Mateusz Jaszczuk

+1 (765) 746 9700 jaszczuk@seas.upenn.edu Mateusz Jaszczuk mateuszjaszczuk.com

Education

University of Pennsylvania *Aug 2024 – Present*
M.S. in Mechanical Engineering and Applied Mechanics *Philadelphia, PA*
with a concentration in Mechatronic and Robotic Systems

- **GPA:** 4.00/4.00
- **Coursework:** Design of Mechatronic Systems, Introduction to Robotics, Data-driven Modeling and Probabilistic Scientific Computing, Machine Learning, Distributed Robotics, Adaptive and Reactive Control

Purdue University *Aug 2020 – May 2024*
B.S. in Aeronautical and Astronautical Engineering *West Lafayette, IN*
with a specialization in Autonomy and Control

- **GPA:** 3.71/4.00
- **Coursework:** Applied Optimal Control and Estimation, Linear Systems Analysis and Synthesis, Spacecraft Attitude Dynamics, Control Systems Analysis, Structural Analysis

Research Experience

Figueroa Robotics Lab (GRASP) *Jan 2025 – Present*
Graduate Research Assistant *Philadelphia, PA*

- Developed a passive impedance controller with a Dynamical System-based motion policy for Franka Emika 7 DoF manipulator arm for safe human-robot interactions
- Developed a data-driven adaptation framework – Rapid Mismatch Estimation – which allows impedance-controlled manipulators to interact with objects of unknown dynamics
- Utilized Machine Learning methods to develop a real-time compensation framework. Developed ROS packages for optimal system integration
- Performed simulation and hardware experimental validations of the novel adaptation method, utilizing PyBullet, Gazebo, and Franka manipulator.

Composite Manufacturing & Simulation Center *Oct 2022 – May 2024*
Undergraduate Research Assistant *West Lafayette, IN*

- Developed a Bayesian model to predict the conductivity of additively manufactured short fiber-reinforced composites.
- Supported the development of Gaussian Process surrogates of the micromechanics model.
- Developed Python scripts to implement a probabilistic framework (Physics-Guided Transfer Learning) and automate results post-processing from Abaqus FEA simulations.
- Performed experiments to characterize the anisotropic thermal conductivity of 3D printed, carbon-reinforced samples to provide reliable verification to developed Bayesian framework.
- Supported writing the academic paper and created images to illustrate the predictions and verification of the framework.

Air Force Research Lab - Purdue UAS Research and Test Facility *Aug 2023 – Dec 2023*
Undergraduate Research Assistant, Project Lead *West Lafayette, IN*

- Developed autonomous fixed-wing aircraft that flew in enclosed hangars for Windracers, UK.
- Supported the development of the autopilot software using pseudo-GPS signals generated by motion capture cameras.
- Designed aircraft sizing code, performing motion simulations and verification experiments.
- Communicated with the project coordinator and client, presented work progress during monthly meetings, and discussed the budget and project development cycle.

Publications and Presentations

[1] **M. Jaszczuk** and N. Figueroa, "Rapid mismatch estimation via neural network informed variational inference," in *9th Conference on Robot Learning (CoRL)*, 2025.

[2] A. J. Thomas, **M. Jaszczuk**, E. Barocio, G. Ghosh, I. Bilionis, and R. B. Pipes, "Probabilistic physics-guided transfer learning for material property prediction in extrusion deposition additive manufacturing," *Computer Methods in Applied Mechanics and Engineering*, vol. 419, p. 116660, 2024.

[3] A. J. Thomas, **M. Jaszczuk**, E. Barocio, I. Bilionis, and R. B. Pipes, "Physics-guided transfer learning for property prediction in composite additive manufacturing." SAMPE Japan, 2023.

[4] **M. Jaszczuk**, "A bayesian framework for transfer of process-dependent material properties." Purdue Fall Undergraduate Research Expo, November 2023. West Lafayette, IN, USA.

Project Experience

NOAA Wind Tracking Satellite Constellation, Senior Design Project *Aug 2023 – Dec 2023*
Attitude Dynamics and Control Engineer *West Lafayette, IN*

- Created MATLAB 6 degrees of freedom model to simulate satellite's altitude behavior at different orbital planes.
- Coordinating system development in the team, ensuring the spacecraft design will fulfill stability and orientation requirements for the mission objectives of monitoring Earth's Ocean Surface.
- Designing active and passive altitude control systems to maintain orbital stability and enable satellite maneuverability for the mission duration.

Purdue Space Program NASA Student Launch '23 *May 2022 – May 2023*
Project Manager *West Lafayette, IN*

- Derived requirements and designed a mission for the NASA Student Launch competition.
- Managing tasks and maintaining proper project workflow in a team of 100 students.
- Providing sub-teams with resources and ensuring systems design is relevant for the Top-Level assembly.
- Communicating with NASA and NAR; submitting appropriate project deliverables.
- Working on flight simulations and mission performance predictions – 6 degrees of freedom model in Simulink.

Purdue Space Program NASA Student Launch '22 *Aug 2021 – May 2022*
Launch Vehicle Construction Engineer *West Lafayette, IN*

- Designing motor and fins support structure for the competition rocket, choosing materials by creating strength-mass-cost trade studies.
- Performing FEA, CFD, and actual tests (airframe bending, subscale flight) on components, measuring Von Mises' stress, and optimizing vehicle parts based on analysis results.
- Utilizing CNC milling and laser cutting to produce high-precision aluminum components with custom tool paths, leading the manufacturing team in the vehicle assembly process.