

Seth Bernstein

PhD Student, University of Michigan

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I am passionate about leveraging Human-Computer Interaction (HCI) and Large Language Models (LLMs) to enhance accessible and personalized education. My research focuses on using LLMs to scaffold code comprehension through personalized, culturally relevant explanations, providing inclusive learning experiences.

EDUCATION

University of Michigan

Doctor of Philosophy in Information

Advised By: Dr. Barbara Ericson

August 2025 — Present
Ann Arbor, Michigan

Temple University

Bachelor of Science in Computer Science

August 2021 — May 2025
Philadelphia, Pennsylvania

RESEARCH EXPERIENCE

Temple University Human–Computer Interaction Lab Research Lead

January 2023 — July 2025

- Led multiple research teams concurrently, ensuring effective collaboration and progress.
- Facilitated lab events and ran workshops, enhancing the research environment.
- Managed Temple University's RSF-REU program, overseeing research for undergraduate students.
- Mentored new researchers in critical reading techniques, aiding in their effective analysis of scientific literature.
- Organized and facilitated community events, engaging over 50 researchers within the lab.

Temple University Human–Computer Interaction Lab Research Assistant

March 2022 — January 2023

- Conducted literature reviews ensuring up-to-date knowledge of current publications.
- Actively participated in collaborative meetings with researchers from other universities.
- Identified and tracked emerging AI and LLM technologies, staying up-to-date knowledge of current publications.
- Collaborated on multiple research papers and posters by performing quantitative data analysis, conducting literature reviews, helping design experiments, and developing discussion sections.

PUBLICATIONS

- [1] Seth Bernstein, Ashfin Rahman, Nadia Sharifi, Ariunjargal Terbish, and Stephen MacNeil. 2025. Beyond the benefits: a systematic review of the harms and consequences of generative AI in computing education. In *Proceedings of the 25th Koli Calling International Conference on Computing Education Research (Koli Calling '25)*. Association for Computing Machinery, Koli, Finland, (Nov. 2025), 1–18. DOI: 10.1145/3769994.3770036.
- [2] Seth Bernstein, Paul Denny, Juho Leinonen, Stephen MacNeil, et al. 2024. "like a nesting doll": analyzing recursion analogies generated by cs students using large language models. In *Proceedings of the ITiCSE Conference*. DOI: 10.1145/3649217.3653533.
- [3] Seth Bernstein, Paul Denny, Juho Leinonen, Stephen MacNeil, et al. 2024. Analyzing students' preferences for llm-generated analogies. In *Proceedings of the ITiCSE Conference*. (July 2024). DOI: 10.1145/3649405.3659504.
- [4] Stephen MacNeil, Andrew Tran, Dan Mogil, Seth Bernstein, Erin Ross, and Ziheng Huang. 2022. Generating diverse code explanations using the gpt-3 large language model. In *Proceedings of the 2022 ACM Conference on International Computing Education Research - Volume 2* (ICER '22). Association for Computing Machinery, Lugano and Virtual Event, Switzerland, 37–39. ISBN: 9781450391955. DOI: 10.1145/3501709.3544280.
- [5] Juho Leinonen, Paul Denny, Stephen MacNeil, Sami Sarsa, Seth Bernstein, Joanne Kim, Andrew Tran, and Arto Hellas. 2023. Comparing code explanations created by students and large language models. In *Proceedings of the 2023 Conference on Innovation and Technology in Computer Science Education V. 1* (ITiCSE 2023). Association for Computing Machinery, Turku, Finland, 124–130. ISBN: 9798400701382. DOI: 10.1145/3587102.3588785.
- [6] Stephen MacNeil, Joanne Kim, Juho Leinonen, Paul Denny, Seth Bernstein, Brett A. Becker, Michel Wermelinger, Arto Hellas, Andrew Tran, Sami Sarsa, James Prather, and Viraj Kumar. 2023. The implications of large language models for cs teachers and students. In *Proceedings of the 54th ACM Technical Symposium on Computer Science Education V. 2* (SIGCSE 2023). Association for Computing Machinery, Toronto ON, Canada, 1255. ISBN: 9781450394338. DOI: 10.1145/3545947.3573358.
- [7] Stephen Macneil, Paul Denny, Andrew Tran, Juho Leinonen, Seth Bernstein, Arto Hellas, Sami Sarsa, and Joanne Kim. 2024. Decoding logic errors: a comparative study on bug detection by students and large language models. In *Proceedings of the 26th Australasian Computing Education Conference (ACE '24)*. Association for Computing Machinery, Sydney, NSW, Australia, 11–18. ISBN: 9798400716195. DOI: 10.1145/3636243.3636245.

