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Benjamin Xie

Postdoctoral Fellow

I design critical and equitable *human-data interactions* for educational and environmental outcomes.

Education

2016 - 2022 **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*

Academic Appointments

2022- **Stanford Institute for Human-Centered AI (HAI), McCoy Family Center for Ethics in Society**
Embedded Ethics Postdoctoral Fellow. Mentors: Mehran Sahami, Rob Reich, Anne Newman
2022 **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

2022 **ACM CSCW Award for Contribution to Diversity and Inclusion**
Awarded to 3.5% of accepted papers to recognize contributions to diversity & inclusion
2022 **UW Distinguished Dissertation Award, Departmental Nomination**
2021 **University of Washington Husky 100**
Awarded to 100 of UW's 55,000 students who make the most of their time at UW
2021 **UW Marcy Migdal Fund for Educational Equality, Honorable Mention**
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)
2016 **National Science Foundation (NSF) Graduate Research Fellowship** ($138,000 over 3 yrs)
2015 **MIT EECS - Google Research and Innovation Scholar** ($6,000)

Grants

*** Denotes that I facilitated the ideation and writing of the proposals, as well as the execution of the research. However, I was ineligible to be named a PI or Co-PI because I was a postdoc or graduate student.*

2023-2025 **Addressing Environmental Data Inequities by Empowering Youth in Frontline Communities**
Stanford Woods Institute Environmental Venture Projects ($249,870)
Role: Senior Personnel**. With Victor R. Lee (PI), Nicole Ardoin (Co-PI), Jenny Suckale (Co-PI), Najiha Al-Asmar (Non-profit collabroator)

2023-2024 **Developing Novice Programmers' Capacity for Critical Reflection on Generative AI** ($5,000)
Stanford HAI & Accelerator for Learning: Generative AI for the Future of Learning. Role: PI.

2023 **Neighborhood Environmental Advocacy & Technology (NEAT) Fellowship** ($9,000)
Stanford Haas Center for Public Service Community-Based Research Fellowship
Role: PI. With Najiha Al-Asmar (non-profit collaborator)

2022 **Start-Up Funds: Community-Engaged Research on AI** ($15,000)
Stanford McCoy Center for Ethics and Society & Inst. for Human-Centered AI. Role: PI.

2020 **Designing a Human-AI System for Equitable Student Feedback at Scale** ($5,000)
Google Cloud Academic Research Grant
Role: Senior Personnel**. With Amy J. Ko (PI)

2020 **Improving the Equity of CS Discoveries** ($35,056)
NSF Non-Academic Research Internships for Graduate Students (INTERN)
Role: Graduate Student Intern**. With Amy J. Ko (PI), Baker Franke (non-profit collaborator)

Peer-Reviewed Publications

Unlike most of academia, premiere conferences in Human-Computer Interaction and Computing Education are considered high quality, selective venues for archival research. These conferences exceed many journals in their selectivity, visibility, and impact. Therefore, my peer-reviewed publications are mostly conference papers.

My publications have been cited over 700 times, and I have an h-index of 11. (Google Scholar, Jan 2024)

Full texts of my publications are available at benji.phd/papers

* denotes equal contribution | ^ denotes mentored student

From Consumers to Critical Users: Prompty, an AI Literacy Tool For High School Students
D. V. Dennison, R. C. C. Garcia^, P. Sarin^, J. Wolf, C. Bywater, **B. Xie**, V. R. Lee (2024)
AAAI EAAI: Symposium on Educational Advances in Artificial Intelligence
Designed tool that scaffolded the prompting and output comparison of a large language model for high school language arts students.

Co-Designing AI Education Curriculum with Cross-Disciplinary High School Teachers
B. Xie, P. Sarin*^, J. Wolf*, R. C. C. Garcia^, I. Sieh, D. V. Dennison, A. Fuloria, C. Bywater, V. R. Lee (2024)
AAAI EAAI: Symposium on Educational Advances in Artificial Intelligence
Curriculuar co-design with high school teachers identified considerations for integrating AI education across disciplines.

