Ian Drosos

Researcher
Microsoft Research
Cognitive Science Ph.D.

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Research Interests

human-computer interaction; designing and building AI tools to support the workflows of developers, data scientists, and learners.

Education

University of California, San Diego
Ph.D. in Cognitive Science — 2017 – 2022
Dissertation: *Synthesizing Transparent and Inspectable Technical Workflows*, Advisor: Philip Guo

North Carolina State University
M.S. in Computer Science — 2015 – 2017
Thesis: *HappyFace: Identifying and Predicting Frustrating Learning Obstacles at Scale*, Advisor: Chris Parnin

Southern Polytechnic State University
B.S. in Computer Science — 2007 – 2011

Experience

Microsoft Research, Cambridge, UK
Researcher — 2022 –
HCI + AI research of the design of intelligent systems on the Tools for Thought project. I study how AI can help users critically think and have greater control over AI-generated output during data analysis and programming tasks through HCI research of professional, end-user, and learner workflows. [C.8-15; C.X2-3; W.1-2; W.X1]

UCSD – The Design Lab, La Jolla, CA
Researcher – Ph.D. Candidate — 2017 – 2022
HCI research in providing better experiences for data scientists, programmers, content creators, and learners. Published six papers and won two paper awards. [C.2-7]

UCSD, La Jolla, CA
Instructor — 2018 – 2022
- HCI Portfolio Design Studio (COGS121)

Teaching Assistant
- Interaction Design (COGS120/CSE170)
- Human-Computer Interaction Programming Studio (COGS121)
- HCI Portfolio Design Studio (COGS121)
- Data-Driven UX/Product Design (COGS127)

Autodesk, San Rafael, CA
Intern – User Interface Research — 01/2021 – 04/2021
Investigated barriers to providing expert (human) help to questions about feature-rich software like Autodesk Fusion 360. Designed, implemented, and deployed a custom survey prototype to collect feedback from experts (n=28). Paper in submission. [C.X1].

Microsoft, Redmond, WA
Research Intern – Program Synthesis 07/2018 – 12/2018
Designed, implemented, and evaluated (n=12) a prototype called Wrex for generating readable Python code through program synthesis within Jupyter notebooks using JavaScript and Python. Published the results at CHI2020, which won Best Paper. [C.4]

Verizon, Alpharetta, GA
Member Technical Staff I & II – Systems Engineering 2011 – 2015
Full-stack software engineer developing enterprise systems using Java, PL/SQL, JavaScript, and HTML.

Publications

(C)onference, (J)ournal, and (W)orkshop.

C.15 Ian Drosos, Jack Williams, Advait Sarkar, Nicholas Wilson, Sean Rintel, and Payod Panda. 2025. Dynamic Prompt Middleware: Contextual Prompt Refinement Controls for Comprehension Tasks. In CHIWORK '25: Proceedings of the 4th Annual Symposium on Human-Computer Interaction for Work (CHIWORK 2025). (Patent filed). [Link] ***2nd Place / 1,064 projects in internal Hackathon (Everyday AI Executive Challenge)**

C.14 Hao-Ping (Hank) Lee, Advait Sarkar, Lev Tankelevitch, Ian Drosos, Sean Rintel, Richard Banks, and Nicholas Wilson. 2025. The Impact of Generative AI on Critical Thinking: Self-Reported Reductions in Cognitive Effort and Confidence Effects From a Survey of Knowledge Workers. In Proceedings of the CHI Conference on Human Factors in Computing Systems (CHI 2025).

C.13 Bhuvanashree Murugadoss, Christian Poelitz, Ian Drosos, Vu Le, Nick McKenna, Carina Negreanu, Chris Parnin, and Advait Sarkar. 2025. Evaluating the Evaluator: Measuring LLMs' Adherence to Task Evaluation Instructions. In Proceedings of the AAAI Conference on Artificial Intelligence (AAAI 2025). [Link]

C.12 Majeed Kazemitabaar, Jack Williams, Ian Drosos, Tovi Grossman, Austin Henley, Carina Negreanu, and Advait Sarkar. 2024. Improving Steering and Verification in AI-Assisted Data Analysis with Interactive Task Decomposition. In Proceedings of The ACM Symposium on User Interface Software and Technology (UIST 2024). [Link]

