

# BENJAMIN XIE

Ph.D. Candidate

I study and design for data equity in computing education.

## EDUCATION

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

## RESEARCH EXPERIENCE

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| 2020-     | <b>Code.org</b> , <i>Research Intern</i> . Mentor: Baker Franke   |
| 2016-     | <b>UW Code &amp; Cognition Lab</b> , <i>Graduate Research Assistant</i> . Mentor: Amy J. Ko                 |
| 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 students across UW's three campuses who make the most of their time |
| 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 over 250 times, and I have an h-index of 7. ([Google Scholar](#), May 2021)*

### **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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### 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.*

### 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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PROGRAM COMMITTEE	ACM COMPASS: Conference on Computing and Sustainable Societies (2021), EECScon: MIT EECS Undergrad Research Conference (2014, 15)
REVIEWER	ACM CHI (2018, 20, 21), ACM UIST (2019), ACM TOCE (2019), ACM SIGCSE (2018, 19), ICIS (2020), Journal of Information and Learning Sciences (2018)
STUDENT COORDINATOR	UW HCI Seminar (2020-21), UW DUB Seminar (2019), UW DUB Doctoral Colloquium (2019), UW DUB PhD Retreat (2018), UW Information School PhD Retreat (2018)
MENTOR	Technology Access Foundation (TAF) Academy STEM Expo (2016-2019) Google Summer of Code (on behalf of MIT Media Lab, 2016)

## PROFESSIONAL EXPERIENCE

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2015	NovoEd, Software Engineering Intern
2014	AppNexus, Software Engineering Intern, API Team
2013	eBay, Software Engineering Intern, Marketplace Team