Michael Xieyang Liu

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RESEARCH FOCUS

My research is at the intersection of human-computer interaction (HCI), programming tools, sensemaking, intelligent user interfaces, and human-AI interaction, where I design and build systems that accelerate online sensemaking for developers and facilitate human-AI interactions for end-users.

PROFESSIONAL EXPERIENCE

Google PAIR, Research Scientist — 2023 - present

Microsoft Research, Research Intern — 2022
with Advait Sarkar, Carina Negreanu, Jack Williams, Andy Gordon, and Ben Zorn
Natural language interactions for end-user programmers using code-generating LLMs.

Google, UX Research Intern — 2020
with Dustin Smith, Todd Kulesza, and Sarah D'Angelo
Go developers' refactoring practices and engagement with refactoring tools.

Bosch Research, Research Intern — 2019
with Lisa Yu, Wan-Yi Lin, and Alessandro Oltramari
Crowdsourcing & AI techniques for improving the safety and performance of autonomous vehicles.

EDUCATION

Ph.D. in Human-Computer Interaction — 2017 - 2023
Carnegie Mellon University, Pittsburgh, PA, USA
Thesis: Tool Support for Knowledge Foraging, Structuring, and Transfer during Online Sensemaking
Committee: Brad A. Myers, Aniket Kittur, Kenneth Holstein, Daniel M. Russell

M.S. in Human-Computer Interaction — 2017 - 2021
Carnegie Mellon University, Pittsburgh, PA, USA

B.S. in Computer Science — 2013 - 2017
University of Michigan, Ann Arbor, MI, USA

PUBLICATIONS

Peer-reviewed Conference Papers

C14. **Michael Xieyang Liu**, Tongshuang Wu, Tianying Chen, Franklin Mingzhe Li, Aniket Kittur, Brad A. Myers. **Selenite: Scaffolding Online Sensemaking with Comprehensive Overviews Elicited from Large Language Models**. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI 2024).*

C13. Franklin Mingzhe Li, **Michael Xieyang Liu**, Shaun K. Kane, Patrick Carrington. **A Contextual Inquiry of People with Vision Impairments in Cooking**. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI 2024).*

C12. **Michael Xieyang Liu**, Advait Sarkar, Carina Negreanu, Ben Zorn, Jack Williams, Neil Toronto, Andrew D. Gordon. **"What It Wants Me To Say": Bridging the Abstraction Gap Between End-User Programmers and Code-Generating Large Language Models**. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI 2023).*
Best Paper Honorable Mention Award

C11. Tianying Chen, **Michael Xieyang Liu**, Emily Ding, Emma O'Neil, Mansi Agarwal, Robert E. Kraut, Laura Dabbish. **Facilitating Counselor Reflective Learning With a Real-time Annotation Tool**. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI 2023).*

C10. **Michael Xieyang Liu**, Andrew Kuznetsov, Yongsung Kim, Joseph Chee Chang, Aniket Kittur, Brad A. Myers. **Wigglite: Low-cost Information Collection and Triage**. *Proceedings of the 35th Annual ACM Symposium on User Interface Software and Technology (UIST 2022).*

C9. Franklin Mingzhe Li, **Michael Xieyang Liu**, Yang Zhang, Patrick Carrington. **Freedom to Choose: Understanding Input Modality Preferences of People with Upper-body Motor Impairments for Activities of Daily Living**. *Proceedings of the 24th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS 2022).*

C8. **Michael Xieyang Liu**, Aniket Kittur, Brad A. Myers. **Crystalline: Lowering the Cost for Developers to Collect and Organize Information for Decision Making**. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI 2022).*

C7. Amber Horvath, **Michael Xieyang Liu**, River Hendriksen, Connor Shannon, Emma Paterson, Kazi Jawad, Andrew Macvean, Brad A. Myers. **Understanding How Programmers Can Use Annotations on Documentation**. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI 2022).*

C6. **Michael Xieyang Liu**, Aniket Kittur, Brad A. Myers. **To Reuse or Not To Reuse? A Framework and System for Evaluating Summarized Knowledge**. *Proceedings of the ACM on Human-Computer Interaction. 5, CSCW1, Article 166 (April 2021) (CSCW 2021).*
Best Paper Award and **CMU SCS News Coverage**

C5. Joseph Chee Chang, Yongsung Kim, Victor Miller, **Michael Xieyang Liu**, Brad A. Myers, Aniket Kittur. **Tabs.do: Task-Centric Browser Tab Management**. *Proceedings of the 34th Annual ACM Symposium on User Interface Software and Technology (UIST 2021).*

C4. Alex Reinhart, Logan Brooks, Maria Jahja, Aaron Rumack, Jingjing Tang, [et al., including **Michael Xieyang Liu**]. **An open repository of real-time COVID-19 indicators**. *Proceedings of the National Academy of Sciences (PNAS 2021).*
CMU COVIDCast Website

