

# Michael Xieyang Liu

People + AI Research (PAIR), Google DeepMind

✉ [lxieyang@google.com](mailto:lxieyang@google.com) | 🏠 [lxieyang.github.io](https://github.com/lxieyang) | 🎓 Google Scholar | 🌐 [lxieyang](#) | 🐦 [lxieyang](#)

## 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

<b>Google DeepMind</b> , Research Scientist	2023 - present
<b>Microsoft Research</b> , Research Intern	2022
<i>Natural language interactions for end-user programmers using code-generating LLMs.</i>	
<b>Google</b> , UX Research Intern	2020
<i>Go developers' refactoring practices and engagement with refactoring tools.</i>	
<b>Bosch Research</b> , Research Intern	2019
<i>AI &amp; Crowdsourcing for improving the safety and performance of autonomous vehicles.</i>	

## EDUCATION

<b>Ph.D. in Human-Computer Interaction</b>	2017 - 2023
Carnegie Mellon University, Pittsburgh, PA, USA	
<b>Thesis:</b> Tool Support for Knowledge Foraging, Structuring, and Transfer during Online Sensemaking	
<b>Committee:</b> Brad A. Myers, Aniket Kittur, Kenneth Holstein, Daniel M. Russell	
<b>M.S. in Human-Computer Interaction</b>	2017 - 2021
Carnegie Mellon University, Pittsburgh, PA, USA	
<b>B.S. in Computer Science</b>	2013 - 2017
University of Michigan, Ann Arbor, MI, USA	

## PUBLICATIONS

### Peer-reviewed Conference Papers, Journal Articles & Pre-prints

- C18. Minsuk Kahng, Ian Tenney, Mahima Pushkarna, **Michael Xieyang Liu**, James Wexler, Emily Reif, Krystal Kallarackal, Minsuk Chang, Michael Terry, Lucas Dixon. **LLM Comparator: Interactive Analysis of Side-by-Side Evaluation of Large Language Models.** *IEEE Transactions on Visualization and Computer Graphics (VIS 2024).*
- C17. **Michael Xieyang Liu\***, Savvas Petridis\*, Alexander J. Fiannaca, Vivian Tsai, Michael Terry, Carrie J. Cai. **In Situ AI Prototyping: Infusing Multimodal Prompts into Mobile Settings with MobileMaker.** *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC 2024).*
- C16. **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).*

- C15. 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)*.
- C14. **Michael Xieyang Liu**, Frederick Liu, Alexander J. Fiannaca, Terry Koo, Lucas Dixon, Michael Terry, Carrie J. Cai. **“We Need Structured Output”: Towards User-centered Constraints on Large Language Model Output**. *Extended Abstract in ACM CHI Conference on Human Factors in Computing Systems (CHI 2024)*.
- C13. Minsuk Kahng, Ian Tenney, Mahima Pushkarna, **Michael Xieyang Liu**, James Wexler, Emily Reif, Krystal Kallarackal, Minsuk Chang, Michael Terry, Lucas Dixon. **LLM Comparator: Visual Analytics for Side-by-Side Evaluation of Large Language Models**. *Extended Abstract in ACM CHI 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

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|---|------------|
| Guest lecture: Sensemaking<br><i>Designing Human-Centered Software, Carnegie Mellon University</i>  | April 2024 |
| Building AI Sensemaking Systems<br><i>University of Zürich</i>  | Dec. 2023  |
| Bridging the Abstraction Gap Between End-User Programmers and Code-Generating Large Language Models<br><i>Viginia Tech</i>                    | Sept. 2023 |
| Accelerating Programming Sensemaking with Human-Centered Interactive Systems<br><i>Apple AI/ML, Microsoft Research</i>                        | Mar. 2023  |
| Accelerating Sensemaking with Human-Centered Interactive Systems<br><i>Google Research, Allen Institute for Artificial Intelligence (AI2)</i> | Feb. 2023  |

<b>Bridging the Abstraction Gap Between End-User Programmers and Code-Generating Large Language Models</b> <i>Microsoft Research</i>	Aug. 2022
<b>Understanding Refactoring with Golang</b> <i>Google Cloud DevEx Presentation</i>	Aug. 2020
<b>Supporting Knowledge Acceleration for Programming from a Sensemaking Perspective</b> <i>Sensemaking Workshop at CHI Conference on Human Factors in Computing Systems</i>	April 2018

## OPEN-SOURCE EXPERIENCE

<b>Chrome extension boilerplate (w/ React &amp; Webpack)</b> 3.6k ★, 1.1k 🍴 on GitHub (as of Oct. 2024); powering startups such as HyperWrite AI	2019 - present
<b>Vertical Tabs Chrome Extension</b> 36.9k users on the Chrome Web Store; 460+ ★ on GitHub (as of Oct. 2024)	2019 - present

