

Lindsay M. Smith

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RESEARCH INTEREST: My research focuses on the **science of AI**: I apply techniques and ideas from physics and complex systems to artificial neural networks to understand how they learn. My current research in machine learning/AI includes projects in **mechanistic interpretability**, **in-context learning**, **LLM multi-agent interactions**, and **AI safety**.

EDUCATION

M.A., Ph.D. — Princeton University — *Physics* 2022 - PRESENT (EXPECTED 2027)
NSF GRFP; Research Advisors: Profs. William Bialek (Princeton) and David Schwab (CUNY)

B.A. — University of Pennsylvania — *Physics (Honors)* 2018 - 2022
Research Advisor: Prof. Dani Bassett
Cum Laude, Minors in Mathematics and French and Francophone Studies

PUBLICATIONS

* indicates equal contribution.

5. Jeff Shen* & **Lindsay M. Smith*** (2025). ALICE: An Interpretable Neural Architecture for Generalization in Substitution Ciphers. *Under review*, <https://arxiv.org/abs/2509.07282>.
4. Chase Goddard, **Lindsay M. Smith**, Vudtiwat Ngampruetikorn*, David J. Schwab* (2025). When can in-context learning generalize out of task distribution? *ICML 2025*, <https://arxiv.org/abs/2506.05574>.
3. **Lindsay M. Smith**, Chase Goddard, Vudtiwat Ngampruetikorn*, David J. Schwab* (2024). Model Recycling: Model component reuse to promote in-context learning. *NeurIPS 2024 Workshop on Scientific Methods for Understanding Deep Learning*, <https://openreview.net/forum?id=vWSu8nEURM>.
2. Chase Goddard, **Lindsay M. Smith**, Vudtiwat Ngampruetikorn*, David J. Schwab* (2024). Specialization-generalization transition in exemplar-based in-context learning. *NeurIPS 2024 Workshop on Scientific Methods for Understanding Deep Learning*, <https://openreview.net/forum?id=D1ui5QwHqF>.
1. **Lindsay M. Smith**, Jason Z. Kim, Zhixin Lu, and Dani S. Bassett (2022). Learning continuous chaotic attractors with a reservoir computer, *Chaos* 32, 011101, <https://doi.org/10.1063/5.0075572>. *Selected as an Editor's Pick and publicized with a Scilight summary: <https://doi.org/10.1063/10.0009079>*.

SELECTED HONORS AND AWARDS

National Science Foundation (NSF) ACCESS Computing Award – 200,000 credits (~ \$5000)	2025
<i>I applied for and am the Principal Investigator for this award.</i>	
NSF AI Institutes Virtual Organization (AIVO) Travel Grant – \$2000	2025
American Physical Society (APS) GSNP Student Speaker Award Finalist – \$500	2025
NSF Graduate Research Fellowship Program (GRFP) – \$138,000 + \$12,000 bonus from Princeton	2022 - 2027
Charlotte and Morris Tanenbaum *52 Graduate Fellowship in Physical or Life Sciences – \$40,000	2022 - 2023
Joseph Henry Merit Award – \$5,000	2022
University Scholars Program – \$7,000	2020 - 2022
<i>Applied for and awarded summer research funding in 2020 and 2021.</i>	
National French Honor Society – Pi Delta Phi	2020 - Present
Sister Loretta Thome Scholarship – \$10,000	2018 - 2023

EXPERIENCE

MARS (Mentorship for Alignment Research Students) Mentee, Cambridge, UK July 2025 - Present
MARS 3.0 participant at the Cambridge AI Safety Hub. Co-first author on project investigating AI control and steering via Chain-of-Thought (CoT) injections.

SELECTED PRESENTATIONS

Princeton Center for Theoretical Science Workshop: The Physics of John Hopfield , Princeton, NJ	2025
Poster: “ALICE: An Interpretable Neural Architecture for Generalization in Substitution Ciphers”	
Meta 2025 PhD Forum , Menlo Park, CA	2025
Poster: “ALICE: An Interpretable Neural Architecture for Generalization in Substitution Ciphers”	
APS March Meeting , Anaheim, CA	2025
Talk: “Multi-Agent Debate: Analyzing Consensus in Networks of LLM Agents” – (<i>GSNP Student Speaker Award Finalist</i>)	
APS March Meeting , Chicago, IL	2022
Talk: “Learning Continuous Chaotic Attractors with a Reservoir Computer”	
Conference for Undergraduate Women in Physics (CUWiP) , Virtual	2022
Poster: “Learning Continuous Chaotic Attractors with a Reservoir Computer”	
Penn Research Expo , Phila., PA	2020, 2021, 2022
Posters: “Development of control in brain networks over temporal and spatial scales using graph models”, “Learning Continuous Chaotic Attractors with a Reservoir Computer”	
CUWiP , Virtual	2021
Lightning Talk: “Development of control in brain networks over temporal and spatial scales using graph models”	
University Scholars Lunch Talk , Phila., PA	2020, 2022
Talks: “Development of control in brain networks over temporal and spatial scales using graph models”, “Learning Continuous Chaotic Attractors with a Reservoir Computer”	
APS March Meeting , Virtual	2020
Poster: “Development of control in brain networks over temporal and spatial scales using graph models”	

MENTORING, OUTREACH, TEACHING

PHY 103: General Physics I, Teaching Assistant	2025
Princeton Towards an Inclusive Physics cOmmunity in graduaTe Students (TIPOTS), Mentor	2024 - Present
Princeton Women in Physics, Executive Board	2023 - Present
Princeton Physics EDI, Events Committee	2022 - 2024
Princeton Physics Mentorship, Mentor	2022 - 2024
<i>Mentored one to two undergraduate physics students each semester. Met at least once a semester to give career and academic advice.</i>	
CIS 110, Tutor	2021 - 2022
<i>Tutored two to three students weekly in CIS 110: Introduction to Computer Programming.</i>	
Side By Side Agency, Mentor	2021
<i>Mentored a student on her research project exploring astrophysics, advising her how to create a poster and conduct independent research.</i>	

SKILLS

Python, PyTorch, Jupyter, Git, MATLAB, Java, C++, ROOT, Mathematica, LaTeX, Linux