EMILY SHEETZ

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EDUCATION

University of Michigan *August 2018 - Present (Anticipated December 2023)*
PhD, Computer Science and Engineering GPA: **3.940** / 4.0
Artificial Intelligence
Robotics

Member of Ensemble of Computer Science and Engineering Ladies+ (ECSEL+)
Member of Graduate Society of Women Engineers (GradSWE)

University of Michigan *August 2018 - June 2021*
MS, Computer Science and Engineering GPS: **3.940** / 4.0

Monmouth College *August 2014 - May 2018*
BA, Mathematics and Computer Science GPA: **3.975** / 4.0
Spanish Minor
Honors Program
Summa Cum Laude

Member of Blue Key Honors Society
Member of Sigma Delta Pi, Spanish Honors Society
Member of Alpha Lambda Delta

RESEARCH

Affordance Representation and Execution January 2019 - Present
University of Michigan *Ann Arbor, MI*

· Explore use of object affordances to achieve complex robot manipulation tasks
· Extend representation of object affordances to include controllers to improve manipulation abilities
· Lead project conception and implementation and work collaboratively with students

Natural Language Processing August 2017 - May 2018
Monmouth College *Monmouth, IL*

· Trained a Generative Adversarial Network (GAN) to generate sentences of text on the character level
· Explored how probabilistic language models could be quantitatively evaluated using perplexity
· Defined the problem, investigated methods, and planned the execution of the research plan
· Presented results of mathematics and computer science senior research projects to faculty and students

Analog and Digital Sound Synthesis August 2017
Monmouth College *Monmouth, IL*

· Introduced to software for high quality sound recording and visualizing sound waves
· Explored FM synthesis with non-sinusoidal carrier waves using the LittleBits Synth Kit
· Presented research to faculty and students

Optimized Snapshot-Based Visual Homing for UAVs May 2017 - July 2017
Auburn University *Auburn, AL*

· Researched visual homing on unmanned aerial vehicles (UAVs)
· Introduced to Python, OpenCV, and machine learning implementations

· Implemented simulation framework for testing techniques in MATLAB
· Worked independently to research, design simulation framework, and find solutions

Design of a Mathematical Model for an Autonomous Vehicle June 2016 - August 2016
University of Arizona *Tucson, AZ*

· Used system identification to develop a mathematical model for internal vehicle dynamics
· Introduced to autonomous systems, control theory, and model predictive control
· Worked independently to research, analyze data, troubleshoot, and solve problems
· Operated the Cognitive Autonomous Test (CAT) Vehicle for project testing

Analysis of Chaotic Walks on a Plinko Board August 2015
Monmouth College *Monmouth, IL*

· Conducted experiments for introduction into the mathematics of chaos theory
· Supervised students during Summer Opportunity for Intellectual Activity projects
· Presented research to faculty, students, and community members

Particle Image Velocimetry for Flow Around an Airfoil August 2014 - May 2015
Monmouth College *Monmouth, IL*

· Investigated water flow around airfoils at angles of attack using particle image velocimetry
· Operated lab equipment including lasers, flow cell, and Phantom v9.1 high speed camera
· Created poster presentation and presented research to students and faculty members

High Speed Imagery and Mathematical Modeling August 2014
Monmouth College *Monmouth, IL*

· Focused on experiment design, data analysis, and introduction to mathematical modeling
· Collaborated with mathematics majors to conduct experiments
· Gained experience designing experiments and using Mathematica and MATLAB

WORK EXPERIENCE

NASA Johnson Space Center Pathways Intern January 2022 - May 2022
NASA Johnson Space Center, ER4 *Houston, TX*

· Incorporate human-in-the-loop object registration and stance generation to the Valkyrie virtual reality (VR) project
· Integrate multiple pieces of existing software and implement communication between separate parts
· Work on tasks closely related to projects by teammates and act on feedback from multiple teammates
· Regularly test features and document progress through written documentation and video demos
· Perform robot operations to test use of new VR features for driver-assist teleoperation of robots
· Present work to team and upper branch management

Research Mentor June 2021 - Present
Lumiere Education *Virtual*

· Mentor high-school students on research projects related to computer science and robotics
· Explain reading and writing academic research papers during one-on-one weekly meetings
· Advise on research question, project design, code implementation, and research paper deliverables
· Lead small group lessons on applying artificial intelligence and machine learning concepts in Python

