Madeline Endres

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*Understanding and improving **software developer productivity and wellbeing***

Education _____

University of Michigan   *Aug. 2018 - May 2024*
Ph.D in Computer Science Engineering   *(Expected Graduation)*
- Advisor: Westley Weimer, Committee Members – Dr. Amir Kamil, Dr. Ranjit Jhala, Dr. Ioulia Kovelman
- Preliminary Examination – High Pass, Sept. 2019, Dissertation Proposal – To occur: November, 2023

University of Michigan   *Aug. 2013 - May 2018*
B.S. in Computer Science, B.M. in Cello Performance
- GPA 3.96, Awarded Highest Distinction (top 3% of graduating class)

Publications _____

16 peer-reviewed publications (+1 under review): 13 conference papers (ICSE, ESEC/FSE, PLDI, ASE, OOPSLA, etc.), 3 peer-reviewed workshop papers. 3 conference papers with undergraduate mentees as the first author.

Published Full Papers [Peer-Reviewed]:

Underlined and highlighted indicates undergraduate mentee, ✴*Indicates interdisciplinary collaborator*

[C13] Title Redacted for Conditionally Accepted Paper   *ICSE 2024*
He, W., M. Parikh, M., Weimer, W., **Endres, M.**
- Conditionally Accepted at the 46th IEEE/ACM International Conference on Software Engineering

[C12] Causal Relationships and Programming Outcomes: A Transcranial Magnetic Stimulation   *ICSE 2024*
Experiment
Ahmad, H., **Endres, M.,** Newman, K., Santiesteban, P., Shedden, E., Weimer, W.
- Accepted at the 46th IEEE/ACM International Conference on Software Engineering

[C11] A Four-Year Study of Student Contributions to OSS with a Lightweight Intervention   *ESEC/FSE 2023*
Fang, Z., **Endres, M**., Zimmermann, T., Ford, D., Weimer, W., Leach., K., Huang, Y
- 31st ACM Symposium on the Foundations of Software Engineering, 27% acceptance rate

[C10] From Organizations to Individuals: Psychoactive Substance Use By Professional   *ICSE 2023*
Programmers
Newman, K., **Endres, M**., Weimer, W., Johnson, B.
- 45th IEEE/ACM International Conference on Software Engineering, 26% acceptance rate

[C9] Seq2Parse: Neurosymbolic Parse Error Repair   *OOPSLA 2022*
Sakkas, G., **Endres, M**., Guo, P., Weimer, W., Jhala, R.
- OOPSLA issue of the Proceedings of the ACM on Programming Languages (PACMPL), 31% acceptance rate

[C8] Debugging with Stack Overflow: Web Search Behavior in Novice and Expert   *ICSE-SEET 2022*
Programmers
Li, A., **Endres, M**., Weimer, W.
- International Conference on Software Engineering, *Software Engineering Education and Training*, 34% acceptance rate

[C7] [Hashing It Out: A Survey of Programmers' Cannabis Usage, Perception, and Motivation](#)　　*ICSE 2022*

Endres, M., ✵ Boehnke, K., Weimer, W.

- 44th IEEE/ACM International Conference on Software Engineering, 26% acceptance rate

[C6] [To Read or To Rotate? Comparing the Effects of Technical Reading Training and Spatial](#) *ESEC/FSE 2021* [Skills Training on Novice Programming Ability](#)

Endres, M., ✵ Fansher, M., ✵ Shah, P., Weimer, W.

- 29th ACM Symposium on the Foundations of Software Engineering, 24% acceptance rate

[C5] [Relating Reading, Visualization, and Coding for New Programmers: A Neuroimaging Study](#)　*ICSE 2021*

Endres, M., Karas, Z., ✵ Hu, Z., ✵ Kovelman, I., Weimer, W.

- 43rd IEEE/ACM International Conference on Software Engineering, 22% acceptance rate

[C4] [An Analysis of Iterative and Recursive Problem Performance](#)　　　　　　*SIGCSE 2021*

Endres, M., Weimer, W., Kamil, A.

