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Benjamin Xie

Postdoctoral Scholar

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

Education

2016-2021 **University of Washington**, Seattle, WA
Ph.D. in Information Science
Advisor: Amy J. Ko
Thesis: *Stakeholders' Interpretations of Data for Equitable Computing Education*

2011-2016 **Massachusetts Institute of Technology**, Cambridge, MA
M.Eng., B.S. in Computer Science
Advisor: Hal Abelson
Thesis: *Progression of Computational Thinking Skills Demonstrated by App Inventor Users*

Research Experience

2021- **UW Code & Cognition Lab**, *Postdoctoral Scholar*. Mentor: Amy J. Ko
2016-2021 **UW Code & Cognition Lab**, *Graduate Research Assistant*. Mentor: Amy J. Ko
2020-2021 **Code.org**, *Research Intern*. Mentor: Baker Franke
2014-2016 **MIT App Inventor**, *Research Assistant*. Mentor: Hal Abelson
2012-2013 **MIT Scheller Teacher Education Program**, *Research Assistant*. Mentors: Judy Perry, Lisa Stump

Awards & Honors

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

Funding

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

Teaching

Instructor
Identity, Demographic Data, and Computing Education Seminar, UW INFO 499. Wi '22
Introduction to Data Science, UW INFO 370. Fa '17

Teaching Assistant
Advanced Methods in Data Science, UW INFO 371. Wi '21
Technical Foundations of Informatics, UW INFO 201. Fa '19
Cooperative Software Design, UW INFO 461. Sp '17
Introduction to Computer Science, Prospect Hill Academy. Fa '14, Sp '15

Guest Lecturer
Gradient Descent. In Advanced Methods in Data Science, UW INFO 371. Wi '21.
Exploratory Data Analysis. In Applied Regression and ANOVA, UW STAT 423. Wi '19.

Students Supervised

I have mentored 11 students (2 Master's, 9 undergrad), including 6 women, 2 BIPOC (Black, Pacific Islander), 1 non-binary, 2 international, and 1 transfer student. Six co-authored four papers with me, with one first-authoring a paper. Three went on to pursue PhDs, one a Master's, and 5 into industry.

Peer-Reviewed Publications

My publications have been cited ≈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 (presented at ACM CSCW)
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

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

Surfacing Equity Issues in Large Computing Courses with Peer-Ranked, Demographically-Labeled Student Feedback
B. Xie (2022)
University of Washington Information School Research Symposium
Presented research on contextualized student feedback that was published to PACMHCI/CSCW 2022.

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

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

Associate Chair	**ACM CHI**: ACM Conference on Human Factors in Computing Systems (2022)
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, 22), **ACM UIST** (2019), **ACM TOCE** (2019), **ACM SIGCSE** (2018, 19), **ICIS** (2020), **Journal of CS Education** (2021), **Journal of Information an Learning Sciences** (2018)
Committee Member	**UW Information School HCI Faculty Search Committee** (2020-21)
Student Volunteer	**ACM ICER**: International Computing Education Research Conference (2021)
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)

Research Development

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

Professional Experience

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