

Madeline Endres

Computer Science and Engineering • University of Michigan

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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] Causal Relationships and Programming Outcomes: A Transcranial Magnetic Stimulation Experiment ICSE 2024

AHMAD, H., **ENDRES, M.**, NEWMAN, K., SANTIESTEBAN, P., SHEDDEN, E., WEIMER, W.

- Accepted at the 46th IEEE/ACM International Conference on Software Engineering

[C12] 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

[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 Programmers ICSE 2023

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 Programmers ICSE-SEET 2022

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 Skills Training on Novice Programming Ability **ESEC/FSE 2021****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**SANTISTEBAN, 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.***Title redacted for under submission paper****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

Aug. 2018 - Present

- Supervised by Professor Westley Weimer
- 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 venues)

- 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