- 52nd ACM Technical Symposium on Computer Science Education, 31% acceptance rate

[C3] [Type Error Feedback via Analytic Program Repair](#)　　　　　　　　*PLDI 2020*

Sakkas, G., Endres, M., Cosman, B., Weimer, W., Jhala, R.

- 41st ACM SIGPLAN Conference on Programming Language Design and Implementation, 22% acceptance rate

[C2] [Pablo: Helping Novices Debug Python Code Through Data-Driven Fault Localization](#)　*SIGCSE 2020*

Cosman, B., Endres, M., Sakkas, G., Medvinsky, L., Yao-Yuan, Y., Jhala, R., Chaudhuri, K., Weimer, W.

- 51st ACM Technical Symposium on Computer Science Education, 31% acceptance rate

[C1] [InFix: Automatically Repairing Novice Program Inputs](#)　　　　　　　*ASE 2019*

Endres, M., Cosman, B., Sakkas, G., Jhala, R., Weimer, W.

- 34th IEEE/ACM International Conference on Automated Software Engineering, Main Research Track, 20% acceptance rate

Published Workshop Papers [Peer-Reviewed]

[W3] [An Analysis of Sex Differences in Computing Teaching Evaluations](#)　　*GE@ICSE 2022*

Santiesteban, P., Endres, M., Weimer, W.

- 3rd Workshop on Gender Equality, Diversity, and Inclusion in Software Engineering (GE)

[W2] [What can Program Repair Learn from Code Review?](#)　　　　　*APR@ICSE 2022*

Endres, M., Reiter, P., Forrest, S., Weimer, W.

- 3rd International Workshop on Automated Program Repair

[W1] [Making a Gamble: Recruiting Software Engineering Participants on a Budget](#)　*ROPES@ICSE 2022*

Endres, M., Weimer, W., Kamil, A.

- 1st Workshop on Recruiting Participants for Empirical Software Engineering

Non Peer-Reviewed arXiv Preprints:

[A1] [Formalizing Natural Language Intent into Program Specifications via Large Language Models](#)　*2023*

Endres, M., Fakhoury, S., Chakraborty, S., Lahiri, S.

Full Working and Under Submission Manuscripts:

These are submitted or previously-submitted full papers in various stages of peer review.

Can Large Language Models Transform Natural Language Intent into Formal Method Postconditions?

Endres, M., Fakhoury, S., Chakraborty, S., Lahiri, S. Under submission at *FSE* (Foundations of Software Engineering), 2024

The Impact of Cannabis Intoxication on Mobile Touchscreen Interaction

Endres, M., ✵ Kruger, D., Weimer, W. Planning resubmission in 2023

Fellowships

$138,000   NSF Graduate Research Fellowship, 2020-2023

Funding and Grants

Total Awarded (for which I wrote or co-wrote the majority of each proposal, see recommendation letters and/or ask my primary reference for more details): **$82,700**

$8,000   **National Science Foundation, REU Amendment to Award 2211749:** *Near Hardware Program Repair and Optimization.* An amendment to an NSF medium award to support undergraduate researchers in the lab. My responsibilities included proposal text writing (2023)

$10,000   **University of Michigan, XR Clinic:** *Extended Impact for Investigating Spatial Reasoning Training via Extended Reality.* Wrote proposal text and distributed funds (2023)

$1,400   **University of Michigan, Rackham International Travel Grant:** *Awarded for attending ICSE, 2023 in Melbourne, Australia.* I wrote and submitted the proposal materials (2023)

$8,000   **University of Michigan, Chronic Pain and Fatigue Research Center:** *Observational Study of Programming While Using Cannabis.* Responsibilities include proposal text writing (2022)

$25,000   **University of Michigan, XR Clinic:** *Investigating Spatial Reasoning Training via Extended Reality.* Responsibilities include proposal text writing (2020)

$24,300   **University of Michigan, Center for Academic Innovation:** *Investigating Spatial Reasoning Training for Introductory Computing.* Wrote proposal text and distributed funds (2020)

