

EMILY A. KAMIENSKI

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EDUCATION

Massachusetts Institute of Technology (MIT) - Cambridge, MA			GPA: 5.0/5.0
• Ph.D. Mechanical Engineering	Major: Robotics & Controls	Minor: AI	Expected Dec. 2024
• S.M. Mechanical Engineering			June 2021
Georgia Institute of Technology (GT) - Atlanta, GA			GPA: 3.96/4.0
• B.S. Mechanical Engineering	Minor: Computer Science		May 2019

TECHNICAL PROJECTS

MIT

- Graduate Research Assistant – d’Arbeloff Laboratory** (PI: Harry Asada), *MIT* Fall 2019-Present
- Design and control of a robot for fall catching for a novel dual arm robot to gently grasp a falling person and safely lower them to a seated position
 - Constructed linear model of whole-body angular momentum, a metric for balance while walking, using lifted linearization and Koopman Operator Theory for analyzing gait dynamics
 - Created data driven fall prediction algorithm using LSTM network to control reconfigurable mobility aid
 - Conducted human subject tests at MIT clinical research center to obtain dynamic and kinematic data during loss of balance
 - Incorporated feedback controller into a growing robot to improve positioning accuracy
- Teaching Assistant – Robotics 2.12 Class**, *MIT* Spring 2021, 2022
- Developed term project which used remotely teleoperated robots and guided students in weekly labs
 - Set up Universal Robot 5e and programmed in python using ROS to perform pick and place tasks guided by computer vision
 - Used ROS to enable communication between two robots with individual computers

Georgia Tech

- Undergrad Research Assistant – Intelligent Robotics & Emergent Automation Lab** Fall 2017 to Spring 2019
- Created prototype UAV docking mechanism to independently attach/detach from moving ground vehicle
 - Designed & built prototype robot to drive on cable through tree canopy at Morton Arboretum to collect data on vegetation growth
 - Worked on serial communication protocol for test involving the use of multiple rotor vehicles to lift a payload
- Undergrad Research Assistant – Advanced Mechanical Bipedal Experimental Robotics Lab** Fall 2016
- Worked in a team to build automated safety cart that would track the DURUS robot as it walks on a treadmill
 - Machined multiple parts for the safety cart using a milling machine and a lathe
- Georgia Tech Motor Sports** (Formula SAE) 2015 to 2018
- Manufacturing Director** - Created parts on CNC mill & lathe, organized team machine training, & performed design work on pedal box
- Controls Subsystem** - Design & fabrication work on pedals, steering, & clutch using SolidWorks; composite layups
- Powertrain Subsystem** - Designed fuel system with SolidWorks; fabricated it using water jet and metal break

WORK EXPERIENCE

- Northrop Grumman Aerospace Systems – Flight Controls Technology** May to August 2019
Redondo Beach, California
- Modeled IMU gimbal table and developed control laws in Simulink
 - Developed Real Time Component Framework (RTCF) using C++ and Python
 - Autogenerated controller code and tested controller on physical system and verified it met requirements
- Northrop Grumman Aerospace Systems – Advanced Manufacturing Technology & Innovation** May to August 2018
El Segundo, California
- Technical lead on development effort in support of out-of-autoclave curing for a closed/confidential program
 - Project deliverables have an expected savings on the order of \$1 million USD
 - Collaborated on 5 activities in support of a \$10 million NCTA portfolio
- United Technologies Aerospace Systems - Space Systems Division** May to August 2017
Windsor Locks, Connecticut
- Performed structural analysis using Patran FEA on ORION Multi-Purpose Crew Vehicle components

- Identified peak stresses and average weld stresses developed on a pump, accumulator, and heat exchangers
- Analyzed stress data induced by gravitational loads, normal modes, tube stub loads, and pressure loads

Naval Surface Warfare Center Carderock Division – SEAP & NREIP

Summer 2014, 2015, 2016

Carderock, Maryland

- Supported ship model tow tests and data collection, 3D modeled & fabricated floats for aircraft model

AWARDS & ACHIEVEMENTS

MIT Travel Grant Recipient - 2024

Mechanical Engineering Research Exhibition Honorable Mention, *MIT* - 2021

George Woodruff Mechanical Engineering School Chair's Award, GT - 2019

Astronaut Scholarship, awarded by Astronaut Scholarship Foundation, GT – 2018

Ford Blue Oval Vehicle Team Scholarship, GT – 2016

Capitol Hill Maker Faire Presenter, presented prosthetic hand made with 3D printer I built, Washington DC - 2015

PUBLICATIONS, PATENTS, & PRESENTATIONS

Publications

E. Kamienski, S. Donahue, M. Major, and H. Harry Asada. "Koopman Modeling of Human Gait Dynamics for Global Modal Analysis Using Periodic Motion Regularization", *American Control Conference (ACC)*. Under review.