Research Intern August 2020 - Present
NASA Johnson Space Center *Houston, TX*

- NASA Space Technology Graduate Research Opportunities (NSTGRO) application and acceptance based on project proposal
- Collaborate with employees at JSC to incorporate my work into their existing projects with Valkyrie
- Present research findings at regular meetings
- Prepare quarterly progress reports and annual research plans

Engineering Teaching Consultant August 2020 - Present
University of Michigan *Ann Arbor, MI*

- Consult with teaching assistants to address teaching challenges
- Review teaching philosophy statements
- Learn about best teaching practices and pedagogy research to share during consultations

Academic Success Program Tutor January 2019 - Present
University of Michigan *Ann Arbor, MI*

- Tutor undergraduate level mathematics and computer science courses
- Explain concepts and work through examples with student athletes one-on-one
- Practice helpful studying, reading, and note-taking habits

Graduate Student Instructor August 2019 - May 2020
University of Michigan *Ann Arbor, MI*

- Prepare for and lead weekly discussion sections to review course material and clarify homework concepts
- Work with students one-on-one during office hours to address questions and concerns with the course
- Collaborate with staff members to write and grade exams, handle exam management, write assignments

Research Intern June 2019 - August 2019
TRACLabs *Webster, TX*

- Developed a hierarchy of single- and multi-objective potential field controllers
- Explored practical use of controllers through experiments on the TRACArm robot
- Worked with the Robotics Lab to discuss ideas and implementation details within existing software

Computer Science Tutor August 2017 - May 2018
Monmouth College *Monmouth, IL*

- Utilized knowledge of programming practices and languages C++, Java, and Python
- Lead group discussions of material and explain concepts one-on-one
- Encouraged students to think about problems and solutions from new perspectives

Computer Science Lab Assistant August 2016 - May 2017
Monmouth College *Monmouth, IL*

- Assist in Introduction to Computer Science and Introduction to Programming labs
- Lead group discussions of material and explain concepts one-on-one
- Encourage students to think about problems and solutions from new perspectives

Math Tutor August 2016 - May 2017
Monmouth College *Monmouth, IL*

- Tutor high school student in algebra in one-on-one sessions
- Explain concepts and problem-solving strategies
- Talk student through homework problems to practice discussed strategies

Writing Tutor May 2016 - May 2018
Monmouth College *Monmouth, IL*

· Provide direction to students at any point in the writing process
· Utilize nondirective tutoring methods to help students to improve their writing process
· Develop relationships with students through encouragement and validation of their efforts

Speech Assistant August 2015 - May 2018
Monmouth College *Monmouth, IL*

· Assist students at any point in the process of drafting or delivering a speech
· Observe speeches, evaluate speakers needs, and provide feedback on speeches
· Develop relationships with students by encouraging them and supporting their efforts

Research Assistant May 2017 - July 2017
Auburn University *Auburn, AL*

· Worked under the supervision of Dr. Saad Biaz and Dr. Richard Chapman
· Collaborated with peers to research, develop approach to problem, and write code
· Wrote academic paper, created poster, and presented research

Research Assistant June 2016 - August 2016
University of Arizona *Tucson, AZ*

· Worked under the supervision of Dr. Jonathan Sprinkle and doctoral students
· Collaborated with peers to research, write MATLAB scripts, and design experiments
· Experienced writing academic papers and presenting research

Fulton Hall Resident Assistant August 2015 - May 2017
Monmouth College *Monmouth, IL*

· Plan social programs and assist with organizing collaborative educational programs
· Provide emotional and academic support for residents and residence hall staff
· Create a community on the floor and in the residence hall with open-door policy

TECHNICAL STRENGTHS

C++
Python
ROS
C#
Java
MATLAB
Mathematica
JavaScript
HTML

PUBLICATIONS

Emily Sheetz, Xiaotong Chen, Zhen Zeng, Kaizhi Zheng, Qiuyu Shi, and Odest Chadwicke Jenkins. Composable Causality in Semantic Robot Programming. IEEE International Conference on Robotics and Automation (ICRA), 2022.