$6,000   **University of Michigan, Center for Research on Learning and Teaching:** *Investigating Spatial Reasoning Training for Introductory Computing.* Wrote proposal text and distributed funds (2020)

Teaching and Mentorship

Teaching — Traditional Classroom Instruction

10 Time Instructional (Teaching) Assistant, University of Michigan
• 6 unique courses, including the full introductory sequence and two upper-level courses. Enrollment ranged from 60-900
• Conducted office hours (10/10 semesters), Answered forum posts (10/10), Taught and developed weekly hour-long discussions with 30+ students (8/10), Developed exam/homework questions (7/10), Graded course materials (10/10)
• For course with available evaluation scores (Software Engineering), received above 4/5 on all 22 teaching questions
Specific Courses Taught

Software Engineering, EECS 481	*Winter 2018*
Programming Languages, EECS 490	*Fall 2016, Fall 2017*
Discrete Mathematics, EECS 203	*Spring 2017*
Programming and Introductory Data Structures, EECS 280	*Winter 2017*
Data Structures and Algorithms, EECS 281	*Spring 2016*
Elementary Programming, EECS 183	*Fall 2014, Winter 2015, Fall 2015, Winter 2016*

Programming Languages Course Development, University of Michigan   *Jan. 2017 - May 2017*
Pedagogy Design Directed Study
• Supervised by Professor Amir Kamil
• Collected data from undergraduate Programming Languages (EECS 490) the first semester that it was taught in 10 years
• Analyzed data and developed an improved syllabus used in subsequent semesters

TEACHING — SUPPLEMENTAL COURSE INSTRUCTION

Technical Reading for Computing, University of Michigan *Winter 2020*
- Designed and taught 10, 1.5-hour sessions to 30 computing students on how to read and understand scientific writing
- Students were also enrolled in *Elementary Programming* (EECS 183), saw *significant transfer to improved programming*

Developing Spatial Thinking, University of Michigan *Winter 2020*
- Taught 10, 1.5-hour sessions to 30 computing students of a pre-existing course for improving spatial skills
- Students were also enrolled in *Elementary Programming* (EECS 183), saw *significant spatial ability gains*

TEACHING TRAINING AND CONSULTING

Engineering Teaching Consultant, University of Michigan *Aug 2019 - Aug 2020*
- Position affiliated with Michigan's Center for Research on Learning and Teaching in Engineering
- I provided one-on-one teaching consultations (three meetings, each 1+ hr) with 10 instructors
- I facilitated 5 workshops for 80 graduate instructors on research-based best teaching practices; (e.g. *Facilitating Group Work to Maximize Learning* and *Guided Practice Teaching*)., Received uniformly positive reviews from attendees

UNDERGRADUATE RESEARCH MENTEES

Undergraduates for whom I was their **primary advisor**. Mentorship included how to select research topics (2/7), design a study (4/7), submit an IRB (5/7), recruit participants (5/7), collect data (7/7), analyze data (5/7), write scientific text (6/7), and prepare graduate school or industrial applications (6/7). Unless noted otherwise, had 1-2 individual meetings per week.

Wenxin He (UMich 2022, moved on to UMich Computer Science Masters, 2024) *Winter 2022 - Present*
    Advised on a research project on the impact of cannabis intoxication on programming ability. A **full conference paper** where Wenxin is first author is conditionally accepted **at ICSE 2024**.

Manasvi Parikh (UMich 2023, applying for CS PhD Positions) *Winter 2022 - Present*
    Assisted on research projects at the intersection of interface use and cannabis intoxication and on teaching spatial reasoning in VR. A **full conference paper** where Manasvi is an author conditionally accepted **at ICSE 2024**.

Yiannos Demetriou (UMich 2023, applying for MD-PhD Positions) *Winter 2021 - Present*
    Advised on a project about teaching spatial reasoning ability in VR with the **goal of submitting a full journal paper** where Yiannos is the first author.

