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Melissa Chen

PHD STUDENT
HUMAN-COMPUTER INTERACTION & COMPUTING EDUCATION

Research Interests

I study how to design sociotechnical systems to support introductory computing students' self-efficacy, with a focus on helping students make accurate evaluations of their programming abilities. I leverage theories and methods from design-based research, human-computer interaction, computing education, and learning sciences.

Education

Sept 2022 – Present
Northwestern University
PhD in Computer Science
Studying human-computer interaction and computing education, advised by Dr. Eleanor O'Rourke in the Delta Lab

Aug 2018 – May 2022
University of Illinois at Urbana-Champaign
BS in Computer Science, minor in Mathematics
Graduated with Highest Honors & as a Distinguished Chancellor's Scholar

Research projects

Sept 2022 – Present
Delta Lab, Northwestern University
Graduate Researcher, advised by Dr. Eleanor O'Rourke

Co-designing scalable interventions for student self-assessments (co-advised by Dr. Duri Long)

- Created and led workshops to co-design classroom-based interventions with introductory computing students and instructors to address students' overly negative self-assessments of their programming abilities
- Collaborating with co-design partners to design, deploy, and evaluate classroom-based interventions

Reasons for students' self-assessments of programming ability

- Designed, conducted, and analyzed qualitative data from longitudinal interviews to understand why students negatively evaluate their programming abilities in common moments in the programming process

Sociotechnical interventions for students' self-assessments

- Conducted design-based research to iteratively build and test AI-driven, IDE-based real-time feedback tool
- Conducted user studies with introductory computing students to understand perception and usage of tools
- Designed and conducted five-week workshop with introductory computing students to test discussion-based intervention and co-design trustworthy interventions

Aug 2021 – May 2022 **ORCHID Lab**, University of Illinois at Urbana-Champaign
Undergraduate Researcher, advised by Dr. Brian Bailey

Disparities by gender in self and peer evaluations in group work

- Designed data visualizations and conducted statistical testing to understand disparities in students' self and peer evaluations
- Connected results to theories from CSCW and sociology research

Jan 2021 – May 2022 **National Center for Supercomputing Applications**, University of Illinois at Urbana-Champaign
Undergraduate Research Intern, advised by Dr. Kaiyu Guan

Impact of data qualities on model classification accuracy

- Experimented with how data qualities (e.g., color vs. grayscale) impacted model classification accuracy for streetview images of crop field tillage

Crop field grassway segmentation using NAIP satellite imagery

- Implemented and tested a novel approach using unsupervised clustering to segment satellite images of crop fields into crop and non-crop types to use as training data for a supervised model

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Publications

Peer-reviewed conference papers

Chen, M., Li, Y., O'Rourke, E.. 2024. Understanding the Reasoning Behind Students' Self-Assessments of Ability in Introductory Computer Science Courses. *ACM Conference on International Computing Education Research.* **Winner: Best Paper Award**

Li, Y. , **Chen, M.**, Hunt, A., Zhang, H., and O'Rourke, E. 2024. Exploring the Interplay of Metacognition, Affect, and Behaviors in an Introductory Computer Science Course for Non-Majors. *ACM Conference on International Computing Education Research.*

Editorially reviewed posters (archival)

Chen, M. and O'Rourke, E. 2023. Designing a Real-Time Intervention to Address Negative Self-Assessments While Programming. *ACM Conference on International Computing Education Research.*

Other Posters

Chen, M. and O'Rourke, E. Towards a real-time intervention to encourage beginners to develop accurate beliefs about programming ability. *CRA-WP Grad Cohort for Women 2023.*

Chen, M. and O'Rourke, E. Towards a real-time intervention to encourage beginners to develop accurate beliefs about programming ability. *2022 Lambert Conference on the Future of Human-Computer Interaction and Design*.

Chen, M., Shi, W., and Bailey, B. Disparities by Gender in Self and Peer Evaluations. *University of Illinois Undergraduate Research Symposium. 2022.*

Chen, M., Jong, M. Producing Training Data for Supervised Learning on Satellite Data. *National Center for Supercomputing Applications SPIN Poster Session. 2022.*

Chen, M., Zhao, K., Huang, Y. Crop Field Grassway Segmentation Using NAIP Satellite Imagery. *National Center for Supercomputing Applications SPIN Poster Session. 2021.*

Talks

Understanding the Reasoning Behind Students' Self-Assessments of Ability in Introductory Computer Science Courses. *Conference Talk. ICER 2024.*

Towards Scalable Interventions for CS1 Student Self-efficacy. *Presentation. Design Research Cluste Fellowship, Northwestern University Center for Human-Computer Interaction and Design. 2024.*

Designing a Real-Time Intervention to Address Negative Self-Assessments While Programming. *Lightning Talk. ICER 2023.*

