

Seth Poulsen
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Education

Ph.D. Computer Science, NSF Graduate Research Fellow Expected July 2023
University of Illinois at Urbana-Champaign

- Computing Education
- Learning Analytics
- Artificial Intelligence in Education

B.S. Mathematics, summa cum laude April 2018
Brigham Young University

- Minor: Computer Science
- GPA: 4.0

Teaching Experience

Teaching Assistant—Introduction to Programming Spring 2022
UIUC Computer Science Department, Champaign, IL

Teaching Assistant—Discrete Mathematics Fall 2020, Spring 2021
UIUC Computer Science Department, Champaign, IL

Teaching Assistant—Calculus I Fall 2017
BYU Mathematics Department, Provo, UT

Industry Work Experience

Product Development Intern Summer 2022
The Art of Problem Solving, San Diego, CA

- Prototype AI tools for automatically grading student work using large language models
- Analyze education data to identify student difficulties and drive curriculum improvements

Software Development Engineer Summer 2017, May 2018 - August 2019
Amazon.com, inc., Seattle, WA

- Built accessibility features for Kindle reader applications
- Contributed to the launch of the Kindle Lite mobile application, used by millions of people
- Helped modernize the book-sampling experience on Amazon.com, launching with support for millions of electronic books

Research Students Mentored

- Mei Chen, B.S. '21. First Position: M.S. Data Science, NYU.
- Ridha Alkhabaz, B.S. '22. First Position: M.S. Computer Science, UIUC.

- Jason Xia, B.S. '22. First Position: Software Engineer, Duolingo.
- Jackson Ward, M.C.S. '22. First Position: Software Engineer, State Farm.

Academic Service

- Reviewer:
 - SIGCSE 2020, 2021, 2022, 2023
 - ITiCSE 2020, 2021
 - CHI 2022
 - FIE 2021
 - Computer Science Education special replication issue
- Peer Review of NSF Graduate Research Fellow Proposals: 2021, 2022
- Ambassador for Graduate Student Recruiting: 2020, 2021
- Organizer, Building Regional Community for Computing Education Graduate Students Workshop at the 2021 Consortium for Computing Sciences in Colleges Midwest Chapter (CCSC:MW)

Invited Talks

- *Psychometric Evaluation of the Cybersecurity Concept Inventory* University of Maryland, Baltimore County Cyber Defense Lab. September 2020.
- *Kindle Lite: Amazon's Smallest App and How We Made it Accessible to All.* Amazon.com Engineering Excellence Knowledge Tap Series, Seattle, WA. May 2019.

Awards

- Best Paper Runner-Up, ICER 2021
- 2nd Place, Student Research Competition, SIGCSE 2021
- NSF Graduate Research Fellowship, 2021 - present
- University of Illinois Andrew & Shana Laursen Fellowship, 2019
- Brigham Young University Full Tuition Scholarship, 2012, 2014 - 2018
- Session Winner, BYU Student Research Conference Spring 2016

Peer-reviewed Conference Publications¹

- [1] **Seth Poulsen**, Mahesh Viswanathan, Geoffrey L Herman, and Matthew West. Evaluating proof blocks problems as exam questions. In *Proceedings of the 17th ACM Conference on International Computing Education Research*, pages 157–168, 2021 **Best Paper Runner-up**.
- [2] Geoffrey L. Herman, Yucheng Jiang, Yueqi Jiang, **Seth Poulsen**, Mariana Silva, and Matthew West. An analytic comparison of student-scheduled and instructor-scheduled collaborative learning in online contexts. In *Proceedings of the 2022 American Society for Engineering Education Conference*. American Society for Engineering Education, 2022.
- [3] **Seth Poulsen**, Mahesh Viswanathan, Geoffrey L. Herman, and Matthew West. Proof blocks: Autogradable scaffolding activities for learning to write proofs. In *Proceedings of the 27th ACM*

¹My name in bold, students I mentored underlined.

Conference on Innovation and Technology in Computer Science Education Vol. 1, ITiCSE '22, page 428–434, New York, NY, USA, 2022. Association for Computing Machinery.

