# Neal Cronin

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## Education

**Georgia Institute of Technology** — Atlanta, Georgia
*Bachelor of Science in Computer Science* — *August 2024 - Present*
***Courses:*** *Artificial Intelligence, Objects and Design, Computer Organization and Programming, Data Structures and Algorithms, Linear Algebra, Discrete Math*

## Experience

**Georgia Tech Research Institute (GTRI)** — Atlanta, Georgia
*Research Intern (STEM@GTRI)* — *June 2023 - July 2023*

**Autonomous Robotics**: Collaborated in the CIPHER lab to develop navigation code for an autonomous robot running on ROS2 using a LIDAR sensor for environment mapping.

**Data Structures**: Optimized LIDAR data storage and accessibility using quadtrees to enable efficient spatial indexing and real-time visualization.

**Data Visualization**: Utilized MatPlotLib to create accurate visual representations of robot surroundings for safety testing.

## Projects

**Tissue-Integrated Bionic Knee**: Modeled the e-OPRA$^{TM}$ Implant System from specifications listed in technical drawings to render visuals used in the paper.

Tony Shu et al., Tissue-integrated bionic knee restores versatile legged movement after amputation. Science389, eadv3223 (2025) . DOI: 10.1126/science.adv3223

**OTIS Challenge**: Won 2nd place ($15,000) for a solution focused on inclusive mobility and climate change. I led the development of a functional "breathing vest" prototype that utilized piezoelectric sensors to harness energy from chest expansion during breathing.

**Osu! World Cup Prediction Model**: Built a predictive neural network using PyTorch to forecast international tournament outcomes. I developed a custom data pipeline to ingest player statistics, match history, and beatmap metadata via the osu! API and the rosu-pp library to create the training dataset.

**RoboSumo Robot**: Led a multi-disciplinary team to develop a combat robot under SRS Robothon rules. I designed the chassis and mechanical assemblies in Onshape, managed the physical assembly and wiring (including 3D printing and CNC machining), and programmed the autonomous logic in C++ to integrate infrared and line sensors for opponent detection.

**VEX Robotics World Championship**: Developed high-speed autonomous routines using C++ proportional–integral–derivative controllers, achieving drivetrain precision that earned a qualification for the World Championship

**Hall Effect Keypad**: Reduced input latency by modifying open-source firmware for the RP2040 microcontroller to support analog actuation points, outperforming standard mechanical switches in high-frequency performance

**Combat Robotics**: Designed "Cat5," a 1 pound ant-weight robot, using Fusion 360 to optimize for weight distribution and durability. I executed the full build process, including high-clearance 3D printing and precise soldering of compact electronic speed controllers and receiver components.

## Honors and Awards

**HOPE Scholarship**: $45,000 for college tuition.

**OTIS 2nd Place Nationally**: $15,000 prize.

**Laws of Life Essay School Winner**: $100 prize.

## Skills Summary

**Platforms**: Linux (Ubuntu), Windows, Arduino, Raspberry Pi

**Software**: PyTorch, TensorFlow, MatPlotLib, Django

**Hardware**: Soldering, 3D Printing, Makerspace Trained

**CAD**: Autodesk Fusion 360, Autodesk Inventor, Onshape

## References

**Brandon Horsley**: Former Robotics Coach – bhorsleyphysics@gmail.com

**Stephen Cochran**: Former Mechatronics Teacher – Stephen.Cochran@gcpsk12.org