

# EMILY SHEETZ

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## EDUCATION

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### University of Michigan

*August 2018 - Present*

PhD, Computer Science and Engineering

GPA: **4.0** / 4.0

Artificial Intelligence

Robotics

Member of Ensemble of Computer Science and Engineering Ladies+ (ECSEL+)

Member of Graduate Society of Women Engineers (GradSWE)

### Monmouth College

*August 2014 - May 2018*

B.A., 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

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### 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**

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**Graduate Student Instructor**

August 2019 - Present

*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
- Write and grade exams, write assignments, oversee grading of assignments

**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 notetaking habits

**Research Intern**

June 2019 - August 2019

*TRAC Labs**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***Monmouth College*

August 2017 - May 2018

*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***Monmouth College*

August 2016 - May 2017

*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***Monmouth College*

August 2016 - May 2017

*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***Monmouth College*

May 2016 - May 2018

*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***Monmouth College*

August 2015 - May 2018

*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***Auburn University*

May 2017 - July 2017

*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***University of Arizona*

June 2016 - August 2016

*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***Monmouth College*

August 2015 - May 2017

*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

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Java  
C++  
MATLAB  
Python  
Mathematica  
JavaScript  
HTML

## PRESENTATIONS

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<b>Tri-Section Meeting of the Mathematical Association of America (MAA)</b> <i>Optimized Snapshot-Based Visual Homing for UAVs</i> Oral Presentation Recipient of Outstanding Undergraduate Research (OUR) Award from the Illinois Section (ISMAA)	March 2018
<b>Scholar's Day Presentation on Mathematics Capstone Project</b> Evaluating Horror Text Generated by Probabilistic Language Models	April 2018
<b>Scholar's Day Presentation on Computer Science Capstone Project</b> Writing Horror Text Using Generative Adversarial Networks with Memory	April 2018
<b>Presenter at First Science Symposium</b> Probabilistic and Machine Learning Approaches to Text Generation	April 2018
<b>Scholar's Day Presentation on Honors Capstone Project</b> Mathematics and the Philosophy of Chaos	April 2017
<b>Scholar's Day Presentation on Historical Documents Research</b> Balancing Equality and Freedom: An Examination of Declarations of Independence	April 2016
<b>Scholar's Day Presentation on Mathematics Research</b> Particle Image Velocimetry Experiments for Flow Around an Airfoil	April 2015
<b>Scholar's Day Presentation on Gender Disparity in Education</b>	April 2015

## FUNDING APPLICATIONS

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NASA Space Technology Graduate Research Opportunities (NSTGRO) Applicant	November 2019
National Science Foundation Graduate Research Fellowship Program Applicant	October 2019
National Science Foundation National Robotics Initiative 2.0 Grant Proposal	February 2019
NASA Space Technology Research Fellowship (NSTRF) Applicant	November 2018
National Science Foundation Graduate Research Fellowship Program Applicant	October 2017

## ACADEMIC ACHIEVEMENTS

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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 Minter Prize for Student Working to Maximum Potential	April 2017
Paul Cramer Prize for Outstanding 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**

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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
SO <sub>f</sub> IA Activities Coordinator	August 2015
Monmouth College Bands Dodgeball Tourmanment Supervisor	February 2014