

Annagrace Hamson

PhD Student

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PhD EXPERIENCE

NORTHWESTERN UNIVERSITY

Evanston, IL | Aug 2024 - Present

Mechanical Engineering – Center for Robotics and Biosystems

- Swarm Lab: Principal Investigator Michael Rubenstein

PROJECTS

One Degree-of-Freedom Reconfigurable Swarm Modeling and Control

- Creating a simulator of a swarm of one-DoF robots using differential programming. Incorporates magnetic and friction forces
- Developing distributed algorithms for shape identification and shape formation control in multi-agent robotic systems

Automated Battery Charging and Swapping

- Designing and building continuously operating automated battery swapping and charging system for drone swarms
- Swapped over 1500 batteries in one month with no critical errors, swapped 400 batteries in 8 hours on slow setting with no critical errors. The final version will house 100 batteries, and swap every 30 seconds continuously for at least 8 hours

RELEVANT COURSEWORK

- State Estimation, Navigation, Planning, and Control for Robotic Systems, (including Kinematics and Dynamics)
- Machine Learning and Artificial Intelligence for Robotics (including Genetic and Evolutionary Algorithms)
- Mechatronics and Multi-Agent Robotic Systems

PROFESSIONAL EXPERIENCE

NORTHROP GRUMMAN – SYSTEMS ENGINEER

Redondo Beach, CA | Sept 2023 – Jul 2024

- Developed satellite simulation software, focusing on orbit determination and maneuver detection methods
- Managed team tasking via Agile using Jira software to streamline digital transformation processes
- Led architecture development for new programs; responsible for long-term development plans and overall system organization

NORTHROP GRUMMAN – ASSOCIATE SYSTEMS ENGINEER

Redondo Beach, CA | Jul 2022 – Sept 2023

- Coordinated large-scale database review among stakeholders and developed review processes
- Advised and developed system architectures in initial stages or for additional program captures and introduced to customers
- Subject matter expert of program software architecture, Provided systems engineering software support for departments
- Provided networking, learning, and speaking opportunities to interns for development and retention while on the intern committee

NORTHROP GRUMMAN – ENGINEERING INTERN (Two Years)

Redondo Beach, CA | May-Aug 2020, 2021

- Conducted link degradation analyses through simulation and analysis in SPW and Matlab
- Analytically proved a signal degradation measurement in testing and verified in simulations
- Used model-based systems engineering to organize infrastructure and drive enhancements
- Drove model-based interface and requirement documentation

UNDERGRADUATE EDUCATION

HARVEY MUDD COLLEGE, Graduated with Distinction

Claremont, CA | May 2022

- B.S. in Engineering and a Concentration in Literature, supported by a National Merit Scholar Financial Award

ACADEMIC EXPERIENCE

ENGINEERING FOCUS, Harvey Mudd College

- Deterministic and probabilistic digital signal processing. Machine-learning techniques. State estimation and control theory

MILLENNIUM SPACE SYSTEMS CLINIC TEAM, MSS/Harvey Mudd College

Aug 2021-May 2022

- Developed an LRF CubeSat optimized for widespread compatibility employing modular design aspects with a manufacturing and assembly focus

SOUTHERN CALIFORNIA EDISON CLINIC TEAM, SCE/Harvey Mudd College

Fall 2021

- Developed strategies (like low vibration characterization) to monitor large-scale infrastructure and predict degradation and stress
- Recommended solutions to improve system stability and long-term health

AUV TESTING AND EVALUATION, Harvey Mudd College

Spring 2020

- Designed kits to collect data from water sources, interfacing sensors and motors with an Arduino microprocessor
- Deployed 3D printed kits for final testing and presented results in IEEE technical reports

SKILLS

- Python, Matlab, CAD, Cameo EA, DOORS, DoDAF, UML/SYSML, SolidWorks, SQL, R, Java, C++, Technical Documentation, SPW, Electronic Lab training