- [4] Morgan M Fong, **Seth Poulsen**, and Geoffrey L Herman. What's in a linked list? a phenomenographic study of data structure diagrams. In *2021 ASEE Virtual Annual Conference Content Access*, 2021.
- [5] Mei Chen, **Seth Poulsen**, Ridha Alkhabaz, and Abdussalam Alawini. A quantitative analysis of student solutions to graph database problems. In *Proceedings of the 26th ACM Conference on Innovation and Technology in Computer Science Education V. 1*, pages 283–289, 2021.
- [6] Ridha Alkhabaz, **Seth Poulsen**, Mei Chen, and Abdussalam Alawini. Insights from student solutions to mongodb homework problems. In *Proceedings of the 26th ACM Conference on Innovation and Technology in Computer Science Education V. 1*, pages 276–282, 2021.
- [7] Alan T Sherman, Geoffrey L Herman, Linda Oliva, Peter AH Peterson, Enis Golaszewski, **Seth Poulsen**, Travis Scheponik, and Akshita Gorti. Experiences and lessons learned creating and validating concept inventories for cybersecurity. In *National Cyber Summit*, pages 3–34. Springer, 2020.
- [8] **Seth Poulsen**, Liia Butler, Abdussalam Alawini, and Geoffrey L Herman. Insights from student solutions to sql homework problems. In *Proceedings of the 2020 ACM Conference on Innovation and Technology in Computer Science Education*, pages 404–410, 2020.

Peer-reviewed Journal Articles

- [9] Max Fowler, David H Smith IV, Mohammed Hassan, **Seth Poulsen**, Matthew West, and Craig Zilles. Reevaluating the relationship between explaining, tracing, and writing skills in cs1 in a replication study. *Computer Science Education*, pages 1–29, 2022.
- [10] **Seth Poulsen**, Geoffrey L Herman, Peter AH Peterson, Enis Golaszewski, Akshita Gorti, Linda Oliva, Travis Scheponik, and Alan T Sherman. Psychometric evaluation of the cybersecurity concept inventory. *ACM Trans. Comput. Educ.*, 22(1), oct 2021.
- [11] Courtney Hoagland, Stephen P. Humphries, Nathan Nicholson, and **Seth Poulsen**. Difference sets disjoint from a subgroup. *Graphs and Combinatorics*, Feb 2019.
- [12] **Seth Poulsen**. The effect of additional math in high school on college success. *The Mathematics Educator*, 28(2), 2019.

Peer-reviewed Workshop and Poster Presentations

- [13] Mei Chen, Seth Poulsen, Ridha Alkhabaz, and Abdussalam Alawini. A quantitative analysis of student solutions to graph database queries. In *Proceedings of the 52nd ACM Technical Symposium on Computer Science Education, SIGCSE '21*, page 1385, New York, NY, USA, 2021 **Student Research Competition Runner-up**.
- [14] **Seth Poulsen**, Shubhang Kulkarni, Geoffrey Herman, and Matthew West. Benchmarking partial credit grading algorithms for proof blocks problems. In *International Conference on Artificial Intelligence in Education*, pages 199–203. Springer, 2022.

- [15] **Seth Poulsen**, Matthew West, and Talia Ringer. Autogenerating natural language proofs for proof education. In *The Coq Workshop*, 2022.
- [16] **Seth Poulsen**, Carolyn J. Anderson, and Matthew West. The relationship between course scheduling and student performance. In *Proceedings of the 4th Workshop on Educational Data Mining in Computer Science Education*, 2020.
- [17] Joseph Jones, James Wasson, Sean Brown, **Seth Poulsen**, Peter Aldous, and Eric Mercer. Memory safety in c by abstract interpretation. *SIGSOFT Softw. Eng. Notes*, 43(4):56–56, January 2019.

Preprints

- [18] Aysa Fan, **Seth Poulsen**, Mariana Silva, and Matthew West. Integrating computational tools into a first course in linear algebra. in preparation.
- [19] **Seth Poulsen**, Binglin Chen, Craig Zilles, and Matthew West. Understanding why: Statistical techniques to infer causality are underused in computing education research. <https://sethpoulsen.github.io/papers/poulsen2020understanding.pdf>.
- [20] **Seth Poulsen**, Yael Gertner, Benjamin Cosman, Matthew West, and Geoffrey L. Herman. Learning gains of proof blocks versus written proofs. in submission.
- [21] **Seth Poulsen**, Shubhang Kulkarni, Geoffrey Herman, and Matthew West. Efficient partial credit grading of proof blocks problems. *arXiv preprint arXiv:2204.04196*, 2022.

Open Source

- Contributor and Maintainer:
 - PrairieLearn, a problem driven online learning system
- Contributor:
 - Runestone Interactive, tools and services for interactive educational materials
 - The Pyret Language, a functional programming language for education
 - Pycparser, a complete C99 parser in pure Python
 - Sympy, a Python library for symbolic mathematics

Programming Languages

Professional:

- | | |
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| <ul style="list-style-type: none">• Typescript• Javascript• C++• C• Python | <ul style="list-style-type: none">• Java• L^AT_EX• SQL• R |
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Proficient:

- Coq
- Haskell
- Racket

- Pyret
- Julia