Stephen Welch

Gainesville, VA

stephenwelch@vt.edu | StephenWelch | stephenwelchva

Education

M.S. in Computer Engineering: Software & Machine Intelligence — *Virginia Polytechnic Institute*
Graduating May 2025 | GPA: 3.80 — *Aug. 2023 - May 2025*
Relevant Courses: Learning Theory for Dynamics & Control | Nonlinear Systems Theory | Machine Learning

B.S. in Computer Engineering: Controls, Robotics & Autonomy — *Virginia Polytechnic Institute*
Minor in Computer Science | GPA: 3.27 — *Aug. 2019 - May 2023*

Skills

Tools	Git, Gradle, Jetbrains IDEs, Visual Studio, GNUPlot, LaTeX
Frontend	JavaFX, Swing, Qt, ASP.NET
Languages	Python, Java, C++, C#, Javascript, SQL

Work Experience

Robotics Researcher — *Blacksburg, VA*
Terrestrial Robotics Engineering and Controls Lab — *Jan. 2020 - Present*
- Enabled torque control of 32 DOF bipedal robot using performant (12,000 calls/s) force-torque mapping written in **Java** & **Python**
- Created novel reinforcement learning-based controller for linear series-elastic actuators using **Python**, **RLLib**, and **Java**

AI Intern — *Alexandria, VA*
Shield AI — *Dec. 2020-May 2023*
- Developed reinforcement learning approaches to airborne combat autonomy
- Improved debrief experience for fighter pilots evaluating AI agents with visualization & replay tool written in **Javascript** and **Lua**

Enterprise Applications Intern — *Herndon, VA*
Serco North America — *Mar. 2020 - Aug. 2020*
- Automated manual website verification and contracts book updates using **Powershell** and **Java**
- Improved usability & browser compatibility for TA/NDA web application built with **C#**, **ASP.NET** and **SQL**

Software Team Lead — *Haymarket, VA*
FIRST Robotics Team 1885 — *Jun. 2017 - Jun. 2019*
- Designed and taught courses on advanced **Java** programming, **Git**, cybersecurity
- Led development of **Java** software for controls, logging, and UI for competition robots with team of 6-8 students

Projects

AUV Fault Detection
Center for Marine Autonomy and Robotics — *2023*
- Detects anomalous behavior on the 690-type submersible robot using Kalman Filter & NLP-based approaches
- Implemented & validated in **C++ ROS**-based simulation

Multi-Agent Heron Manager
Heron Systems — *2021*
- **Python** framework enabling multi-agent interaction driven by arbitrary amount of simulation processes
- Integrates with open-source and in-house reinforcement learning libraries

Accomplishments

Jun. 2023 ***Real-World Deep Reinforcement Learning for Position Tracking of a Pendulum Driven by a SEA***, IMECE 2023
Apr. 2023 ***Real-Time Model-Free Deep Reinforcement Learning for Force Control of a Series Elastic Actuator***, IROS 2023
Apr. 2022 ***A Mapping Approach to Achieve Torque Control for Parallel-Actuated Robotic Systems***, IMECE 2022
Apr. 2018 ***Effective Student Leadership in the FIRST Robotics Competition***, FRC World Championship