# **Jacob Blevins**

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## **OBECTIVE**

Robotics PhD and machine learning masters student with an eager desire to advance the human condition through development of reinforcement learning-based autonomous robotics, seeking a position within the Robot Learning and Reasoning Lab at Georgia Tech.

### **EDUCATION**

## Georgia Institute of Technology, Atlanta, GA

PhD – Mechanical Engineering: Robotics & Control

May 2022 – Expected: Dec 2026

o Relevant Coursework: Linear, Digital, and Nonlinear Controls, Advanced Control Implementation, Robotics, Dynamics of Mech Systems

MS – Computer Science: Machine Learning

May 2024 – Expected: Dec 2026

Relevant Coursework: Machine Learning, Artificial Intelligence, Deep Learning
 MS – Mechanical Engineering: Design

August 2020 - May 2021

BS – Mechanical Engineering

August 2016 – May 2020

## **RESEARCH & PUBLICATIONS**

# In Progress

- Deep Learning for Perfect False Data Attackability Estimation for Linear Time-Invariant Systems
  - o Determination of nontrivial solutions for perfect state and control vector attacks through pattern recognition with deep learning NNs
- Defending Visual Perception from Adversarial Deep Model Fooling: Protecting Autonomous Vehicles

### Completed

- Jacob Blevins, Jun Ueda. "Encrypted Model Reference Adaptive Control with False Data Injection Attack Resilience via Somewhat Homomorphic Encryption-Based Overflow Trap." TechRxiv. August 26, 2024.
- Jacob Blevins, Amit Jariwala. "Leveraging AI Chatbots in Makerspaces: Enhancing Learning and Collaboration." ISAM 2024.
- J. Ueda and J. Blevins, "Affine Transformation-based Perfectly Undetectable False Data Injection Attacks on Remote Manipulator Kinematic Control with Attack Detector," in IEEE Robotics and Automation Letters.
- H. B. Kwon, S. Kosieradzki, J. Blevins and J. Ueda, "Encrypted Coordinate Transformation via Parallelized Somewhat Homomorphic Encryption for Robotic Teleoperation," 2023 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM), Seattle, WA, USA, 2023, pp. 228-233.

### **PROJECTS**

NVIDIA Open Hackathon: Language to Action

Present

- Llama3.2 paired with YOLOworld to auto generate and execute code for pathing and control commands from human language. i.e. tell
  your robot what to do and it will do it!
- Building a Vision-Based Object Tracking Model for Autonomous Vehicles

Sept 2024 – Dec 2024

- Development of a vision-based deep perception model for object detection and tracking in road-way scenarios for autonomous vehicles.
   A study on how variations in model architecture such as the addition of attention or encoder-decoders affect final inference for this task.
- Autonomous Mobile Robot via Machine Learning

  May 2024 July 2024

PPO, YOLOv8, K-means, and other ML algorithms collaborating to guide a Turtlebot3 through an unknown environment

RoboJackets - RoboNav Mars Rover Software Team

April 202

 Motion planning subteam – Development of path planning and control for a mars rover with an NVIDIA Jetson Orin Nano for traversal over complex terrain for the 2025 University Rover Competition

• Liquid Sloshing Reduction via Input Shaping

Nov 2023

 Input shaping of crane, double-pendulum, liquid system, reducing system modes to 5% of their original magnitude, saving factory workers from hazardous liquid sloshing

# **EMPLOYMENT HISTORY**

Georgia Institute of Technology – Associate Academic Professional

Dec 2024 – Present

- Lecture System Dynamics, Experimental Methods, and Computing Techniques
- o Integrate ML techniques into the mechanical engineering curriculum, helping students understand how they can use data science to solve complex engineering problems
- Manage undergraduate research and tutoring programs, bringing students to their full academic potential

Georgia Institute of Technology – Graduate Teaching Assistant and Researcher

August 2020 – Present

- Research on security of networked robotic systems (see research & publications section)
- Teaching and advising mechanical engineering laboratory focusing on heat transfer, thermodynamics, signals, systems ID, controls, IC engines, and refrigeration
- Georgia Institute of Technology Lab & Facilities Coordinator

May 2021 - Nov 2024

- Teaching lab-based courses focusing on design, manufacture, and technical communication
- Management and design of Georgia Tech's mechanical engineering course labs, resulting in state-of-the-art machine and equipment availability and quality workflow for thousands of students and design teams
- o Training students on fabrication machinery, tools, and safety
- AC & DC Power Technologies Mechanical Engineer

May 2020 - Aug 2020

- Design and Analysis of energy storage systems via AutoCAD drawings and MATLAB for validating failure modes
- MATLAB programing of application for creating detailed customer power-load charts

Caterpillar (CAT) Large Power Systems Division – Large Engines Intern May 2019 - Aug 2019 Large engine head fatigue testing, measurement, and temperature data analysis Panasonic Automotive - Advanced Engineering Intern May 2018 - Aug 2018 Redesigned and optimized the kinematics system of a General Motors Heads Up Display (GM HUD) Lead the communications with suppliers as the key product engineer during the procurement of prototype parts Georgia Institute of Technology – Fluid Mechanics Grader and Statics Tutor *Jan 2018 – Dec 2019* **TECHNICAL SKILLS** Robotics - ROS2, Gazebo, RoboDK Programming - Python, C/C++, MATLAB/Simulink Machine Learning - Pytorch, Keras, CUDA, PACE (Georgia Tech's GPU cluster) Design and Manufacturing - CAD, 3D Printing, Laser cutting, Water Jetting, Metalworking, Woodworking, Welding **SERVICE & ORGANIZATIONS** Organizations FIRST Robotics Workshop Lead Upcoming IEEE Robotics and Automation Society graduate student member Aug 2024 - Present RoboGrads at Georgia Tech Aug 2024 - Present **Professional Contributions** Reviewer, International Conference on Robotics and Automation Sept 2023, Sept 2024 Reviewer, Modeling Estimation and Control Conference March 2024 Georgia Institute of Technology Contributions Interactive Learning Committee – Mechanical Engineering Aug 2022-Present **HONORS & AWARDS** GWW School of Mechanical Engineering Professional Support Excellence May 2024 GWW School of Mechanical Engineering Culture Champion May 2023 Aug 2016 – May 2020

June 2013

### **EXTRACURRICULARS**

Eagle Scout (Boy Scouts of America)

Music – Atlanta Symphony Orchestra bass vocalist and jazz vocalist

Highest Honors - Georgia Institute of Technology - GPA: 4.0

- Fitness Nationally competitive powerlifter, certified personal trainer, and CrossFit athlete
- Other PC and keyboard building, wood turning, juggling, unicycling, piano, and guitar