

# Shaun FEDRICK

## Mechatronics Design Engineer/ASML

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## PROFESSIONAL EXPERIENCE

current Jan 2022	<b>Mechatronics Design Engineer   Motion Planning and Controls , ASML, Wilton,Ct</b> Currently I work to implement robotic (Controls, Machine learning, Kinematics, and Computer vision) software and functional changes onto a 6 dof precision robotic stage. This involves writing software in matlab, python and C++ for a 6dof robot. I then implement the function onto the fleet within a cross sectoral team. <ul style="list-style-type: none"><li>&gt; Used numerical optimization techniques to optimize pretension values for pull only actuators and to optimize controller parameters given frequency response data.</li><li>&gt; Created a motion planning application that utilized multithreading to position the robotic stage into several desired positions .</li><li>&gt; Lead the development of two new robotic tools that will enable automatic testing of electronics, hardware, and control methodologies of our new robot.</li><li>&gt; Designed, developed, and tested a software algorithm in C++ and Matlab 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.</li></ul> <div>C++roboticscontrolsData AnalysisSimulationPytorchTensor FlowMatlabLinear AlgebraStatisticsMachine LearningAgile</div>
Dec 2021 May 2021	<b>GRASP Lab   Graduate Student Researcher (Robotics) , UNIVERSITY OF PENNSYLVANIA, Pennsylvania</b> 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 . <ul style="list-style-type: none"><li>&gt; Designed and optimized a nonlinear controller using Matlab and Python</li><li>&gt; Created a simulation and optimization of a mechanical Design of the latch insert using Python.</li><li>&gt; Wrote a controller in C++ to control the latching mechanism.</li><li>&gt; See DOI:10.1109/ICRA40945.2020.9196534 for more information on the robot.</li></ul> <div>C++PythonControlsRapid PrototypingGitDockerData AnalysisRobotics</div>
May 2020	<b>Fluid dynamic research   Student Researcher, HAVERFORD COLLEGE AND UNIVERSITY OF PENNSYLVANIA, Pennsylvania</b>
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. <ul style="list-style-type: none"><li>&gt; Analyzed and tracked mechanics of a sphere moving through a fluid using OpenCV</li><li>&gt; Programmed a testing instrument to collect force measurements of a probe being moved at a constant velocity through viscoelastic fluid</li></ul> <div>MatlabOpenCVPythonSolid WorksJavaComputational PhysicsComputer VisionRapid Prototyping</div>
May 2019	<b>Digital Scholarship   Website designer, HAVERFORD COLLEGE, Pennsylvania</b>
December 2016	I worked on <a href="https://archivogam.haverford.edu/en/">https://archivogam.haverford.edu/en/</a> , a website designed to connect persons illegally detained and forcibly disappeared in Guatemala during the Civil War with friends and relatives. <ul style="list-style-type: none"><li>&gt; Wrote the front and back end of Home and Images Section of Archivo Gam</li><li>&gt; Implemented a panning zoom feature and a person search feature</li></ul> <div>PythonLinuxDjangogitcommand lineDocker</div>

## EDUCATION

December 2021	<b>University of Pennsylvania   Mechatronics and Robotic Systems , (MASTERS OF SCIENCE IN ENGINEERING), Philly,PA</b>
January 2020	<ul style="list-style-type: none"><li>&gt; Mechatronic and Robotics engineering master's student.</li></ul> <div>RoboticsMechatronicsControlsMachine LearningComputer visionElectrical designSensors</div>
December 2020	<b>Haverford College  Physics , B.S, Haverford,PA</b>
August 2016	<ul style="list-style-type: none"><li>&gt; Fluid dynamic research; Thesis : Touch Down of a Sphere in Viscoelastic Media</li></ul> <div>PhysicsMathDynamicsMechanicsComputational PhysicsCodingProblem SolvingExpirementation</div>