

# Shaun FEDRICK

## Mechatronics Design Engineer/ASML

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 [github.com/sfedrick](https://github.com/sfedrick)  Portfolio

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


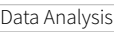


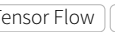





## PROFESSIONAL EXPERIENCE

current  
Jan 2022

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

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

- Designed a numerical optimization technique to optimize pretension values for pull only actuators and to optimize controller parameters using a MIL (machine in the loop) approach .
- Created a motion planning application that utilized multithreading to position the robotic 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 our reticle stage.
- Designed, developed, and tested a software algorithms 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.









           
 

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
- Programmed a testing instrument to collect force measurements of a probe being moved at a constant velocity through viscoelastic fluid

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 Archivo 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