Kaia Newman (UMich 2023, moved on to Carnegie Mellon, PhD in SE (*S3D*)) *Winter 2022 - Summer 2023*
    Advised on various projects, including one on the intersection of mental health, substance use, and software engineering. A **full conference paper** where Kaia is the first author was accepted for publication **at ICSE 2023**.

Annie Li (UMich 2022, moved on to Stripe Inc.) *Winter 2019 - Winter 2022*
    Advised, mentored, and collaborated on a project on searching on Stack Overflow**. A full conference paper** where Annie is the first author accepted for publication **at ICSE-SEET, 2022.**

Anne Fitzpatrick (UMich 2020, moved on to Atomic Object Inc.) *Winter 2019*
    Assisted a research project involving spatial reasoning ability and programming ability. Had weekly group meetings.

Serena Chan (UMich 2020, moved on to Google) *Winter 2019*
    Assisted a research project involving spatial reasoning ability and programming ability. Had weekly group meetings.

Service

INTERNATIONAL LEVEL — CONFERENCE AND JOURNAL REVIEWER

Technical Symposium on Computer Science Research (SIGCSE): *PC Member, 2024*
International Workshop on Automated Program Repair (APR@ICSE): *PC Member, 2023*
Empirical Software Engineering Journal: *Article Reviewer, 2022, 2023*
Mining Software Repositories (MSR): *Shadow PC Member, 2022*

International Level — Other

Dagstuhl Seminar Collector, *Foundations for a New Perspective of Understanding Programming,*   *Fall 2022*
- Took over **50 pages of notes** at the seminar during both participant talks and working groups
- **Wrote the first draft of the final seminar report** (see citation below) and **coordinated feedback** from participants
- **Integrated feedback** from participants and **submitted the final report** which was accepted by Dagstuhl for publication

Report from Dagstuhl Seminar 22402, Foundations for a New Perspective of Understanding Programming

Madeline Endres, André Brechmann, Bonita Sharif, Westley Weimer, Janet Siegmund

Department Level

University of Michigan Diversity Speaker Series Co-Organizer   Fall *2022 - Present*
- One of two co-organizers of department-funded speaker series with one speaker per semester (one hosted so far, a second arriving in December, 2023)
- Duties include selecting potential speakers; arranging travel, lodging and catering, advertising the talk and small group meetings; day-of logistics; and collecting feedback
- Organized talk and small group meetings attended by over 70 students and faculty, well over departmental average for invited speakers. Event received universally positive feedback (4 or greater on a 7-point likert scale)

Inclusive Teaching Training (Computer Science Department, University of Michigan)   Winter *2019 - Present*
- Facilitated 15, 90-minute seminars for around 200 EECS Instructional Assistants
- Helped design curriculum during inaugural semester, subsequently permanently adopted by CS department (has served almost 800 graduate and undergraduate teaching assistants, see https://cares.engin.umich.edu/inclusive-teaching-training/)

Student Doctoral Admissions Application Reviewer   Winter *2023*
- Read and evaluated 10 applications for Michigan's PhD program

Community Level: Computer Science Outreach

Guest Lecturer, Tech For Social Good Student Organization   *Ann Arbor, MI*
- Gave talk on my educational experiences and cannabis research, 20 attendees   *Fall 2021*

Guest Lecturer, Girls Who Code   *Ann Arbor, MI*
- Gave talk on my experiences as a CS researcher to around 20 high school girls learning to code   *Nov. 2018*

Computer Science Teacher, 7 Mile Coding   *Detroit, MI*
- Helped design and teach free coding lessons for disadvantaged youths (around 30 attendees)   *Jan 2018 - April 2018*