## SERVICE

### Academic Service

<b>Associate Chair</b>	ACM CHI 2025 Blending Interaction: Engineering Interactive Systems & Tools subcommittee ACM UIST 2024 Program Committee Member ACM CHI 2024 Computational Interaction subcommittee ACM CHI 2020 Late Breaking Work Track
<b>Paper Reviewing</b>	<b>Conferences:</b> CHI (2019 - 2025), CSCW (2019 - 2023), UIST (2019 - 2022), IUI (2020, 2023), VAST (2020) <b>Journal:</b> TOCHI (2022) 🏆 <i>Special Recognitions for Outstanding Reviews: UIST (2021), CHI (2023)</i>

### Community Service

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

## RESEARCH EXPERIENCE

<b>Graduate Research Assistant</b> (advised by Brad A. Myers & Aniket Kittur) <i>Human-Computer Interaction Institute, Carnegie Mellon University</i> 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.	2017 - 2023
<b>Research Assistant</b> (with Jodi Forlizzi, Roni Rosenfeld & Ryan Tibshirani) <i>Delphi Research Group, Carnegie Mellon University</i> 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]	2020 - 2021

<b>Undergraduate Researcher</b> <i>Crowds and Machines Lab, University of Michigan, Ann Arbor</i> Worked on crowd & AI-powered interdisciplinary projects that address novel and promising research questions.	2016 - 2017
<b>Research Assistant</b> (advised by Jia Deng) <i>Vision &amp; Learning Lab, University of Michigan, Ann Arbor</i> Worked on a computer vision based toolkit that boosts performance on human-object interaction detection by exploiting human-object spatial relations.	2015 - 2016

## MENTORING

<b>Jane Hsieh</b> <i>Oberlin College Student (Currently a CMU S3D Ph.D. Candidate)</i> Studied programmers' web-foraging behaviors. Contributed to the development of the Unakite system.	2018 - 2019
<b>Emily Deng</b> <i>CMU Master's Student</i> Designed and carried out interview studies with programmers that probe their programming behaviors and needs.	2017 - 2018
<b>Shaun Burley</b> <i>CMU Master's Student</i> Designed and carried out interview studies with programmers that probe their programming behaviors and needs.	2017 - 2018

## SELECTED HONORS, GRANTS, AWARDS & COVERAGE

<b>Best Paper Honorable Mention Award</b> , ACM CHI Conference on Human Factors in Computing Systems (CHI 2023)	April 2023
<b>Special Recognitions for Outstanding Reviews</b> , ACM CHI Conference on Human Factors in Computing Systems (CHI 2023)	Nov. 2022
<b>CMU SCS News Coverage on our CSCW 2021 Best Paper</b> : "CMU Researchers Develop Tool To Help Determine When To Reuse Content"	Nov. 2021
<b>Best Paper Award</b> , 24th ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW 2021)	Oct. 2021
<b>Special Recognitions for Outstanding Reviews</b> , 34th Annual ACM Symposium on User Interface Software and Technology (UIST 2021)	June 2021
<b>CMU News Coverage on COVIDcast</b> : "Carnegie Mellon Unveils Five Interactive COVID-19 Maps"	April 2020
<b>Best Paper Honorable Mention Award</b> , 32nd Annual ACM Symposium on User Interface Software and Technology (UIST 2019)	Oct. 2019
<b>SHF: Small: Knowledge Acceleration for Programming (\$500,000 over 3 years)</b> , NSF	June 2018
<b>James B. Angell Scholar</b> , 94th Annual Honors Convocation, University of Michigan	March 2017
<b>EECS Scholar Award</b> , 2017 EECS Honors & Awards Reception, University of Michigan	March 2017
<b>Summer Undergraduate Research Experience (SURE) program</b> , University of Michigan	May 2016
<b>Tang-Junyuan Fellowship (Top 2/250, \$50,000)</b> , UM-SJTU Joint Institute	July 2015, July 2016
<b>Dean's List</b> , University of Michigan	Dec. 2015, April 2016
<b>Basic Teaching Assistant Certificate</b> , Center for Learning and Teaching, UM-SJTU Joint Institute	Aug. 2015
<b>Dean's List</b> , UM-SJTU Joint Institute	2013 - 2015
<b>Fellowship for Outstanding Academic Performance</b> , Shanghai Jiao Tong University	June 2015

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

April 2015

## TEACHING EXPERIENCE

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

Fall 2020

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

Fall 2020

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

Fall 2019

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

Winter 2017

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

Fall 2016

**Teaching Assistant – Vv255 Multivariate Calculus**

Summer 2015

University of Michigan – Shanghai Jiao Tong University Joint Institute

## 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