E. Kamienski and H. Asada, "Model Free Method of Screening Training Data for Adversarial Datapoints Through Local Lipschitz Quotient Analysis," in *IEEE Robotics and Automation Letters*, vol. 9, no. 12, pp. 11122-11129, Dec. 2024, doi: 10.1109/LRA.2024.3483628.

A. Stewart-Height, R. Bolli, E. Kamienski, and H. H. Asada, "Design and Experimental Validation of Woodwork-Inspired Soft Pneumatic Grippers". *2025 IEEE International Conference on Robotics and Automation (ICRA)*. Under Review.

I. Nozawa, E. Kamienski, C. O'Neill and H.H. Asada, "A Monte Carlo Approach to Koopman Direct Encoding and Its Application to the Learning of Neural-Network Observables", in *IEEE Robotics and Automation Letters*, vol. 9, no. 3, pp. 2264-2271, March 2024, doi 10.1109/LRA.2024.3354612.

E. A. Kamienski, P. Bonato and H. H. Asada, "Time-Critical Fall Prediction Based on Lipschitz Data Analysis and Design of a Reconfigurable Walker for Preventing Fall Injuries," in *IEEE Access*, vol. 12, pp. 1822-1838, 2024, doi: 10.1109/ACCESS.2023.3347263.

J. Bell, E. Kamienski, S. Teshigawara, H. Itagaki and H. H. Asada, "Gear Ratio Optimization of a Multifunctional Walker Robot Using Dual-Motor Actuation," *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2021, pp. 9339-9346, doi: 10.1109/IROS51168.2021.9636482.

Patents

E. Kamienski and H. H. Asada, "Fall Catching Robot". US Patent 63/607,061, Filed Dec. 6, 2023. (Provisional)

E. Kamienski and H. H. Asada, "Pants with Embedded Harness for Daily Use". US Patent 63/342601, Filed May 16, 2022.

E. Kamienski and H. H. Asada, "A Reconfigurable Walker for Predicting and Preventing Fall of Patients". US Patent 63/252367, Filed May 10, 2021. (Provisional)

Workshop Presentations

E. Kamienski. "Human Gait Modeling and Analysis using Koopman Operators". Invited Talk at "Koopman Operators in Robotics" Workshop. *Robotics: Science & Systems 2024*. Delft, Netherlands. July 15, 2024.

<https://sites.google.com/yale.edu/rss-2024-koopman-operators/home>

MIT COURSEWORK

16.485 Visual Navigation for Autonomous Vehicles

6.S898 Deep Learning

6.832 Underactuated Robotics

2.74 Bioinspired Robotics

2.151 Advanced System Dynamics & Control
2.160 Identification, Estimation, & Learning
2.72 Elements of Mechanical Design
18.0851 Computational Science & Engineering
2.12 Intro to Robotics
2.77 Fundamentals of Precision Product Design
2.032 Dynamics
2.183 Biomechanics & Neural Control of Movement

SKILLS AND QUALIFICATIONS

Programming: Python, C++, Pytorch, Tensorflow, Matlab, Simulink, HTML, Git, LaTeX, MS Visual Studio

Robotics: ROS, Drake, OpenCV, Raspberry Pi, Arduino, Universal Robots

Engineering Software: SolidWorks, Patran, HSMWorks, Microsoft Office

Manufacturing: Manual/CNC mill & lathe, water jet, composite layups, 3D printing (built printer), MIG welding

Extracurricular Activities: Reading, woodworking, triathlons, backpacking, & playing trumpet

LEADERSHIP

Graduate Women in Robotics Professional Development Chair, <i>MIT</i>	May 2023 to present
President of Mechanical Engineering Graduate Association of Women, <i>MIT</i>	May 2022 to May 2024
Treasurer of Maker Workshop, <i>MIT</i>	Fall 2022 to Summer 2023
Mentor at Maker Workshop, <i>MIT</i>	Fall 2021 to Spring 2023
Robotics 2.12 TA, <i>MIT</i>	Spring 2021, 2022
Tau Beta Pi Corporate Relations Officer, <i>GT</i>	Fall 2018 to Spring 2019
Manufacturing Director of GT Motorsports, <i>GT</i>	Fall 2017 to Spring 2018