Thomas Moriarty

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EDUCATION

Massachusetts Institute of Technology, Cambridge, MA
Double major; BS in Mechanical and Ocean Engineering, BS in Music

GPA: 4.6/5.0
February 2015

MISSION STATEMENT

I am a seasoned mechanical engineer and developing controls engineer with strong communication and mentorship skills. I enjoy working closely with teams on meaningful projects, and am actively seeking an on-site or hybrid role that integrates controls and mechanical engineering within commuting distance of Cambridge, MA.

TECHNICAL EXPERIENCE

Independent projects　　　　　　　　　　　　　　　　　　　　　　　　　*2023-present*
- Building a library of trajectory optimization and control algorithms for personal development using JAX auto-differentiation, Mujoco, and optimization tools. Project set up using Docker and GitHub Actions for CI

Engineering consultant　　　　　　　　　　　　　　　　　　　　　　　　*2023-present*
- Providing technical guidance for mechanical design and controls development in a robotic hand tactile ASL interface for Tatum Robotics. Building structural models relating tendon retractions to hand configurations to aid in system-level design process and trajectory planning. (Ongoing)
- Provided engineering support for a prototype Aluminum-based power reactor, aiding in fuel transport system design prototyping and reactor pneumatics to Found Energy (2023).

Indigo Technologies Inc.　*Lead Systems Engineer – Director of Vehicle Controls*　　　　*2021 - 2022*
- Led control architecture development for integrated power-train suspension systems, enabling design and testing of feedback controllers for novel dual-stator hub-motor based active suspensions
- Created analytical dynamic models of Indigo vehicles and suspension-integrated motors for control algorithm development and simulation in CarSim/Simulink, and developed fundamental parameter interfaces between electro-mechanical systems and vehicle controls.
- Designed and implemented active roll, yaw, and ride control on vehicle for Indigo vehicles, and implemented system ID methods for identifying vehicle dynamic models necessary for controls development
- Led front-suspension mechanical design for a 4-wheel vehicle prototype, iterating on previous design.

Biorobotics Lab – CMU Robotics Institute　*Student Researcher*　　　　　　　　　　*2020*
- Developed articulated floating-base manipulator dynamic models of swimming robots using twist representations for large tank inspection and servicing.
- Developed nonlinear and adaptive model predictive controllers and compared controller performances for simulated satellite rendezvous maneuvers.
- Studied optimal control theory and underactuated robotic control in CMU graduate program.

Indigo Technologies Inc.　*Sr. Mechanical Engineer*　　　　　　　　　　　　　　*2015 – 2020*
- Led mechanical engineering on novel dual-rotor electro-mechanical active suspension systems [US 12,054,021], and designed 4 different custom suspensions for full-size 3-wheel electric vehicle prototypes over 5 years.
- Defined workflow for large-scale CAD assemblies across a 7+ person team, managed project scope for team of 5 engineers over an outlook of 1+ years, and provided technical guidance for new mechanical employees.
- Designed, analyzed and fabricated chassis structures, as well as fabrication and test equipment for building and testing chassis and suspension systems for multiple Indigo vehicles.
- Developed novel active leaning systems and energy consumption models for narrow leaning vehicles.
- Interfaced with and presented to external partners to provide technical insight for core company technologies.

TEACHING EXPERIENCE

MIT Engineering Systems Design Class *Teaching Assistant – 2.014*　　　　　　　　*2014 – 2015*
- Assistant taught a capstone mechanical engineering class, building submerged AUV power systems with Lincoln Labs and the Office of Naval Research, as well as protoyping designs for a 3-kiloWatt Aluminum fueled generator.

I2Camps *Short course instructor – Edgerton Center MIT*　　　　　　　　　　　　*2013 Summer*
- Developed and taught a 2 week introductory engineering design camp module ages 11 - 14, focused on iterative process of design with small underwater remotely operated vehicles (ROVs)

PATENTS

- US 10,483,832 - Multi-bar linkage electric drive system
- US 12,054,021 - Lead Inventor - Multi-input, multi-output actuator and assemblies using same

RELEVANT SKILLS

Machining: Lathe, Mill, Router, TIG weld, Laser Cutter, Water Jet, Manual tools, GD&T-Y14.5
Software: SolidWorks/CAD, MathCAD, MATLAB-Simulink, Optimum-Kinematics, CarSim, Mujoco
Programming Languages: C/C++, Python
Hobbies: Music production/performance, photography, biking/running, technical side projects