SOPHIA SMITH

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EDUCATION

The University of Texas at Austin
Oden Institute for Computational Sciences and Engineering (M.S.) *May 2025*
GPA: 3.75/4.00

The University of Chicago
Majors: Physics (B.A.), Mathematics (B.S.) *June 2021*
GPA: 3.54/4.00
Dean's List *6 Quarters*

EXPERIENCE

University of Texas, Center for Autonomy

Graduate Researcher *September 2021 - present*

· Areas of emphasis:
  - Decentralized reinforcement learning in stochastic multiagent environments, focusing on coordination and team decomposition.
  - Application of generative AI for the verifiable design of multiagent systems.
  - Human-robot interactions: using game theoretic approaches to encourage interpretable robots.
· Implements python simulations of stochastic multiagent environments, conducts machine learning and reinforcement learning experiments.
· Built an iterative LLM pipeline that generates, formally checks, and refines task decompositions from natural language task descriptions.
· Experiments frequently use mathematical modeling techniques: Markov decision processes, game theory, optimization, automata, and formal methods.
· Creates intuitive visualizations and presentations to communicate complex problems, methods, and results.
· Publications:
  - Automatic Decomposition of Reward Machines for Decentralized Multiagent Reinforcement Learning (Conference for Decision and Control 2023)
  - Decentralized Conflict Resolution for Multi-Agent Reinforcement Learning Through Shared Scheduling Protocols (Conference for Decision and Control 2023)
  - Encouraging Inferable Behavior for Autonomy: Repeated Bimatrix Stackelberg Games with Observations (American Control Conference 2024)

University of Texas at Austin Mathematics

Graduate Teaching Assistant *August 2025 - present*

· Plans and leads calculus discussion sessions with 60+ students.
· Identifies areas of student misunderstanding and crafts curricula to reinforce topic.

NASA Ames Research Center

OSTEM Intern *May 2025 - August 2025*

· Facilitated the integration of unmanned aircraft into non-towered airports by leveraging radio comms for situational awareness and planning around non-towered airports.
· Determined feasibility of unmanned aircraft leveraging radio comms.

OSTEM Intern *May 2024 - August 2024*

· Concept development evaluating communication capabilities and requirements for unmanned aircraft when flying into non-towered airports.
· Investigated possible contingency operation adjustments in the event a remote pilot loses contact with an unmanned aircraft.

University of Texas, Oden Institute

Babuška Forum Organizer *June 2023 - June 2024*

- Hosted a weekly seminar series to expose graduate students to research topics in computational engineering, science, and math.
- Identified and invited faculty and postdoc speakers from diverse fields, advertised seminars, and coordinated website listings.

Moncrief Intern and Undergraduate Researcher *June 2020 - August 2021*

- Researched active perception with the Autonomous Systems group. Implemented algorithms from literature in Python to optimize information gain from probabilistic graphical models.

University of Chicago Physics Department

Undergraduate Researcher with Prof. Arvind Murugan *October 2019 - June 2021*

- Conducted computational research project investigating Eigen's self-tuned catastrophe in polymerase using a quantitative biology framework.
- Wrote and ran simulations of evolving populations with the Wright-Fisher method in Python.

University of Chicago Math Research Experience for Undergraduates

Full Program Research Participant *June 2019 - September 2019*

- Researched partial differential equations and wrote paper on harmonic functions with the Dirichlet condition.

RELEVANT COURSES

Learning Based Optimal Control	Numerical Linear Algebra
Game Theoretic Modeling for Multi-Agent Systems	Stochastic Processes
Causality and Reinforcement Learning	Convex Optimization
Mathematical Modeling in Science and Engineering	Markov Decision Processes
Fundamental Techniques in Machine Learning and Data Science	

TECHNICAL SKILLS

Languages	Python, Matlab, Bash, Julia
Tools	PyTorch, Git, LLM APIs, HuggingFace, Numpy, Pandas, Microsoft Office
Strengths	Quantitative reasoning, machine learning, stochastic processes, game theory, data visualization, and presenting.

OUTREACH

Code2College

Volunteer Instructor *September 2022 - present*

- Volunteers at organization serving high-school students from underrepresented groups in STEM.
- Teaches 9 week courses (Introductory Python, Intermediate Python, Artificial Intelligence) aimed at preparing students from underrepresented groups in STEM for paid, technical internships.
- Reviews and edits resumes and college essays.

EXTRA CURRICULAR

UChicago Varsity Cross Country and Track & Field *August 2017- June 2021*

UChicago Women's Athletic Association Representative *August 2018- June 2021*