Research and other Relevant Work Experience

Academic Research

Graduate Research Assistant, University of Michigan   *Ann Arbor, MI*
- Supervised by Professor Westley Weimer   *Aug. 2018 - Present*
- Conducted research projects related to human aspects of automated program repair, the cognitive processes of programming, and the impact of psychoactive substances on programming (16 published manuscripts)
- Conducted **human studies of programming** tools and practices; 11 IRB protocols, 1,250 remote, 210 in-person participants
- **Collaborated with the Programming Systems Group at UCSD** (Ranjit Jhala's group, 2018-Present)
    - Designed and conducted 5 human evaluations for various programming tools, 4 accepted publications
- Led **interdisciplinary collaborations** with researchers in Michigan's Department of Psychology (2020-Present) and Michigan's Chronic Pain and Fatigue Research Center (2021-Present)
    - Duties included generating and building consensus around interdisciplinary research questions
    - 4 submitted publications, 3 accepted as of November 2022 (3 to top tier venus)

- Organized and Managed Activities for a Multi-institutional and Multinational Air Force Grant (ARFL, Dec 2021-Dec 2022)
    - Duties included managing other researchers to meet technical milestones (met 2/2 milestones under my tenure)
    - Organized and ran 10 monthly multinational meetings, with participants from both Singapore and the US

Research Intern, CISPA Helmholtz Center for Information Security   *Saarbrücken, Saarland, Germany*
- Supervised by Professor Andreas Zeller   *Oct. 2020 - Dec. 2020*
- GitHub mining project investigating successful Jupyter Notebooks (analyzed 300,000 files from 19,000 repositories)

Industrial Research

Research Intern, Microsoft Research – Research in Software Engineering (RiSE) team   *Redmond, WA*
- Supervised by Postdoctoral Researcher Dr. Sarah Fakhoury, Senior Principal Researcher Dr. Shuvendu Lahiri   *Summer 2023*
- Project exploring the use of Large Language Models for generating formal specifications from informal natural language
    - Resulted in the submission of a full research paper to FSE, 2024, arXiv preprint: https://arxiv.org/abs/2310.01831

Computer Science Intern, The MITRE Corporation   *Ann Arbor, MI*
- Worked on various research, data analysis, and software development projects   *May 2017 - Sep. 2017*
- Awarded a MITRE **Special Recognition Award for work on TIREM** (Terrain Integrated Rough Earth Model)
    - TIREM estimates radio propagation loss between points on a spherical earth with rough terrain
    - Exposed and fixed inconsistencies in legacy versions of TIREM, **saving MITRE an estimated $125,000**

Industrial Outreach and Media Coverage _____

Developer-Facing Talks

Hashing it Out? Understanding Psychoactive Substance Use in Programming *St Louis, Missouri; September, 2022*
Papers We Love Conference (Co-located with StrangeLoop Developer Conference)
- Invited 40-minute talk, 200 Attendees, recording: https://pwlconf.org/2022/madeline-endres/

Selected Online Articles

University of Michigan Computing Research News: *Study explores drug use in programming jobs, tension between policy and reality,* May 25, 2023, link: http://bit.ly/42oiFsq
VeriHeal: *Study Shows That Programmers Embrace Cannabis—But Not for Wellness,* Ashley Priest, February 7th, 2022, link: http://bit.ly/3VusFNG
Marijuana Moment: *One-Third Of Programmers Use Marijuana While Working, With Many Touting Creative Benefits, Study Finds,* Kyle Jaeger, December 27, 2021, link: http://bit.ly/3GTFJbm
University of Michigan Computing Research News: *Exploring faster ways to think like a software developer,* November 17, 2021, link: http://bit.ly/3VvuHxP

Social Media Discussions

Reddit: r/technology
- Programming and cannabis research, 6.8 thousand up-votes, *2022,* 535 comments, link: http://bit.ly/3Vf3ZJx
Hacker News
- Programming and psychoactive substances research, 123 up-votes, 121 comments, *2023,* link: https://bit.ly/48Hp9Hq
- Programming and cannabis research, 161 up-votes, 256 comments, *2022,* link: http://bit.ly/3EJKbXO

Primary Reference: Westley Weimer, Full Professor of Computer Science, University of Michigan (weimerw@umich.edu)
Secondary Reference: Ranjit Jhala, Professor of Computer Science, University of California, San Diego (jhala@cs.ucsd.edu)
Additional references available upon request