Teaching Ethics in Computing Education: A Systematic Literature Review of ACM Computer Science Education Publications
N. Brown*, **B. Xie***, E. Sarder, C. Fiesler, E. S. Wiese (2023)
ACM TOCE: Transactions on Computing Education
Review of 40 years of research on ethics in computing education found broad conceptions of ethics, many pedagogical strategies, challenges with assessment, and lack of clearly applicable recommendations for practice.

Developing Novice Programmers' Self-Regulation Skills with Code Replays
B. Xie, J. O. Lim*^, P. K. D. Pham*^, M. Li, A. J. Ko (2023)
ACM ICER: International Computing Education Research Conference
Designed tool that enabled replays of code writing process and found that its use improved novice programmers' self-regulation behaviors when writing code.

A Decade of Demographics in Computing Education Research: A Critical Review of Trends in Collection, Reporting, and Use
A. Oleson*, **B. Xie***, J. Salac, J. Everson, F. M. Kivuva^, A. J. Ko (2022)
ACM ICER: International Computing Education Research Conference
Critical content analysis of 510 computing education research papers to identify themes in the collection, reporting, and use of demographic data.

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)
Award for contribution to Diversity & Inclusion (3.5% of accepted papers)
Developed & evaluated tool that contextualizes student feedback for teaching teams to identify equity issues in large classes.

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 validity for a formative assessment for language-specific program tracing skills
G. L. Nelson, **B. Xie**, A. D. 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 introductory CS 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 programming skills and demonstrated improved learning outcomes.

Experiences of Computer Science Transfer Students
H. Kwik^, **B. Xie**, A. J. Ko (2018)
ACM ICER: International Computing Education Research Conference
Investigated social and academic experiences of computer science students who transferred to a 4 yr university.

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, M. Kirdani-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

Workshop and Discussion Papers

Papers that contribute to workshops or foster discussions. These papers have been lightly reviewed or refereed.

Constructionist Approaches to Learning Artificial Intelligence/Machine Learning: Past, Present, and Future
L. Morales-Navarro, Y. Kafai, K. Kahn, R. Romeike, T. Michaeli, D. DiPaola, S. Ali, R. Williams, C. Breazeal, F. E. V. Castro, K. Desportes, G. Stager, V. Kumar, H. Bodon, M. Worsley, V. R. Lee, P. Sarin, **B. Xie**, J. Wolf, I. Sieh, D. Varuvel Dennison, R. Garcia and C. Solomon (2023)
FabLearn / Constructionism
Symposium on how teachers and learners collaborated to develop AI/ML powered projects that integrate constructionism

CRAFT-work: An Integrative Co-Design Approach for Designing High School AI Literacy Resources
V. R. Lee, P. Sarin, J. Wolf, **B. Xie** (2023)
CHI Workshop on AI Literacy: Finding Common Threads between Education, Design, Policy, and Explainability
Described process of co-designing multi-disciplinary and modular AI literacy resources with high school teachers

Centering Environmental Justice in Computing Education
B. Xie, G. L. Nelson, F. E. V. Castro, N. Lytle, B. Bettin (2023)
ACM SIGCSE: Technical Symposium on Computer Science Education
Fostered Birds of a Feather discussion to connect computing education and environmental justice

Learning, Education, and HCI
B. Xie, E. Harpstead, B. DiSalvo, P. Slovak, A. Kharrufa, M. J. Lee, V. Pammer-Schindler, A. Ogan, J. J. Williams (2019)
ACM CHI Extended Abstracts: Conference on Human Factors in Computing Systems
Proposed special interest group to foster the intersection of HCI and learning sciences.

