

MATEUSZ JASZCZUK

+1 (765) 746-9700 | jaszczuk@seas.upenn.edu | [LinkedIn](#) | [Personal Website](#)

Education

University of Pennsylvania

*M.S. in Mechanical Engineering and Applied Mechanics
with a concentration in Mechatronic and Robotic Systems*

Aug 2024 – Present

Philadelphia, PA

GPA 4.00/4.00

Relevant 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

*B.S. in Aeronautical and Astronautical Engineering
with a specialization in Autonomy and Control*

Aug 2020 – May 2024

West Lafayette, IN

GPA 3.71/4.00

Relevant Coursework: Applied Optimal Control and Estimation, Linear Systems Analysis and Synthesis, Spacecraft Attitude Dynamics, Control Systems Analysis, Structural Analysis, Differential Equations, Calculus, C and Python programming

Research Experience

Figuroa Robotics Lab (GRASP)

Graduate Research Assistant

January 2025 – Present

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

Undergraduate Research Assistant

Oct 2022 – May 2024

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 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

Undergraduate Research Assistant, Project Lead

Aug 2023 – Dec 2023

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

Thomas AJ, **Jaszczuk M**, Barocio E, Ghosh G, Bilonis I, Pipes RB, 2024, *Probabilistic physics-guided transfer learning for material property prediction in extrusion deposition additive manufacturing*, Computer Methods in Applied Mechanics and Engineering, 419, 116660

Thomas AJ, **Jaszczuk M**, Barocio E, Bilonis I, Pipes RB, 2023, *Physics-guided transfer learning for property prediction in composite additive manufacturing*, SAMPE Japan

Jaszczuk M. (2023, November 14-15). *A Bayesian Framework for Transfer of Process-Dependent Material Properties*. 2023 Purdue Fall Undergraduate Research Expo, Purdue University.

Project Experience

NOAA Wind Tracking Satellite Constellation, Senior Design Project

Aug 2023 – Dec 2023

Attitude Dynamics & 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 proper 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.

Skills

- **Python** - Data-driven modeling and probabilistic programming (Bayesian Inference, Logistic, Linear Regression, MCMC sampling) using PyMC and JAX, large data sets analysis, and creating research-paper images.
- **Technical Writing** - Writing academic publications in Overleaf and Python data visualization using LaTeX interpreters.
- **LabVIEW** - Performing experiments and live control of additive manufacturing processes on the research platforms.
- **Gazebo** - Simulating the motion of a robotic arm in a Gazebo, evaluating simulation parameters and outcomes.
- **MATLAB and Simulink** - Performing design and analysis of control systems and analysis of large data sets.
- **CAD Software** (SolidWorks, Siemens NX) – creating complex parametric models and assemblies, creating machine toolpaths for CNC operations, and generating G-CODE for additive manufacturing.