C3. **Michael Xieyang Liu**, Jane Hsieh, Nathan Hahn, Angelina Zhou, Emily Deng, Shaun Burley, Cynthia Taylor, Aniket Kittur, Brad A. Myers. **Unakite: Scaffolding Developers' Decision-Making Using the Web**. *Proceedings of the 32nd Annual ACM Symposium on User Interface Software and Technology (UIST 2019).*
Best Paper Honorable Mention Award

C2. Jean Y. Song, Stephan J. Lemmer, **Michael Xieyang Liu**, Shiyan Yan, Juho Kim, Jason J. Corso, Walter S. Lasecki. **Popup: Reconstructing 3D Video Using Particle Filtering to Aggregate Crowd Responses**. *Proceedings of the 24th Annual ACM International Conference on Intelligent UserInterfaces (IUI 2019).*

C1. Yu-Wei Chao, Yunfan Liu, **Xieyang Liu**, Huayi Zeng, Jia Deng. **Learning to Detect Human-Object Interactions**. *2018 IEEE Winter Conference on Applications of Computer Vision (WACV 2018).*

Workshop Papers & Posters

W3. Jane Hsieh, **Michael Xieyang Liu**, Brad A. Myers, Aniket Kittur. **An Exploratory Study of Web Foraging to Understand and Support Programming Decisions**. *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC 2018).*

W2. **Michael Xieyang Liu**, Nathan Hahn, Angelina Zhou, Shaun Burley, Emily Deng, Aniket Kittur, Brad A. Myers. **UNAKITE: Support Developers for Capturing and Persisting Design Rationales When Solving Problems Using Web Resources**. *DTSHPS'18 Workshop on Designing Technologies to Support Human Problem Solving, IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC 2018).*

W1. **Michael Xieyang Liu**, Shaun Burley, Emily Deng, Angelina Zhou, Aniket Kittur, Brad A. Myers. **Supporting Knowledge Acceleration for Programming from a Sensemaking Perspective**. *Sensemaking Workshop @ CHI Conference on Human Factors in Computing Systems (CHI 2018).*

Patent

P2. Ben Zorn, Carina Negreanu, Advait Sarkar, Andrew Gordon, Jack Williams, **Michael Xieyang Liu**, Neil Toronto, Sruti Srinivasa Ragavan. **Generation of Interactive Utterances of Code Tasks**. *US Patent (submitted), 2022*

P1. Aniket Kittur, Brad A. Myers, **Michael Xieyang Liu**. **Multidirectional Gesturing for OnDisplay Item Identification and/or Further Action Control**. *US Patent PCT/US2022/043604 (submitted), 2022*

Invited Talks & Guest Lectures

Building AI Sensemaking Systems — Dec. 2023
University of Zürich

Bridging the Abstraction Gap Between End-User Programmers and Code-Generating Large Language Models — Sept. 2023
Viginia Tech

Accelerating Programming Sensemaking with Human-Centered Interactive Systems — Mar. 2023
Apple AI/ML, Microsoft Research

Accelerating Sensemaking with Human-Centered Interactive Systems — Feb. 2023
Google Research, Allen Institute for Artificial Intelligence (AI2)

Bridging the Abstraction Gap Between End-User Programmers and Code-Generating Large Language Models — Aug. 2022
Microsoft Research

Understanding Refactoring with Golang — Aug. 2020
Google Cloud DevEx Presentation

Supporting Knowledge Acceleration for Programming from a Sensemaking Perspective — April 2018
Sensemaking Workshop at CHI Conference on Human Factors in Computing Systems

OPEN-SOURCE EXPERIENCE

Vertical Tabs Chrome Extension — 2019 - present
36.9k users on the Chrome Web Store; 400+ ★ on GitHub (as of Feb. 2024)

Chrome extension boilerplate (w/ React & Webpack) — 2019 - present
3.1k ★, 980+ on GitHub (as of Feb. 2024); powering startups such as HyperWrite AI

RESEARCH EXPERIENCE

Graduate Research Assistant (advised by Brad A. Myers & Aniket Kittur) 2017 - 2023
Human-Computer Interaction Institute, Carnegie Mellon University
Worked on prototype systems that scaffold developers in making decisions using information from various web sources and enable subsequent developers to learn, understand, and reuse those decisions and rationales.

Research Assistant (with Jodi Forlizzi, Roni Rosenfeld & Ryan Tibshirani) 2020 - 2021
Delphi Research Group, Carnegie Mellon University
Worked on the visualization team of the COVIDcast system, which displays indicators related to COVID-19 activity level across the U.S. These indicators are derived from a variety of anonymized, aggregated data sources made available by multiple partners, including Facebook, Google, and Quidel. [Press coverage]

Undergraduate Researcher 2016 - 2017
Crowds and Machines Lab, University of Michigan, Ann Arbor
Worked on crowd & AI-powered interdisciplinary projects that address novel and promising research questions.

