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*
  - 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
  - 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 2024 – Present*
  - 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
  - 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
  - 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*
- Highest Honors – Georgia Institute of Technology – GPA: 4.0 *Aug 2016 – May 2020*
- Eagle Scout (Boy Scouts of America) *June 2013*

EXTRACURRICULARS

- Music – Atlanta Symphony Orchestra bass vocalist and jazz vocalist
- Fitness – Nationally competitive powerlifter, certified personal trainer, and CrossFit athlete
- Other – PC and keyboard building, wood turning, juggling, unicycling, piano, and guitar