Sam Schoedel

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EDUCATION

Carnegie Mellon, Pittsburgh, PA — Expected Graduation August 2024
Master of Science in Robotics — **GPA: 4.0**

Virginia Tech, Blacksburg, VA — May 2022
B.S. - Computer Engineering: Controls, Robotics, and Autonomy — **GPA: 4.0**
Minor - Math

RESEARCH EXPERIENCE

Carnegie Mellon REx Lab — August 2022 - Present
Graduate Research Assistant

- Advised by Dr. Zachary Manchester
- Developed TinyMPC, a fast, low memory, conic solver for model predictive control on embedded systems
- Created a code generation tool with interfaces for high level languages
- Culminated in first author conference papers to ICRA 2024 and CDC 2024

Virginia Tech TREC Lab — January 2019 - May 2022
Undergraduate Research Assistant

- Advised by Dr. Alexander Leonessa
- Designed PCBs to efficiently control actuators on a full-scale, 3D printed humanoid robot
- Started ongoing project to build cheap quadrupeds for swarm and cooperative robotics research
- Developed a grounded force feedback virtual reality system using a PANDA robot arm

WORK EXPERIENCE

Florida Institute for Human and Machine Cognition — June 2024 - Present
Software Engineering Intern

- Integrating model-predictive controllers with the Nadia humanoid robot using Julia, C++, and Java
- Writing quadratic programming solvers that utilize GPUs

NASA Jet Propulsion Laboratory — May - August 2022
Software Engineering Intern

- Developed flight software for CADRE, a multi-rover lunar mission launching in 2024
- Wrote data packet management infrastructure to enable rover communication using C++
- Created automated test interface for rover communication software

HaptX — May - August 2021
Mechatronics Intern

- Developed force-feedback controllers to apply virtual forces on a user's hand attached to a robotic arm
- Applied vector math operations and matrix transformations to manipulate virtual rigid-body contacts

ModalAI — May - Sept 2020
Software Engineering Intern

- Modified visual-inertial odometry algorithms for lightweight computing platforms using C++
- Incorporated loop closure program into main VIO software to reduce position estimation drift
- Refactored VIO algorithm to utilize snapdragon GPU, increasing processing speed by 300%

PUBLICATIONS

S. Schoedel*, X. Nguyen*, E. Nedumaran, B. Plancher, Z. Manchester, "Code Generation for Conic Model-Predictive Control on Microcontrollers with TinyMPC", Conference on Decision and Control (CDC 2024, under review).

X. Nguyen*, S. Schoedel*, A. Alavilli*, B. Plancher, Z. Manchester, "TinyMPC: Model-Predictive Control on Resource Constrained Microcontrollers", International Conference on Robotics and Automation (ICRA 2024). **Best Automation Paper Award winner**, also nominated for **Best Student Paper** and **Best Paper**.

S. Schoedel*, A. Fuge*, B. Kalita, A. Leonessa, "Development of an Affordable and Modular 3D Printed Quadruped Robot", International Mechanical Engineering Congress and Exposition (IMECE 2022).

PRESENTATIONS

Guest Lecture, "Model-Predictive Control on GPUs" 2024
Institute for Human and Machine Cognition

Paper Presentation, "TinyMPC: Model-Predictive Control on Resource-Constrained Microcontrollers" 2024
ICRA 2024

Paper Presentation, "TinyMPC: Model-Predictive Control on Resource-Constrained Microcontrollers" 2023
Carnegie Mellon University REx Lab

Poster Presentation, "Development of an Affordable and Modular 3D Printed Quadruped Robot" 2022
Virginia Tech Mechanical Engineering Graduate Research Symposium

Poster Presentation, "Embedded Programming for Humanoid Robots" 2021
Virginia Tech Undergraduate Research Symposium

TEACHING

16-745: Optimal Control & Reinforcement Learning, Teaching Assistant Spring 2024
Faculty Instructor: Zachary Manchester

AWARDS

Virginia Tech Highest GPA in Electrical and Computer Engineering
Harry Lynde Bradley M.S. Fellowship Awardee
Finalist for best automation, student, and overall paper awards (ICRA 2024)
Best automation paper award (ICRA 2024)

SKILLS

Programming Languages: C, C++, Julia, Python, MATLAB

Software: Git, CMake, ROS, OpenCV, PyTorch, MuJoCo, Isaac Sim, SolidWorks, KiCad

Prototyping: 3D modeling, PCB design, soldering/SMD rework, 3D printing, machining (lathe, knee mill, CNC mill, water jet)