

# BENJAMIN XIE

Ph.D. Candidate

I study and design interactions with data for equitable computing education.

## EDUCATION

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| 2016-2021 | <b>University of Washington</b> , Seattle, WA<br>Ph.D. in Information Science<br>Advisor: Amy J. Ko<br>Thesis: <i>Stakeholders' Interpretations of Data for Equitable Computing Education</i>                              |
| 2011-2016 | <b>Massachusetts Institute of Technology</b> , Cambridge, MA<br>M.Eng., B.S. in Computer Science<br>Advisor: Hal Abelson<br>Thesis: <i>Progression of Computational Thinking Skills Demonstrated by App Inventor Users</i> |

## RESEARCH EXPERIENCE

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|-----------|---|
| 2021-     | <b>UW Code &amp; Cognition Lab</b> , <i>Postdoctoral Fellow</i> . Mentor: Amy J. Ko                         |
| 2016-2021 | <b>UW Code &amp; Cognition Lab</b> , <i>Graduate Research Assistant</i> . Mentor: Amy J. Ko                 |
| 2020-2021 | <b>Code.org</b> , <i>Research Intern</i> . Mentor: Baker Franke   |
| 2014-2016 | <b>MIT App Inventor</b> , <i>Research Assistant</i> . Mentor: Hal Abelson                                   |
| 2012-2013 | <b>MIT Scheller Teacher Education Program</b> , <i>Research Assistant</i> . Mentors: Judy Perry, Lisa Stump |

## AWARDS & HONORS

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| 2021 | <b>University of Washington Husky 100</b><br>Awarded to 100 of UW's 60,000 students who make the most of their time at UW |
| 2021 | <b>UW Marcy Migdal Fund for Educational Equality, Honorable Mention</b>   |
| 2016 | <b>National Science Foundation (NSF) Graduate Research Fellowship</b> (\$138,000 over 3 yrs)                              |
| 2015 | <b>MIT EECS - Google Research and Innovation Scholar</b> (\$6,000)  |

## FUNDING

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| 2020 | <b>Google Cloud Academic Research Grant</b> (\$5,000)                        |
| 2020 | <b>National Science Foundation (NSF) INTERN</b> (\$35,056)                   |
| 2019 | <b>iConference Doctoral Colloquium Travel Award</b> (\$1,300)                |
| 2019 | <b>University of Washington Information School Travel Award</b> (\$300)      |
| 2016 | <b>SOLAR Learning Analytics Summer Institute Student Scholarship</b> (\$580) |

## TEACHING

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| INSTRUCTOR         | <b>Introduction to Data Science</b> , UW INFO 370. Fa '17   |
| TEACHING ASSISTANT | <b>Advanced Methods in Data Science</b> , UW INFO 371. Wi '21<br><b>Technical Foundations of Informatics</b> , UW INFO 201. Fa '19<br><b>Cooperative Software Design</b> , UW INFO 461. Sp '17<br><b>Introduction to Computer Science</b> , Prospect Hill Academy. Fa '14, Sp '15 |
| GUEST LECTURER     | <b>Gradient Descent</b> . In Advanced Methods in Data Science, UW INFO 371. Wi '21.<br><b>Exploratory Data Analysis</b> . In Applied Regression and ANOVA, UW STAT 423. Wi '19.   |

## STUDENTS SUPERVISED

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I have mentored 11 students (2 Master's, 9 undergrad), including 7 women, 2 people of color (Black, Pacific Islander), 2 international, and 1 transfer student. Six have co-authored 4 papers with me, with one first-authoring a paper. Two have gone on to pursue PhDs, one a Master's, and 5 into industry.