Research Assistant (advised by Jia Deng) 2015 - 2016
Vision & Learning Lab, University of Michigan, Ann Arbor
Worked on a computer vision based toolkit that boosts performance on human-object interaction detection by exploiting human-object spatial relations.

SELECTED HONORS, GRANTS, AWARDS & COVERAGE

Best Paper Honorable Mention Award, ACM CHI Conference on Human Factors in Computing Systems (CHI 2023) — April 2023

Special Recognitions for Outstanding Reviews, ACM CHI Conference on Human Factors in Computing Systems (CHI 2023) — Nov. 2022

CMU SCS News Coverage on our CSCW 2021 Best Paper: "CMU Researchers Develop Tool To Help Determine When To Reuse Content" — Nov. 2021

Best Paper Award, 24th ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW 2021) — Oct. 2021

Special Recognitions for Outstanding Reviews, 34th Annual ACM Symposium on User Interface Software and Technology (UIST 2021) — June 2021

CMU News Coverage on COVIDcast: "Carnegie Mellon Unveils Five Interactive COVID-19 Maps" — April 2020

Best Paper Honorable Mention Award, 32nd Annual ACM Symposium on User Interface Software and Technology (UIST 2019) — Oct. 2019

SHF: Small: Knowledge Acceleration for Programming (*$500,000 over 3 years)*, NSF — June 2018

James B. Angell Scholar, 94th Annual Honors Convocation, University of Michigan — March 2017

EECS Scholar Award, 2017 EECS Honors & Awards Reception, University of Michigan — March 2017

Summer Undergraduate Research Experience (SURE) program, University of Michigan — May 2016

Tang-Junyuan Fellowship (Top 2/250, *$50,000)*, UM-SJTU Joint Institute — July 2015, July 2016

Dean's List, University of Michigan — Dec. 2015, April 2016

Basic Teaching Assistant Certificate, Center for Learning and Teaching, UM-SJTU Joint Institute — Aug. 2015

Dean's List, UM-SJTU Joint Institute — 2013 - 2015

Fellowship for Outstanding Academic Performance, Shanghai Jiao Tong University — June 2015

Meritorious Winner (Acceptance: 9%), COMAP Mathematical Contest in Modeling April 2015

MENTORING

Jane Hsieh 2018 - 2019
Oberlin College Student (Currently a CMU S3D Ph.D. Candidate)
Studied programmers' web-foraging behaviors. Contributed to the development of the Unakite system.

Emily Deng 2017 - 2018
CMU Master's Student
Designed and carried out interview studies with programmers that probe their programming behaviors and needs.

Shaun Burley 2017 - 2018
CMU Master's Student
Designed and carried out interview studies with programmers that probe their programming behaviors and needs.

TEACHING EXPERIENCE

Teaching Assistant – 05-410/05-610 User-Centered Research & Evaluation Fall 2020
Human-Computer Interaction Institute, Carnegie Mellon University

Teaching Assistant – 05-431/05-631 Software Structures for User Interfaces Fall 2020
Human-Computer Interaction Institute, Carnegie Mellon University

Teaching Assistant – 05-430/05-630 Programming Usable Interfaces Fall 2019
Human-Computer Interaction Institute, Carnegie Mellon University

Instructional Aide – EECS484 Database Management Systems Winter 2017
University of Michigan, Ann Arbor

Instructional Aide – EECS484 Database Management Systems Fall 2016
University of Michigan, Ann Arbor

Teaching Assistant – Vv255 Multivariate Calculus Summer 2015
University of Michigan – Shanghai Jiao Tong University Joint Institute

SERVICE

Academic Service

Associate Chair	**ACM CHI** 2024 Computational Interaction subcommittee **ACM CHI** 2020 Late Breaking Work Track
Paper Reviewing	**Conferences: CHI** (2019 - 2024), **CSCW** (2019 - 2023), **UIST** (2019 - 2022), **IUI** (2020, 2023), **VAST** (2020) **Journal: TOCHI** (2022) 🎗 *Special Recognitions for Outstanding Reviews: **UIST** (2021), **CHI** (2023)*

Community Service

Committee Member	Ph.D. Admission committee (2022-2023)
Committee Member	REU (Research Experience for Undergraduate) Admissions Committee (2021-2022)
Committee Member	CMU HCII Faculty Lunch Organization Committee (2019-2020)
Committee Member	CMU HCII Ph.D. Student Lounge Committee (2019-2020)

LANGUAGES, TECHNICAL SKILLS & COURSES

Languages	**English**, **Chinese (Mandarin)** - Native or bilingual proficiency, **German** - Limited working proficiency
Programming	HTML/Javascript/CSS, Python, SQL, C/C++, Swift, Java, LaTeX, etc.
Web & App Development	React.js, Angular, Redux, Bootstrap, Node.js, PHP, Ionic Framework, etc.
Deep Learning & AI	PyTorch, Tensorflow, ml5.js
Courses	Machine Learning, Deep Learning, Advanced User Interfaces, Database Management Systems, Information Security, Web Development