

NIALAH J. WILSON

EDUCATION

PhD Aerospace Engineering Cornell University , Ithaca, NY	Expected: 5/2022
MS Aerospace Engineering Cornell University , Ithaca, NY	5/2020
BS Mechanical Engineering, Howard University , Washington, DC	5/2017

EXPERIENCE

Cornell University, Ithaca, NY 10/2017-Present

Graduate Researcher: Mechanical and Aerospace Engineering

Designed motion primitives and scalable coordination algorithms for a novel flexible modular robot. Developed an [open source](#) simulation in MATLAB to model the robot's behavior in complex environments. Currently design interaction methods for human-drone communication.

Sandia National Laboratories, Albuquerque, NM 5/2021-Present

Autonomy NM Grad R&D Intern: Autonomy for Hypersonics

The Boeing Company, Everett, WA 6/2017-8/2017

Weight Engineer Intern: Optimization Center & Product Development in Flight Sciences

Utilized HyperWorks to produce weight efficient design alternatives for 777 and freighter parts. Collaborated across departments to provide accurate weight estimates to inform trade studies for a freighter configuration.

The Boeing Company, Seattle, WA 5/2016-7/2016

Engineering Accelerated Hiring Initiative

Metrology Intern: Metrology and Test Equipment Services in Boeing Test and Evaluation

Designed, implemented, and tested a system including the programming, bracket design, and electronics to replace the laser interferometer measurement system with an optical encoder to be used in the Photometry Lab.

Sandia National Laboratories, Albuquerque, NM 5/2015-4/2016

Held DOE L Security Clearance

Summer Technical Intern/R&D Year Round Telecommuter: Thermal/Fluids Experimentation Sciences

Operated various lab equipment to characterize bellows (springs) and test their effect on dynamic systems with damping and multiphase flow under high vibration conditions. Wrote multiple scripts in MATLAB to analyze the data sets.

Precision Technology, USA Roanoke, VA 5/2014-7/2014

Mechanical Engineering Intern

Designed components and configurations for multi-axis linear electromechanical actuator systems in SolidWorks.

SKILLS

Software: MATLAB, Python, C++, ROS1/2, Linux, SolidWorks, NX, LabVIEW, Altair HyperWorks

Hardware: Raspberry Pi, Arduino, VICON, 3D printer, Band saw, Drill press, Laser cutter, Soldering

PUBLICATIONS/PRESENTATIONS

Nialah J. Wilson*, Steven Ceron*, Logan Horowitz, and Kirstin H. Petersen. "Scalable and Robust Fabrication, Operation, and Control of Compliant Modular Robots", *Scientific Frontiers* special issue on Designing Self-Organization in the Physical Realm, doi: 10.3389/frobt.2020.00044, 2020.

Steven Ceron*, Logan Horowitz*, Nialah Wilson, Claire Chen, Daniel Kim, and Kirstin Petersen. "Towards a Scalable, Self-Reconfigurable Robot with Compliant Modules", extended abstract, Intl. Symp. for Multi-Robot and Multi-Agent Systems (MRS), 2019.

Steven Ceron, Nialah Wilson, Logan Horowitz, and Kirstin Petersen. "Comparative Analysis of Sensors in Rigid and Deformable Modular Robots for Shape Estimation", Intl. Symp. for Multi-Robot and Multi-Agent Systems (MRS), 2019., Ext. Abstract

Wilson, N. Design and Coordination of Flexible Modular Robots. Presen., RSS: Women in Robotics Workshop, 2018

Wilson, Nialah Jena. Bellows Characterization for Dynamic Systems with Damping and Multiphase Flow_njw. No. SAND2016-1457C. Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2016., Poster

Wilson, N. Bellows Characterization for Dynamic Systems with Damping and Multiphase Flow. Presen., Emerging Researchers National Conference in STEM, 2016, Poster

PROJECTS

Security Camera Alert System: Utilized OpenCV, Darknet, and the Python multiprocessing library to do image processing on 3 USB cameras using a Raspberry Pi 3B. If a certain object was identified, the user would be notified via an email alert. Partner project for Design with Embedded Operating Systems, Cornell ECE 5725.

