Tristan Schuler

www.tkschuler.github.io | 571-385-7506 | tristankschuler@gmail.com

RESEARCH INTERESTS

Solar Balloons, Lighter Than Air Vehicles, CubeSats, Robot Design, Swarm Robotics, Space Exploration, Autonomous Systems, Guidance Navigation, and Control (GNC), Simulation

EXPERIENCE

U.S. Naval Research Laboratory — Washington D.C. — May 2018 - Present
Mechanical Engineer

- Designed and manufactured small Lighter than Air Autonomous Agents (LTA3)
- Developed software for operating LTA3's manually and autonomously.
- Researched lightweight indoor localization solutions.
- Led SWAT-C development in partnership with the USNA

University of Arizona — Tucson, AZ — Aug 2019 – Dec 2020
Graduate Research Assistant

- Designed, manufactured, and conducted terrestrial solar balloon flight experiments
- Developed software for predicting solar balloon trajectories on Earth, Venus, and Mars
- Developed CubeSat System Design for an aerial exploration mission to Mars

NASA – Marshall Space Flight Center — Huntsville, AL — Jan 2018—May 2018
Intern

- Adapted April Tags OpenCV library to localize robots (open source release on software.nasa.gov)
- Tested tether deployment and braking dynamics for an electric tether CubeSat

NASA – Marshall Space Flight Center — Huntsville, AL — Aug 2017—Dec 2017
Intern

- Developed programs to interface with several GPS receivers including: JAVAD TR-G2, Novatel SpaceQuest, GNSS-SDR
- Designed tools for parsing and analyzing GPS receiver output

George Mason University — Fairfax, VA — May 2017—Aug 2017
National Science Foundation Undergraduate Researcher (NSF REU)

- Developed algorithms to generate CNC machinable furniture parts from 2D vector drawings and customization parameters provided by a user.

Air Force Research Lab — Eglin AFB, FL
Intern
Developed autonomous ground rover platform using COTS equipment and assessed usability of opensource Pixhawk ArduPilot software for navigation — June 2016—Aug 2016

EDUCATION

University of Arizona, Tucson, AZ — December 2020
Master of Science in Aerospace Engineering — GPA 3.6
Master's Thesis – *Solar Balloons- An Aerial Platform for Planetary Exploration*

George Mason University, Fairfax, VA — May 2019
Bachelor of Science in Mechanical Engineering — GPA 3.41
Minor in Computer Science

SKILLS & CERTIFICATIONS

Programming: Python, C++, Java, ROS, OpenCV, LaTeX, Matlab, Arduino
Software: Solidworks, Inventor, Microsoft Office Suite, Vicon
Operating Systems: Linux, macOS, Windows 10
Certifications: Secret Clearance

PUBLICATIONS

Journal Papers:

1. J. Gibson, **T. Schuler**, L. McGuire, D. Lofaro, and D. Sofge, "Swarm and Multi-agent Time-based Path Planning for LTA3 Systems," in World Scientific: Unmanned Systems, 2019, pp. 1–8

Conference Proceedings:

1. ***T. Schuler**, K. Kukkala, V. Vilvanathan, and J. Thangavelautham, "CubeSat System Design for Mars Exploratory Balloon (MEB)," i-SAIRAS, 2020
2. ***T. Schuler**, S. Shkarayev, and J. Thangavelautham, "Altitude Control of a Solar Balloon for Mars Exploration," AAS Guidance Navigation and Control (GNC), 2020
3. **T. Schuler**, D. Lofaro, L. McGuire, A. Schroer, T. Lin, and D. Sofge, "A Study of Robotic Swarms and Emergent Behaviors using 25+ Real-World Lighter-Than-Air Autonomous Agents (LTA 3)," in SWARM 2019: The 3rd International Symposium on Swarm Behavior and Bio-Inspired Robotics, 2019
4. J. Gibson, **T. Schuler**, L. McGuire D. Lofaro, and D. Sofge, "Multi-agent Time-based A* Path Planning on Lighter-Than-Air Autonomous Agents," in IEEE International Conference on Cybernetics and Intelligent Systems, and Robotics, Automation and Mechatronics (CIS-RAM), 2019
5. D. Srivastava, D. Lofaro, **T. Schuler**, and D. Sofge, "Gesture-Based Interface for Multi-Agent and Swarm Formation Control," in SWARM 2019: The 3rd International Symposium on Swarm Behavior and Bio-Inspired Robotics, 2019
6. A. Bouskela, A.Kling. A. Chandra, **T. Schuler**, S. Shkarayev, and J. Thangavelautham, "Planetary Exploration Using CubeSat Deployed Sailplanes," in International Astronautical Congress (IAC), 2019

**Denotes Presenter*

Works in Progress

1. **T. Schuler**, D. Lofaro, A. Maxseiner, D. Bhawandi, D. Sofge, "Wall Climbing Blimp Swarm via Sensor Driven Emergence," ICRA – Swarms in the Real World, 2021. *In Progress.*
2. **T. Schuler**, D. Bowman, "Long Duration Flights in Venus' Atmosphere Using Passive Solar Hot Air Balloons," Acta Astronautica, 2021. *In Progress*.
3. R. Nallapu, Y. Xu, **T. Schuler**, J. Thangavelautham, "Development of a Hardware Demonstration Platform for Multi-Spacecraft Reconnaissance of Small Bodies." IEEE Journal on Miniaturization for Air and Space Systems. *In Progress.*
4. A. Bouskela, A. Kling, **T. Schuler**, S. Shkarayev, J. Thanavelautham, "Mars Exploration Using Sailplanes," Advances in Space Research. 2021. *In Progress*
5. J. Thangavelautham, **T. Schuler**, M. Debbins, K. Kukkala, V. Vilvanathan, C. Bukowski, H. Kalita, "Tethered Robotic Explorer for Accessing Cliffs, Canyons, Craters on the Surface of Mars." AAS Advances in Astronautical Sciences, 2021. *In Progress*.

PROFESSIONAL ORGANIZATIONS: Society of Hispanic Professional Engineers (SHPE), American Institute of Aeronautics and Astronautics (AIAA)

INTERESTS: Adventure photography, music composition, hiking and backpacking, skiing

REFERENCES available on request.