Selected Awards & Honors

2024 - 2029 **National Science Foundation Graduate Research Fellowship**
Three years of funding awarded to outstanding graduate students in STEM

2024 **ACM ICER 2024 Best Paper Award**
Awarded to one paper per year by the ICER awards committee

2024 **Northwestern CS Department Student Hero Award**
Awarded for service to the department community

2023 - 2024 **Northwestern HCI+D Design Research Cluster Fellowship**
Two quarters of funding awarded to graduate students to engage in design research projects with mentorship from faculty and senior fellow

2023 **ACM-W Research Computer Science Conference Scholarship**
Funded to attend SIGCSE Technical Symposium 2023

2022 - 2023 **Northwestern Incoming Cognitive Science Fellowship**
Awarded to six students in cognitive science-related fields

2020 **Illinois CS Outstanding Course Assistant Award**
Nominated by course professor and selected by the department based on service as undergraduate course assistant

Teaching experience

Fall 2024 **COMP_SCI 401: Introduction to Graduate Studies**, Northwestern University
Graduate Teaching Assistant, Computer Science

Spring 2020, Fall 2020, Spring 2021, Fall 2021, Spring 2022 **CS 233: Computer Architecture,** University of Illinois at Urbana-Champaign
Undergraduate Course Assistant, Computer Science

- Facilitated in-class group work activities by answering student questions and clarifying course content
- Adapted homework and exam questions to online format to support student learning in the virtual and hybrid settings
- Held office hours to debug and answer questions about labs covering various course concepts

Spring 2019, Fall 2019 **CS 196: Freshman Honors**, University of Illinois at Urbana-Champaign
Undergraduate Course Assistant, Computer Science

- Managed two groups of students (2-4 students each) working on semester-long, full-stack projects by providing guidance on group work skills, project planning, and technical implementation

Service

Diversity & Inclusion

2023 - Present **Committee Chair,** NU Graduate Society of Women Engineers
2022 - Present **Co-chair / Co-organizer**, NU Graduate Women in Computing
2022 - 2023 **General Board Member,** NU Women in Science and Engineering Research
2021 - 2022 **CS Student Ambassador / Research Scholar,** Illinois Computer Science
2021 **Orientation CS Department Lead Mentor**, Illinois Women in Engineering
2020 - 2022 **Officer,** Illinois Women in Computer Science
2019 - 2022 **Curriculum Planning Co-lead & Facilitator,** Illinois Girls Who Code

Student Support & Advocacy

2024 **Board Member & Cohort Facilitator,** ResilientNU
2023 - Present **Board Member,** NU Computer Science PhD Advisory Council
2023 - 2024 **Member,** NU CS PhD Visit Day & Orientation Organizing Committees
2019 – 2022 **Member,** Illinois Computer Science Student Leadership Council

Community Building

2023 **Co-organizer / Co-founder,** Computer Science Education Reading Group
2020 **Content Co-chair,** Reflections | Projections Student-Run Tech Conference
2019 - 2020 **Co-director,** HackIllinois Student-Run Open Source Hackathon

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Industry Experience

May 2022 – Aug 2022
Lyft, Remote
Software Engineering Intern & Lyftern Advisory Council Member, Lyft Pink & Memberships Team

- Redesigned existing framework to produce faster, consistent results to improve the user and developer experience
- Presented design documents and presentations to communicate project plans and outcomes to cross-functional stakeholders
- Co-coordinated two projects for interns to network across locations and practice presentation skills and provided input on intern programming

May 2021 – Aug 2021
Lyft, Remote
Software Engineering Intern, Integrity Team

- Leveraged existing infrastructure to create a P0 version of a feature to put Lyft in line with card network expectations
- Collaborated with cross-functional partners in analytics, data science, product, operations, and engineering to finalize implementation details and understand impacts of designs

May 2020 – Aug 2020
Facebook, Remote
Software Engineering Intern, Privacy Infrastructure Team

- Developed a new framework to test feature extractors used to detect user-identifiable information and created an intuitive user interface to expedite feature extractor development and decrease experiment runtime by half

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Other Experience

Mar 2024 – June 2024

Northwestern – Evanston Township High School Partnership Office, Evanston, IL
Gradate Engagement Opportunities Program Practicum Student

- Conducted focus groups and analyzed qualitative data to elevate student voices and experiences as a part of program evaluation for the Women in STEM student club
- Connecting Northwestern faculty and ETHS teachers towards developing more inclusive and supportive computing curricula

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Professional Development

Reflective & Effective Teaching 2023-2024, Searle Center for Advanced Learning and Teaching

Graduate Cohort for Women 2023, Computing Research Association
Computer Science Research Mentorship Program, Google
Tau Beta Pi Engineering Honors Society (Illinois Alpha Chapter)