C.11 Advait Sarkar, Xiaotong (Tone) Xu, Neil Toronto, Ian Drosos, and Christian Poelitz. 2024. When Copilot Becomes Autopilot: Generative AI's Critical Risk to Knowledge Work and a Critical Solution. The European Spreadsheet Risks Interest Group Conference (EuSpRIG 2024). [Link]

C.10 Ian Drosos, Advait Sarkar, Xiaotong (Tone) Xu, Carina Negreanu, Sean Rintel, and Lev Tankelevitch. 2024. "It's like a rubber duck that talks back": Understanding Generative AI-Assisted Data Analysis Workflows through a Participatory Prompting Study. In Proceedings of the Symposium on Human-Computer Interaction for Work. (CHIWORK 2024). [Link]

W.2 Andrew D. Gordon, Carina Negreanu, José Cambronero, Rasika Mudumbai Chakravarthy, Ian Drosos, Hao Fang, Bhaskar Mitra, Hannah Richardson, Advait Sarkar, Stephanie Simmons, Jack Williams, Ben Zorn. 2024. Co-audit: tools to help humans double-check AI-generated content. In the Workshop on Evaluation and Usability of Programming Languages and Tools (PLATEAU 2024). [Link]

W.1 Advait Sarkar, Ian Drosos, Rob DeLine, Andrew D. Gordon, Carina Negreanu, Sean Rintel, Jack Williams, and Ben Zorn. 2023. Participatory prompting: a user-centric research method for eliciting AI assistance opportunities in knowledge workflows. In the Workshop of the Psychology of Programming Interest Group (PPIG 2023). [Link]

C.9 Ian Drosos, Nick Wilson, Andrew D. Gordon, Sruti Ragavan, and Jack Williams. 2023. FxD: a functional debugger for dysfunctional spreadsheets. In Proceedings of the Symposium on Visual Languages and Human-Centric Computing (VL/HCC 2023). (Patent filed). [Link]. *FxD is now part of [Excel Labs!]*
Best Paper, Honorable Mention Award

C.8 Kasra Ferdowsi, Jack Williams, Ian Drosos, Andrew D. Gordon, Carina Negreanu, Advait Sarkar, Benjamin Zorn. 2023. ColDeco: An End User Spreadsheet Inspection Tool for AI-Generated Code. In Proceedings of the Symposium on Visual Languages and Human-Centric Computing (VL/HCC 2023). (Patent filed). [Link]

C.7 Ian Drosos and Philip Guo. 2022. The Design Space of Livestreaming Equipment Setups: Tradeoffs, Challenges, and Opportunities. In Proceedings of the ACM Designing Interactive Systems Conference (DIS 2022). [Link]

C.6 Ian Drosos and Philip Guo. 2021. Streamers Teaching Programming, Art, and Gaming: Cognitive Apprenticeship, Serendipitous Teachable Moments, and Tacit Expert Knowledge. In Proceedings of the Symposium on Visual Languages and Human-Centric Computing, short paper (VL/HCC 2021). [Link]
Best Short Paper, Honorable Mention Award

C.5 Sam Lau, Ian Drosos, Julia Markel and Philip Guo. 2020. The Design Space of Computational Notebooks: An Analysis of 60 Systems in Academia and Industry. In Proceedings of the Symposium on Visual Languages and Human-Centric Computing (VL/HCC 2020). [Link]

C.4 Ian Drosos, Titus Barik, Philip Guo, Robert DeLine, and Sumit Gulwani. 2020. Wrex: A Unified Programming-By-Example Interaction for Synthesizing Readable Code for Data Scientists. In Proceedings of the CHI Conference on Human Factors in Computing Systems (CHI 2020). [Link]
Best Paper Award

C.3 Adam Rule, Ian Drosos, Aurélien Tabard, and James D. Hollan. 2018. Aiding Collaborative Reuse of Computational Notebooks with Annotated Cell Folding. In Proceedings of the ACM on Human-Computer Interaction (CSCW 2018). [Link]