## PEER-REVIEWED PUBLICATIONS

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My publications have been cited  $\approx 350$  times, and I have an h-index of 9. ([Google Scholar](#), Nov 2021)

### **Surfacing Equity Issues in Large Computing Courses with Peer-Ranked, Demographically-Labeled Student Feedback**

B. Xie, A. Oleson, J. Everson, A. J. Ko (2022)

PACMHCI: Proceedings of the ACM on Human-Computer Interaction

*Developed and evaluated tool that contextualizes student feedback for teaching teams to identify equity issues.*

### **Domain Experts' Interpretations of Assessment Bias in a Scaled, Online Computer Science Curriculum**

B. Xie, M. J. Davidson, B. Franke, E. McLeod, M. Li, and A. J. Ko (2021)

ACM L@S: Conference on Learning @ Scale

*Explored a new use of Differential Item Functioning (DIF) where domain experts (Code.org curriculum designers) interpreted data on potential test bias by gender and race.*

### **The Effect of Informing Agency in Self-Directed Online Learning Environments**

B. Xie, G. L. Nelson, H. Akkaraju, W. Kwok, A. J. Ko (2020)

ACM L@S: Conference on Learning @ Scale

*Designed and evaluated three variations of self-directed online learning tool to explore how informing and affording agency affected engagement and learning outcomes*

### **Investigating Novices' In Situ Reflections on Their Programming Process**

D. Loksa, B. Xie, H. Kwik, A. J. Ko (2020)

ACM SIGCSE: Technical Symposium on Computer Science Education

*Presented evidence that self-regulation use during programming varies, and that teaching self-regulation skills may require targeted instruction based on students' self-regulation and programming practices*

### **Towards a Validated Formative Assessment for Language-Specific Program Tracing Skills**

G. L. Nelson, B. Xie, A. Hu, A. J. Ko (2019)

ACM Koli Calling

*Developed formative assessment with Kane's validity framework and situated framework within computing education*

### **An Item Response Theory Evaluation of a Language-Independent CS1 Knowledge Assessment**

B. Xie, M. J. Davidson, M. Li, A. J. Ko (2019)

ACM SIGCSE: Technical Symposium on Computer Science Education

*Evaluated SCS1 language-agnostic concept inventory, using Item Response Theory to identify items that were problematic*

### **A Theory of Instruction for Introductory Programming Skills**

B. Xie, D. Loksa, G. L. Nelson, M. J. Davidson, D. Dong, H. Kwik, A. H. Tan, L. Hwa, M. Li, A. J. Ko (2019)

CSE: Journal of Computer Science Education

*Proposed theory of instruction to teach four distinct programming skills incrementally and demonstrated that teaching these skills resulted in improvement in certain learning outcomes*

### **Experiences of Computer Science Transfer Students**

H. Kwik, B. Xie, A. J. Ko (2018)

ACM ICER: International Computing Education Research Conference

*Investigated experiences of computer science students who transferred to a university, finding that university interventions helped support social transition but did not eliminate gaps in academic performance*

### **An Explicit Strategy to Scaffold Novice Program Tracing**

B. Xie, G. L. Nelson, A. J. Ko (2018)

ACM SIGCSE: Technical Symposium on Computer Science Education

*Described and evaluated a simple but powerful strategy to scaffold tracing of program execution. With  $<30$  min of practice, novices in intro CS course had midterm grades 7% higher than a control group*

### **Comprehension First: Evaluating a Novel Pedagogy and Tutoring System for Program Tracing in CS1**

G. L. Nelson, B. Xie, A. J. Ko (2017)

ACM ICER: International Computing Education Research Conference

*Contributed a new theory of what it means to know a programming language, instruction based on their theory, and a computer-based tutorial for teaching this knowledge. Found that the tutorial resulted in improved learning gains*

### **Skill Progression in MIT App Inventor**

B. Xie, H. Abelson (2016)

IEEE VL/HCC: Symposium on Visual Languages & Human-Centric Computing

*Found that long-term users of App Inventor tend to expand breadth of programming knowledge (use new blocks) before depth (use blocks in more complex ways)*

### **Measuring the Usability and Capability of App Inventor to Create Mobile Applications**

B. Xie, I. Shabir, H. Abelson (2015)

PROMOTO: Workshop on Programming for Mobile and Touch

*Investigated the usability and realized capability of >5,000 App Inventor projects, finding that the order of App Inventor tutorials heavily influence the usability of App Inventor to implement particular functionalities*

## **MAGAZINE ARTICLES**

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### **How Data Can Support Equity in Computing Education**

