

# EMILY A. KAMIENSKI

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## EDUCATION

### Massachusetts Institute of Technology

GPA: 5.0/5.0

Ph.D. Mechanical Engineering Major: Robotics & Controls Minor: Artificial Intelligence Expected August 2024

S.M. Mechanical Engineering

Graduated June 2021

### Georgia Institute of Technology

GPA: 3.96/4.0 Major GPA: 4.0/4.0

B.S. Mechanical Engineering Minor: Computer Science

Graduated May 2019

## RESEARCH

### MIT

#### Graduate Research Assistant – d'Arbeloff Laboratory (Advisor: Harry Asada)

Fall 2019-Present

- Developing linear model of whole body angular momentum, a metric for dynamic stability while walking, using lifted linearization and Koopman Operator Theory for control of a physical assistive device to aid stability while walking
- Created data driven elderly 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
- Enhanced mechanical design & automated movement of expandable robot inspired by plant growth

#### Teaching Assistant – Robotics 2.12 Class

Spring 2021, 2022

- Developed term project using remotely teleoperated robots and guided students in weekly lab sections
- 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 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

Carderock, Maryland

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

## AWARDS & ACHIEVEMENTS

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Mechanical Engineering Research Exhibition Honorable Mention - 2021

George Woodruff School Chair's Award, Georgia Tech - 2019

Astronaut Scholarship, awarded by Astronaut Scholarship Foundation – 2018-2019

Ford Blue Oval Vehicle Team Scholarship – 2016

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

## PUBLICATIONS & PATENTS

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E. Kamienski and H.H. Asada, "Assessing Dataset Learnability Using Lipschitz Quotient Analysis Applied to Fall Prediction". *ICRA*, 2024. Under Review.

E. Kamienski, Paolo Bonato, and H.H. Asada, "New Techniques for Real-Time Fall Prediction and Development of an Injury Prevention System". *IEEE Access*, 2023. Under Review.

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.

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

E. Kamienski and H. H. Asada, "A Reconfigurable Walker for Predicting and Preventing Fall of Patients". US Patent 63/252,367, 5 10 2021. (Provisional)

## MIT COURSEWORK

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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

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**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

**Certifications:** Red Cross first aid & CPR, SOLO wilderness first responder

**Extracurricular Activities:** Reading, half marathons, triathlons, backpacking, & playing trumpet

## LEADERSHIP

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President of Mechanical Engineering Graduate Association of Women, *MIT*

May 2022 to present

Graduate Women in Robotics Industry Outreach Chair

May 2023 to present

Treasurer of Maker Workshop, *MIT*

Fall 2022 to Summer 2023

Mentor at Maker Workshop, *MIT*

Fall 2021 to present

Robotics 2.12 TA, *MIT*

Spring 2021, 2022

Tau Beta Pi Corporate Relations Officer, *GT*

Fall 2018 to Spring 2019

Manufacturing Director of GT Motorsports, *GT*

Fall 2017 to Spring 2018

