David Ologan

ologandavid@gmail.com
(917) - 635 - 2734

http://ologandavid.github.io
www.linkedin.com/in/dologan

RESEARCH OBJECTIVE

I am focused on developing strategies to enable robots to reliably navigate uncertain outdoor environments. My interests include state estimation, planning and control for dynamic robot systems.

EDUCATION

Carnegie Mellon University, Pittsburgh, PA
Doctor of Philosophy, Mechanical Engineering   05/2028
Advisor: Prof. Aaron Johnson

Carnegie Mellon University, Pittsburgh, PA
Master of Science, Mechanical Engineering - Research   05/2024
Advisor: Prof. Aaron Johnson

Massachusetts Institute of Technology, Cambridge, MA
Bachelor of Science, Mechanical Engineering
Bachelor of Science, Electrical Engineering and Computer Science   05/2022
Advisor: Prof. Daniel Frey, Prof. Guy Bresler

RESEARCH EXPERIENCE

Graduate Research Assistant - Robomechanics Lab   *09/2022 – Present*
- Maintainer of Quad-SDK, an open source ROS based full stack software framework for quadrupedal locomotion.
- Developing strategies for proprioceptive foot contact detection using a generalized momentum observer.
- Implemented an Extended Kalman Filter (EKF) for reliable on-board state estimation of a quadruped robot.
- Contributed to the development and testing of an novel momentum observer and controller designed to enable quadrupeds to detect unexpected external forces and react while walking through dense underbrush and entanglements.

Undergraduate Research Assistant - MIT ELO/ Volunteers for Medical Engineering (VME)/ MIT Sandbox   *10/2020 – 03/2022*
- Designed a portable sit-to-stand apparatus for an elderly woman with limited mobility in an attempt to assist her in daily life and with her needs in handicapped bathrooms
- Partnered with MIT Sandbox to bring the design to market

Undergraduate Research Assistant - MIT Deng Energy and Nanotechnology Group   *05/2020 – 08/2020*
- Collaborated with Sili Deng focusing on the assessment of Physics Informed Neural Networks (PINN) effectiveness using Tensorflow and DeepXDE libaries
- Engineered and customized algorithms for the resolution of Nonlinear Partial Differential Equations in diverse Chemical Reaction systems, including Inverse-Reaction Diffusion, Lorentz, and Robertson systems.

Undergraduate Research Assistant - MIT HAUS Group   *12/2019 – 01/2020*
- Evaluated the feasibility of affordable, low cost homes using large scale 3D Printing
- Worked with Professor Hardt to develop a comprehensive python-based model that determined the requirements of a factory network to satisfy intended global production needs

Undergraduate Research Assistant - MIT STAR Lab   *12/2019 – 01/2020*
- Worked on BeaverCube, a 3-u CubeSAT with an Ocean Surveying Payload, with a focus on comprehending Earth's weather system and showcasing advancements

in propulsion technology
- Assisted in the development of BeaverCube's f-prime based flight computer

Undergraduate Research Assistant - MIT Rohsenow Kendall Heat Transfer Lab *11/2018– 08/2019*
- Fabricated a glass heat resistant enclosure for thermal energy storage experiments
- Developed and repaired lab specific equipment for HFI-5 Induction Heater, Cooling System
- Performed experiments on various materials (such as silicon) to determine latent heat properties for thermally storing electric energy through TES. Feasibility for energy storage was evaluated based on price and specific heat capacity

Research Assistant - Columbia University Lamont Doherty Earth Observatory *03/2017– 06/2018*
- Created a python-based Sequence Stratigraphy algorithm to determine Seismic Risk in the Marmara Sea
- Utilized seismic data from the region to generate a model that analyzes prior and future earthquake activity

TECHNICAL SKILLS

Languages: Python, C, C++, MATLAB, Assembly, HTML, CSS, Julia, Mathematica

Fabrication: Mill, Lathe, 3D-Printer, Waterjet, CNC, Laser-Cutter, Circuit Construction and Design

Applications: ROS, Gazebo, Docker, Git, SolidWorks, AutoCAD, Autodesk Fusion, Creo, Eagle, LabView, Simulink, OpenCV, Tensorflow, Pytorch, Optitrack, Latex, Linux

WORK EXPERIENCE

Robotics Development Intern Shark/Ninja
06/2021 – 08/2021 Needham, MA
- Designed and manufactured unique brush-roll geometries and testing apparatus in Creo to optimize pet hair pickup on Shark Robotic Vacuum by 58%
- Drafted and fabricated Floor Powered Side Brushes to minimize costs and size without sacrificing edge cleaning performance

TEACHING EXPERIENCE

Teaching Assistant Mechanical Systems Experimentation
08/2023 - 12/2023 Pittsburgh, PA
- Teaching assistant for course 24.452 at the Carnegie Mellon University.
- Organized and led lab sessions and office hours for approximately 27 students
- Helped students develop a theoretical and experimental understanding of vibrations of linear and torsional, single- and multi-degree-of-freedom mechanical systems

Course Instructor Introduction to Python
05/2022 - 08/2022 New York, NY
- Course instructor for introductory python course at New York University.
- Taught and administered lectures and exams for approximately 15 students.
- Taught students basic coding concepts, syntax, and data structures through a variety of interactive labs

Undergraduate Course Assistant 6.a01: Making with Technology
09/2018 – 12/2021 Cambridge, MA
- Instructed other undergraduate students on the construction of a computer controlled brushless motor using modern fabrication techniques and microcontrollers
- FISHBOTS: Constructed an underwater whale shaped remotely operated vehicle (ROV), utilizing waterproof servos to mimic the undulating motion commonly seen in whales to produce thrust

RELATED COURSEWORK

Graduate Coursework:

- Planning and Decision Making in Robotics
- Robot Dynamics and Analysis
- Optimal Control and Reinforcement Learning
- Modern Control Theory
- Computer Vision for Engineers
- Intro to Deep Learning

Undergraduate Coursework:

- Intro to Robotics
- Power Electronics Lab
- Product Engineering Processes
- Nanoelectronics & Computing Systems
- Design & Analysis of Algorithms
- Dynamics & Controls II
- Thermo-Fluids Engineering I
- Microcomputer Project Lab

ACADEMIC MEMBERSHIPS

- CMU MecheE Master's Student Ambassador (2023-2024)
- MIT Electronics Research Society (MITERS) (2018-2020)
- MIT Maker-Works (2018-2021)

PUBLICATIONS

1. Justin K. Yim, Jiming Ren, **David Ologan**, Selvin Garcia Gonzalez, and Aaron M. Johnson. Proprioception and reaction for walking among entanglements. In IEEE/RSJ International Conference on Intelligent Robots and Systems, October 2023.

ABSTRACT PRESENTATION

1. **David Ologan**, Ardalan Tajbakhsh, Justin K. Yim, Yanhao Yang, Joseph Norby, Jiming Ren, Selvin Orlando Garcia Gonzalez, and Aaron M. Johnson. Quad-SDK Update: Estimation, Underbrush, and Other Improvements. In IROS Late Breaking Results, October 2023.