B. Xie (2020)

ACM XRDS: ACM Crossroads Magazine

*Article describing techniques I am exploring in my dissertation to use data to support equity in computing education.*

### **It Is Time for More Critical CS Education**

A. J. Ko, A. Oleson, N. Ryan, Y. Register, B. Xie, M. Tari, M. J. Davidson, S. Druga, D. Loksa (2020)

ACM CACM: Communications of the ACM

*Position article calling for more critical lens to computer science education.*

### **Learning and Education in HCI: A Reflection on the SIG at CHI 2019**

V. Pammer-Schindler, E. Harpstead, B. Xie, B. DiSalvo, A. Kharrufa, P. Slovak, A. Ogan, J. J. Williams, M. J. Lee (2020)

ACM IX: ACM Interactions Magazine

*Follow-up report on our CHI 2019 SIG on learning, education, and HCI*

## **INVITED TALKS**

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### **Domain Experts' Interpretations of Assessment Bias in a Scaled, Online Computer Science Curriculum**

B. Xie (2021)

University of Washington DUB Seminar

*Presented my work done in collaboration with Code.org and published to Learning @ Scale 2021 to UW HCI community.*

### **Discussing "How Data Can Support Equity in Computing Education"**

B. Xie (2021)

Princeton CITP TechEd Reading Group

*Discussed my XRDS 2020 article.*

### **Equitable Learning Analytics - Why should everyone care?**

R. Ferguson, D. Gasevic, L. Lawrence, B. Xie (2021)

ACM LAK: International Conference on Learning Analytics & Knowledge

*Panel to bring awareness to gaps in diversity, equity, and inclusion practices for learning analytics community.*

## **DOCTORAL COLLOQUIUM/ CONSORTIUM**

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*Opportunities for doctoral students to engage with peers and faculty members to advance their research.*

### **Interpretations and Uses of Data for Equity in Computing Education**

B. Xie (2021)

ACM ICER: International Computing Education Research Conference

### **Supporting Equity in Computing Education with Student-Led Interactions with Data**

B. Xie (2020)

UW DUB Doctoral Colloquium

### **Human-AI Collaborations within Computing Education**

B. Xie (2019)

iConference

## SERVICE

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ASSOCIATE CHAIR	<b>ACM CHI</b> : ACM Conference on Human Factors in Computing Systems (2022)
PROGRAM COMMITTEE	<b>ACM COMPASS</b> : Conference on Computing and Sustainable Societies (2021), <b>EECScon</b> : MIT EECS Undergrad Research Conference (2014, 15)
REVIEWER	<b>ACM CHI</b> (2018, 20, 21, 22), <b>ACM UIST</b> (2019), <b>ACM TOCE</b> (2019), <b>ACM SIGCSE</b> (2018, 19), <b>ICIS</b> (2020), <b>Journal of CS Education</b> (2021), <b>Journal of Information and Learning Sciences</b> (2018)
COMMITTEE MEMBER	<b>UW Information School HCI Faculty Search Committee</b> (2020-21)
STUDENT VOLUNTEER	<b>ACM ICER</b> : International Computing Education Research Conference (2021)
STUDENT COORDINATOR	<b>UW HCI Seminar</b> (2020-21), <b>UW DUB Seminar</b> (2019), <b>UW DUB Doctoral Colloquium</b> (2019), <b>UW DUB PhD Retreat</b> (2018), <b>UW Information School PhD Retreat</b> (2018)
MENTOR	<b>Technology Access Foundation (TAF)</b> Academy STEM Expo (2016-2019) <b>Google Summer of Code</b> (on behalf of MIT Media Lab, 2016)

## RESEARCH DEVELOPMENT

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2017	CMU Simon Initiative LearnLab Summer School
2016	SOLAR Learning Analytics Summer Institute (LASI)

## PROFESSIONAL EXPERIENCE

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2015	<b>NovoEd</b> , Software Engineering Intern
2014	<b>AppNexus</b> , Software Engineering Intern, API Team
2013	<b>eBay</b> , Software Engineering Intern, Marketplace Team