Semir Tatlidil, Yanqi Liu, **Emily Sheetz**, R. Iris Bahar, and Steven Sloman. Using Human-Guided Causal Knowledge for More Generalized Robot Task Planning. Association for the Advancement of Artificial Intelligence (AAAI) Fall Symposium on Human-Robot Interaction (HRI). *arXiv preprint arXiv:2110.04664*, 2021.

PRESENTATIONS

RSS Workshop on Declarative Representations in Robot Control July 2021
Composable Causality in Semantic Robot Programming
Lightning Talk and Poster Presentation

RSS Workshop on Artificial Intelligence and Manipulation for Robotics July 2021
Composable Causality in Semantic Robot Programming
Poster Presentation

Tri-Section Meeting of the Mathematical Association of America (MAA) March 2018
Optimized Snapshot-Based Visual Homing for UAVs
Oral Presentation
Recipient of Outstanding Undergraduate Research (OUR) Award from the Illinois Section (ISMAA)

Scholar's Day Presentation on Mathematics Capstone Project April 2018
Evaluating Horror Text Generated by Probabilistic Language Models
Poster Presentation

Scholar's Day Presentation on Computer Science Capstone Project April 2018
Writing Horror Text Using Generative Adversarial Networks with Memory
Poster Presentation

Presenter at First Science Symposium April 2018
Probabilistic and Machine Learning Approaches to Text Generation
Oral Presentation

Scholar's Day Presentation on Honors Capstone Project April 2017
Mathematics and the Philosophy of Chaos
Oral Presentation

Scholar's Day Presentation on Historical Documents Research April 2016
Balancing Equality and Freedom: An Examination of Declarations of Independence
Poster Presentation

Scholar's Day Presentation on Mathematics Research April 2015
Particle Image Velocimetry Experiments for Flow Around an Airfoil
Poster Presentation

Scholar's Day Presentation on Gender Disparity in Education April 2015
Oral Presentation

FUNDING APPLICATIONS

NASA Space Technology Graduate Research Opportunities (NSTGRO) November 2019
Accepted for funding and collaboration August 2020 to Present

National Science Foundation Graduate Research Fellowship Program October 2019

National Science Foundation National Robotics Initiative 2.0 Grant Proposal February 2019

NASA Space Technology Research Fellowship (NSTRF) November 2018

National Science Foundation Gratuate Research Fellowship Program October 2017

ACADEMIC ACHIEVEMENTS

NASA Johnson Space Center ER Division Individual Excellence Award May 2022

Advancement to PhD Candidacy September 2021

Pass PhD Preliminary Examination	June 2021
Monmouth College Dean's List	August 2014 - May 2018
Paul Cramer Prize for Outstanding Work in Upper-Level Mathematics	April 2018
Computer Science Award for Senior Project	April 2018
Outstanding Undergraduate Research (OUR) Award at MAA Conference	March 2018
Robert Minteer Prize for Student Working to Maximum Potential	April 2017
Paul Cramer Prize for Oustanding Work in Upper-Level Mathematics	April 2017
Computer Science Award for Introductory Sequence	April 2017
Ray A. Schwind Scholarship for Sciences	April 2016
Ray A. Schwind Scholarship for Sciences	April 2015
Hugh R. Beveridge Prize for Outstanding Work in Intermediate Mathematics	April 2015
Speaker Showcase Participant and Winner	December 2014
Illinois Seal of Biliteracy for English and Spanish	May 2014

LEADERSHIP AND VOLUNTEERING EXPERIENCES

CSE Department Faculty Candidate Grad Student Host	March 2021
Computer Science and Robotics Visit Day Volunteer	March 2019 - April 2019
CSE Department Take Your Child To Work Day Volunteer	April 2019
Wind Ensemble Flute Section Leader	August 2016 - May 2018
Wind Ensemble President	August 2017 - May 2018
Wind Ensemble Secretary	August 2016 - May 2016
Marching Band Flute Section Leader	August 2015 - May 2018
Marching Band Woodwind Captain	August 2016 - May 2018
Blue Key Honor Society Secretary	March 2017 - March 2018
Monmouth College Admissions Events Volunteer	August 2015 - May 2018
Jamieson Center and Strom Center Thrift Shop Volunteer	August 2015 - May 2016
SOfIA Activities Coordinator	August 2015
Monmouth College Bands Dodgeball Tourmanment Supervisor	February 2014