Madeline Endres

Computer Science and Engineering • University of Michigan

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*Combining **software engineering** with human factors and **programming languages** techniques to improve **programmer 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. Ranjit Jhala, Dr. Amir Kamil, Dr. Ioulia Kovelman
- Advancement to Candidacy Examination – High Pass, Sept. 2019

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: 13 conference papers (ICSE, ESEC/FSE, PLDI, ASE, OOPSLA, etc.) including distinguished paper awards at ESEC/FSE and ICSE, 3 peer-reviewed workshop papers. Four papers with undergraduate advisees, including three with student first authors. Three papers with interdisciplinary collaborators.

PUBLISHED FULL PAPERS [PEER-REVIEWED]: *Underlined and highlighted* indicates undergraduate mentee, ✳ Indicates interdisciplinary collaborator, 🏆indicates best paper award

[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
- 🏆 Received a distinguished paper award (given to 10% of papers)

[C12] High Expectations: an Observational Study of Programming and Cannabis Intoxication   *ICSE 2024*

HE, W., M. PARIKH, M., WEIMER, W., **ENDRES, M**
- 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,
- 🏆 Received a distinguished paper award (given to 9% of papers, 12/127)

[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*

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.

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)
Other References: Ranjit Jhala, Professor of Computer Science, University of California, San Diego (rjhala@ucsd.edu),
Shuvendu Lahiri, Senior Principal Researcher at Microsoft Research (Shuvendu.Lahiri@microsoft.com)
Additional references available upon request