA, Pennsylvania

December 2018

I worked in collaboration with University of Pennsylvania and Haverford College to investigate the way Non-Newtonian effects impacted lubrication forces within a fluid.

- > Analyzed and tracked mechanics of a sphere moving through a fluid using OpenCV





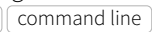
May 2019

Digital Scholarship | Website designer, HAVERFORD COLLEGE, Pennsylvania

December 2016

I worked on <https://archivogam.haverford.edu/en/>, a website designed to connect persons illegally detained and forcibly disappeared in Guatemala during the Civil War with friends and relatives.

- > Wrote the front and back end of Home and Images Section of Archivio Gam
- > Implemented a panning zoom feature and a person search feature








EDUCATION

December 2021

University of Pennsylvania | Mechatronics and Robotic Systems , (MASTERS OF SCIENCE IN ENGINEERING), Philly,PA

January 2020

- > Mechatronic and Robotics engineering master's student.

December 2020

Haverford College| Physics , B.S, Haverford,PA

August 2016

- > Fluid dynamic research; Thesis : Touch Down of a Sphere in Viscoelastic Media

