

# Sam Schoedel

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## EDUCATION

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**Carnegie Mellon**, Pittsburgh, PA  
Master of Science in Robotics

Expected Graduation August 2024  
**GPA: 4.0**

**Virginia Tech**, Blacksburg, VA  
B.S. - Computer Engineering: Controls, Robotics, and Autonomy  
Minor - Math

May 2022  
**GPA: 4.0**

## RESEARCH EXPERIENCE

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**Carnegie Mellon REx Lab**  
*Graduate Research Assistant*

August 2022 - Present

- Advised by Dr. Zachary Manchester
- Developed a fast solver for model predictive control on embedded systems
- Created a code generation tool for high level languages for ease of use and accessibility

**Virginia Tech TREC Lab**  
*Undergraduate Research Assistant*

Jan 2019, May 2022

- Advised by Dr. Alexander Leonessa
- Designed prototype PCB shields and programmed microcontrollers (TI Tiva) to efficiently transfer sensor data and control actuators over EtherCAT
- 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

**Virginia Tech FASER Lab**  
*Undergraduate Research Assistant*

Jan 2020, May 2020

- Advised by Dr. Erik Komendera
- Designed electrical subsystem and prototyped PCBs for Stewart platform based robotic manipulators
- Programmed microcontrollers to communicate between lunar assembly robot and manipulators

## WORK EXPERIENCE

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**NASA Jet Propulsion Laboratory**  
*Software Engineering Intern*

May - August 2022

- 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**  
*Mechatronics Intern*

May - August 2021

- Implemented multi-rate control algorithms for next-generation haptic hardware in C++
- Applied vector math operations and matrix transformations to represent virtual rigid-body contacts in 3D space
- Developed user interface for PLC based hardware life testing platform

**ModalAI**  
*Software Engineering Intern*

May - Sept 2020

- 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 AND PRESENTATIONS

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A. Alavilli\*, X. Nguyen\*, S. Schoedel\*, B. Plancher, Z. Manchester, "TinyMPC: Model-Predictive Control on Resource Constrained Microcontrollers", International Conference on Robotics and Automation (ICRA 2023, submitted).

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)

Embedded Programming for Humanoid Robots, presented at Virginia Tech Undergraduate Research Symposium, 2021 (poster)

Development of an Affordable and Modular 3D Printed Quadruped Robot, Poster Presented at Virginia Tech Mechanical Engineering Graduate Research Symposium, 2022 (poster)

## AWARDS AND AFFILIATIONS

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Tau Beta Pi Engineering Honors Society

Virginia Tech Highest GPA in Electrical and Computer Engineering

Dean's List (8x)

Harry Lynde Bradley M.S. Fellowship Awardee

## SKILLS

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

**Software:** Git, OpenCV, PyTorch, Unreal, Unity, ROS

**Prototyping:** 3D modeling with SolidWorks, FDM and SLS 3D printing, PCB design with EAGLE and KiCad, soldering and SMD rework