C.2 René Just, Chris Parnin, Ian Drosos, and Michael D. Ernst. 2018. Comparing developer-provided to user-provided tests for fault localization and automated program repair. In Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2018). [Link]

C.1 Ian Drosos, Philip Guo, and Chris Parnin. 2017. HappyFace: Identifying and Predicting Frustrating Obstacles for Learning Programming at Scale. In Proceedings of the Symposium on Visual Languages and Human-Centric Computing (VL/HCC 2017). [Link]

In Submission

W.X1 Advait Sarkar and Ian Drosos. 2025. Vibe coding: programming through congenial trust in code-generating AI large language model agents. (In review).

C.X3 Ian Drosos, Advait Sarkar, Xiaotong (Tone) Xu, and Neil Toronto. 2025. "It makes you think": Provocations Restore Critical Thinking During AI-Assisted Tasks. (In review). [Link]

C.X2 Ian Drosos, Advait Sarkar, and Andrew D. Gordon. 2023. "My toxic trait is thinking I'll remember this": Gaps in the learner experience of video tutorials for feature-rich software. (In review). [Link]

C.X1 Ian Drosos, Jo Vermeulen, George Fitzmaurice, Justin Matejka. 2024. Nanomentoring: Investigating How Quickly People Can Help People Learn Feature-Rich Software. (In review).

Awards and Patents

Paper Awards

- VL/HCC 2023. Best Paper, Honorable Mention Award. [C.9]
- VL/HCC 2021. Best Short Paper, Honorable Mention Award. [C.6]
- CHI 2020. Best Paper Award. [C.4]

Hackathons

- Microsoft Global Hackathon 2024 Executive Challenge Winner (2nd place / 1,064 projects in the 'Everyday AI' Challenge). Promptly: Dynamically generated UI for AI.
- Microsoft Global Hackathon 2023 Executive Challenge Winner (2nd place / 182 projects in the 'Change the Game' Challenge). Game Development Copilot: Making a Dream Game.

Patents

- Techniques for formula debugging. Advait Sarkar, Sruti Srinivasa Ragavan, Jack Williams, Ian Drosos, Nicholas Wilson, Irena Berezovsky, Lev Solodkin, Andrew Gordon. 2025. US/18401217. [C.9]
- Range preview with elisions. Advait Sarkar, Sruti Srinivasa Ragavan, Jack Williams, Ian Drosos, Nicholas Wilson, Irena Berezovsky, Lev Solodkin, Andrew Gordon. 2025. US/18401240. [C.9]
- Generation of multi-dimensional array of intermediate values in multiple code executions. Benjamin Zorn, Kasra Ferdowsi, Jack Williams, Carina Negreanu, Andrew Gordon, Advait Sarkar, Ian Drosos. 2024. US/18154741. [C.8]

Skills

Interaction design (Figma, prototyping)
Qualitative research (Thematic analysis, interviews, content analysis, surveys, comparative tool studies, design probes)
Quantitative analysis (Python and R)
Full-stack software engineering (Python, JavaScript, Java, SQL)

Programming Languages

Python, JavaScript, Java, R, SQL

Service

Program Committee
- Intelligent User Interfaces 2025
- Learning @ Scale 2023-2024
- VL/HCC 2023-2024

Reviewer
- CHI 2022-2025
- VL/HCC 2021
- UIST 2020

Invited talks

Rising Stars Applied Research Talk Series - Designing Better Human-AI Workflows: Dynamic UX, Provocations, and Critical Engagement
Microsoft (E+D Applied Research), February 2025

LLM Forum - Understanding Generative AI-Assisted Data Analysis Workflows
European Bioinformatics Institute, September 2024

Learning programming in the era of LLMs
Google, January 2024

Mentorship

Hank Lee, *Microsoft Research intern*, Summer 2024
Bhuvanashree Murugadoss, *Microsoft Research Fellow*, 2023-2024
Xiaotong (Tone) Xu, *Microsoft Research intern*, Summer 2023
Majeed Kazemitabaar, *Microsoft Research intern*, Summer 2023
Kasra Ferdowsi, *Microsoft Research intern*, Summer 2022