

Shaun FEDRICK

Mechatronics Design Engineer/ASML

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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, 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 reticle stage.
- Refactored a code base designed to simulate the dynamics of the 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 our 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 6dof reticle stage.

robotics controls Data Analysis Simulation Matlab Python C++ Linear Algebra Statistics Agile

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.

C++ Python Controls Rapid Prototyping Git Docker Data Analysis Robotics

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

Matlab OpenCV Python Solid Works Java Computational Physics Computer Vision Rapid Prototyping

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 Archivogam
- Implemented a panning zoom feature and a person search feature

Python Linux Django git command line

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.

Robotics Mechatronics Controls Machine Learning Computer vision Electrical design Sensors

December 2020

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

August 2016

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

Physics Math Dynamics Mechanics Computational Physics Coding Problem Solving Experimentation