- [8] Stephen MacNeil, Andrew Tran, Arto Hellas, Joanne Kim, Sami Sarsa, Paul Denny, Seth Bernstein, and Juho Leinonen. 2023. Experiences from using code explanations generated by large language models in a web software development e-book. In *Proceedings of the 54th ACM Technical Symposium on Computer Science Education V. 1* (SIGCSE 2023). Association for Computing Machinery, Toronto ON, Canada, 931–937. ISBN: 9781450394314. doi: 10.1145/3545945.3569785.
- [9] Stephen MacNeil, Andrew Tran, Juho Leinonen, Paul Denny, Joanne Kim, Arto Hellas, Seth Bernstein, and Sami Sarsa. 2023. Automatically generating cs learning materials with large language models. In *Proceedings of the 54th ACM Technical Symposium on Computer Science Education V. 2* (SIGCSE 2023). Association for Computing Machinery, Toronto ON, Canada, 1176. ISBN: 9781450394338. doi: 10.1145/3545947.3569630.
- [10] Stephen MacNeil, Andrew Tran, Joanne Kim, Ziheng Huang, Seth Bernstein, and Dan Mogil. 2023. Prompt middleware: mapping prompts for large language models to ui affordances. *arXiv preprint arXiv:2307.01142*.

SELECTED PROJECTS

Personalized Analogies (*Project Lead*)

- Investigated the use of ChatGPT to generate personally relevant analogies for explaining recursion.
- Analyzed analogies from 350+ first-year CS students using LLMs, investigating their diversity and effectiveness.
- Students enjoyed generating analogies and reported improved understanding and retention of recursion.
- Evaluated LLM-generated analogies for accuracy, interest, and usefulness in teaching computer science. Conducted statistical analysis to measure their effectiveness and impact on student learning and engagement.
- Showed LLM-generated analogies enhance student comprehension and engagement in computing education.

Beyond the Benefits (*Project Lead*)

- Led a team of four on a systematic review of harms and risks of generative AI in computing education.
- Reviewed and coded 224 papers from ACM DL, IEEE Xplore, and Scopus, following PRISMA guidelines.
- Developed a taxonomy of harms across cognitive, metacognitive, social, equity, and academic integrity.
- Identified gaps in empirical evidence and underexplored harms related to collaboration, belonging, and fairness.

SKILLS

- **Programming:** Python, JavaScript, R, HTML, CSS, Java, C, SAS, GIT
- **Technical:** LaTeX, Figma, Qualitative & Quantitative Data Analysis, Prototyping, Usability Testing
- **Soft Skills:** Leadership, Critical Thinking, Collaboration, Communication, Problem-Solving, Project Management, User-Centered Design

SERVICE

OwlHacks Hackathon Director

2023-2024

- Managed 30+ volunteers; oversaw sponsorships, logistics, and budgets for events with 250+ participants.
- Achieved over 100% participant growth from the first to the second hackathon organized.
- Coordinated with industry partners to secure sponsorships and resources.
- Organized workshops and mentoring sessions for participants.
- Ensured smooth operation of the event, including venue setup, registration, and judging.
- Facilitated collaboration among cross-functional teams to enhance participant experience.

President, Temple University Association for Computing Machinery

2023-2024

- **Award:** CIS Outstanding Student Leadership
 - Student who made significant contributions to the CIS organization and to the department
- Organized events for 50+ members, including socials, workshops, and talks.
- Managed a team of 10+ leaders; oversaw logistics, marketing, and content.
- Facilitated collaborations with industry professionals for guest lectures and networking events.
- Implemented new initiatives to increase member engagement and participation.
- Coordinated with university faculty to secure funding and resources for events.
- Developed and maintained a schedule of regular meetings and activities.

PROFESSIONAL EXPERIENCES

UI/UX Design Intern

Coded by

Philadelphia, United States

June 2023 - August 2023

- Led user research (surveys, interviews, observational studies) to identify pain points for new product design.
- Designed wireframes and interactive prototypes using Figma, aligning with user needs.
- Conducted usability tests with 50+ users, incorporating feedback to improve design quality.
- Collaborated with a cross-functional team to ensure seamless design integration and consistent user experience.
- Assisted in creating a design system to standardize UI components and enhance efficiency.
- Presented design concepts and research findings to senior management, advocating for user-centered design.
- Contributed to agile development sprints, ensuring timely delivery of project milestones.

SELECTED COURSES

- Human AI Interaction
- Introduction to Systems Programming and Operating Systems
- Data Structures and Algorithms
- Program Design and Abstraction
- Computer Systems and Low-Level Programming
- Mathematical Concepts in Computing I & II
- Software Design
- Modern Programming Languages: SAS
- Principles of Data Science
- Smart Sensing and Devices
- Securing the Internet of Things