Human-Blimp Interaction: Modified a commercial toy micro-blimp to be controlled via Bluetooth from a computer instead of an iPhone. Programmed specific flight motions and ran experiments using a VICON motion tracking system to see if people could interpret visual cues from the blimp. Partner Project for Human Robot Interaction, Cornell MAE 6710.

Correct Robot Navigation: Developed a MATLAB simulation for a two-link modular robot to navigate in a discretized world. Created an algorithm using linear temporal logic and a Büchi automaton to create a provably correct motion path for any specification. Individual project for Formal Methods of Robotics, Cornell MAE 6770.

AWARDS

Inclusion@RSS Travel Grant ('18), Artishia & Frederick Jordan Scholarship ('16), **Ron Brown Captain Scholar** ('13)

LEADERSHIP

Master of Engineering Project Team Supervisor 8/2019-5/2020

Led a team of 4 students for their capstone project to design a swarm of micro-blimps. Provided technical guidance.

Graduate Resident Fellow Carl Becker House 8/2019- 5/2020

Oversaw 36 residents on my floor and organized events for the entire house of over 350 students. Coordinated with Cornell and external faculty, staff, and students to create events that fostered a community environment. Addressed the entire community in weekly presentations.

Teaching Assistant, Cornell Mechatronics, MAE 3780 8/2019- 12/2019

Tutored students in office hours and provided technical support during lab sessions with 36 students. Graded laboratory reports and gave detailed feedback on assignments.

Undergraduate Project Supervisor 1/2019-5/2019

Mentored and provided technical support to a student altering a commercial micro-blimp and implementing a feedback control loop.

Senior Capstone Design Project: Team Lead 8/2016-4/2017

Led team of 4 students then expanded to co-lead a team of 8. Designed and built an apparatus to test thermal radiation transfer between metallic concentric cylinders in a vacuum environment. Identified tasks and delegated to teammates. Coordinated with manufacturers, team members, and our sponsors Sandia National Laboratories to meet specifications and our deadline. Presented our results to our sponsors at their facilities in Albuquerque, NM.

Howard University Robotics Organization: Co-Founder, President 8/2015-5/2017

Drafted legislation and coordinated with university department heads to establish the organization. Created modules to teach students about basic robotics principles. Organized two autonomous car competitions for the students.

Congressional Black Caucus Foundation Emerging Leaders First China Cohort 8/2014

Selected in the first cohort of African American students to travel China to learn about their history, legislation, and emerging technologies towards the goal of fostering new US-China relationships and mentoring future delegators.

OUTREACH

Ithaca Alumnae Chapter Delta Sigma Theta Sorority, Inc., Member, 9/2020-Present

Organize programs for the betterment of the greater Ithaca community.

Howard University Robotics Organization Mentor, 1/2021-5/2021

Taught ROS2 and Gazebo concepts via recorded modules and created an end of semester assignment.

ENVISION Women in STEM Proposal Writing Competition, 1/2021

Judged high school students' entries and provided constructive feedback.

Expand Your Horizons, Ithaca NY 4/2019

Served as an assistant for a workshop for middle school girls to expose them to engineering careers (~30 girls)

New Visions Engineering, Cornell University, Ithaca NY 11/2018

Co-designed and led a four-hour robotics workshop for ~15 high school students interested in engineering

Connecting Opportunities, Cornell University, Ithaca NY 7/2018

Co-designed and led a 2-hour robotics workshop for ~12 high school students interested in engineering

Middle School Outreach, Howard University Middle School of Math and Science, Washington DC 11/2017

2-day trip to Washington DC to teach 7th grade teachers a physics science project for their students