# Aron Wilson Mathias

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## EDUCATION

**University Of Arizona, Arizona, USA** *August 2023- May 2025*
*ME in Robotics and Automation.*
**SRM Institute of Science and Technology, Kattankulathur , India** *August 2018- May 2022*
*B-Tech in Mechatronics Engineering.*

## PUBLICATION

- A. Mathias, M. Ghufran, J. Hughes and H. Rastgoftar, " **Affine Transformable Unmanned Ground Vehicle** " 2025 has been submitted to IEEE/ASME Transactions on Mechatronics **(Patent for Design and Structure)**
- M. Ghufran, S. Tetakayala, A. Mathias, J. Hughes and H. Rastgoftar, "**Quadcopter Team Configurable Motion Guided by a Quadruped**," 2024 18th International Conference on Control, Automation, Robotics and Vision (ICARCV), 2024, Accepted for Publication.

## WORK EXPERIENCE

***Mechatronics Engineer-Internship*** ***Steele Robotics ,*** *Tucson,USA* ***(Startup)*** *July 2025 - Present*
- Improved system reliability by **15%** by engineering electro-mechanical integration of PCBs, Jetson modules, LiDAR, and GPS into G-Bot; conducted **validation testing and mechanical durability assessments**.
- Designed and optimized **SolidWorks-based mechanical components**, reducing assembly time by **30%** while leveraging PDM for version control and cross-team collaboration.
- Calibrated and validated **LiDAR**, **IMU**, and camera sensors using Vicon-based motion capture; integrated ROS2 navigation stacks with sensor fusion for real-world testing.
- Collaborated with hardware/software teams to **accelerate development cycles by 20%**, ensuring full documentation and traceability of all test fixtures and design iterations.

***Robotics Engineer-Internship*** ***Robuildx ,*** *Newyork,USA* ***(****Early-Stage Robotics Startup****)*** *July 2025 – Present*
- Designed and validated **electro-mechanical subassemblies** for a modular microfactory platform using **SolidWorks and PDM**, reducing design errors by **25%** and enabling scalable part reuse.
- . Simulated robotic workflows via **ROS2, Gazebo, and Isaac Sim**, enabling accurate **digital twin testing**, automated failure mode discovery, and real-time system validation.
- Built **custom test fixtures** for thermal and motion testing; automated sensor data acquisition using **Python-based** instrumentation, improving verification cycle efficiency by **30%**.
- Constructing a **self-charging drone** with integrated **IMU sensors**, leading hardware construction, flight dynamics tuning, and ROS2 navigation stack implementation for full autonomy.

***Graduate Research Assistant*** ***University of Arizona,*** *Tucson, USA* *Jan 2024 – May 2025*
- Led the development of **ATUGV** with ROS2 and Python, integrating IMU, GNSS, and vision data for real-time motion planning and SLAM-based navigation.
- Executed full-system validation of deformable vehicle dynamics, achieving **50% reduction in simulation-to-field performance gap** via rigorous hardware testing.
- Built automated **Python/C++** tools for sensor calibration and KPI logging under Linux; validated system performance using **Vicon motion capture** and sensor fusion.

***Marine Automation Engineer-Internship*** ***Fareast Marine Services India Private Limited*** *June 2022 – June 2023*
- Reduced system downtime by **30%** through programming **Siemens S7-300** and **Allen-Bradley CompactLogix PLCs** for propulsion, ballast, and auxiliary systems in marine automation.
- Enhanced diagnostics by integrating **Modbus** and **Ethernet/IP** protocols with **SCADA/HMI systems** for streamlined communication and troubleshooting.
- Collaborated cross-functionally to integrate **servo motors** and **pneumatic actuators** into **PLC platforms** and troubleshoot **hardware-software interfaces** with **CAN** and **Ethernet protocols**.

***Technical Assistant- Internship*** ***Fareast Marine Services India Private Limited*** *Nov 2019 – Dec 2019*
- Resolved **30+ automation faults** by supporting **FANUC robot integration** with **Siemens** and **Allen-Bradley PLCs**, improving cycle times and **HMI responsiveness**.
- Conducted preventive maintenance and calibration on robotic arms, CNC machines, and industrial control systems, ensuring precision and reliability, while enhancing diagnostics through **AutoCAD Electrical** schematics and **Ethernet/IP signal tracing**.

## RESEARCH /ACADEMIC PROJECTS

**Affine Transformable Unmanned Ground Vehicle (University of Arizona-TLA)** Link
- Engineered a deformable ground vehicle with **carbon-fiber components**, improving **adaptability** by **40%** and reducing **weight** by **25%**; applied **Affine control** in **ROS2 (Python)**, reducing testing by **50%** via **Gazebo simulations**.

**Quadcopter Team Configurable Motion Guided by a Quadruped** Link
- Led **integration** of an **aerial-ground system** using **Affine transformations**, **ROS2**, **MoveIt 2**, and **Python**, improving **formation stability** by **35%**; developed a **motion model** with **ROS1–ROS2 bridging**, achieving **30% faster response**.

**Deformable Continuum UAV (DCU) (University of Arizona-TLA)** Link
- Achieved **98% reliability** by optimizing three **deformable UAVs**, improving **maneuverability**, **stability**, and **precision maneuvering** through **real-time deformation** control, ensuring **consistent performance**.

## SKILLS

**Programming:** Python, C++, C, HTML, MATLAB, Simulink, ROS, Machine Learning & AI, PLC Programming (Siemens), Robotics Programming, Control Systems & Automation, SLAM, Ladder Logic,

**Software:** SOLIDWORKS, Fusion 360, AutoCAD, ANSYS, Agile, Isaac Sim ,Adobe Creative Cloud, Simatic Manager, Docker Container, Linux(Ubuntu),SCADA, HMI,MS Office, RoboDK, Studio 5000,RSLogic 500,TIA Portal

**Tools:** Raspberry Pi, Arduino, CAD Modeling, Data Analysis, 3D Printing, Casting, Soldering, FANUC, Allen-BradleyPLC