Technical Reports

Theories of Programming (Dagstuhl Seminar 22231)
T. D. LaToza, A. J. Ko, D. C. Shepherd, D. Sjøberg, **B. Xie** (2023)
Dagstuhl Reports
Summary of research seminar to sketch new theories of programming and consider the role of theories in programming.

Invited Talks

AI as Unreliable Narrators in (CS) Education
B. Xie (2024)
Kapor Foundation
Presented on latest research trends related to equitable teaching about and with AI in K-12.

Understanding LLM Performance on CS Concept Inventories
B. Xie (2023)
Stanford Accelerator for Learning GenAI+Learning Grantee Meeting
Presented ongoing research on benchmarking CS concept inventories against 80+ large language models.

AI and Education Equity in Higher Education
E. Walker, K. Andrews, F. Castro, J. Solyst, T. Tanskley, **B. Xie**, L. Yan (2023)
ELAI Global: Conference on Empowering Learners for the Age of AI
Panel of early career scholars on equity and social justice in AI and educational technology.

Embedded Ethics at Stanford: Reflections and Future Directions
B. Xie, A. Newman, A. Karthik, W. G. Ray III (2023)
Stanford EdTech Ethics Workshop
Described Stanford's Embedded Ethics program and presented teaching demonstration on ethics in an algorithms class.

Ethical Considerations in Working with Communities and the Public
B. Xie (2023)
Stanford University Research, Action, and Impact through Strategic Engagement Doctoral Fellowship (RAISE)
Presented instructional workshop to graduate fellows conducting research with communities.

Designing for Equitable, Ethical, and Community-Centric Computing Education
B. Xie (2022)
University of Pittsburgh School of Computing and Information Technology for Social Change series
Presented research in designing sociotechnical systems that foster critical discourse with and about data.

Roles of Student Feedback for Equity in Large Computing Courses
B. Xie (2022)
University of Washington Information School Research Symposium
Presented research on contextualized student feedback that was published to PACMHCI/CSCW 2022.

Designing Tech for Equity in Education
B. Xie (2022)
University of Washington Impact++ Panel on Education & Tech
Presented a framework for designing and developing technology for equitable learning.

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.

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.

Teaching

Instructor	**Seminar on Identity, Demographic Data, and Computing Education**, UW INFO 499. Wi '22 **Introduction to Data Science**, UW INFO 370. Fa '17
Ethics Teaching Fellow	**Programming Methodologies**, Stanford CS 106A. Wi '23, Sp '23, Fa '23 **Programming Abstractions**, Stanford CS 106B. Sp '23, Fa '23, Wi '24 **Operating Systems Principles**, Stanford CS 111. Wi '23, Sp '23, Fa '23, Wi '24 **Design & Analysis of Algorithms**, Stanford CS 161. Fa '22 **Human-Centered Product Management**, Stanford CS 177. Fa '22 **Natural Language Processing with Deep Learning**, Stanford CS 224N. Wi '24
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 Mentored

At Stanford, UW, and MIT, I have mentored 18 students (one PhD, four Master's, 13 undergrad), including nine women, two non-binary, five Black, Latinx, and Pacific Islander students, five international, and one transfer student. Twelve co-authored eight papers with me, with three first-authoring papers. After graduating, six went on into graduate school (3 PhD, 3 Master's), two into nonprofit work, one into research, and five into industry.

Service

Program Committee	**ACM ICER**: Conference on International Computing Education Research (2023, 24)
Associate Chair	**ACM CHI**: Conference on Human Factors in Computing Systems (2022, 23)
Advisory Committee	**Kapor Foundation** Responsible AI & Tech Justice (2024-), **JCHE**: Journal of Computing in Higher Education Special Issue on AI & Education Equity in Higher Ed (2023-24)
Reviewer	**ACM CHI** (2018, 20, 21, 23), **ACM TOCE** (2019, 22, 23), **ACM FAccT** (2023), **ACM COMPASS** (2021), **Journal of CS Education** (2021), **ICIS** (2020), **ACM UIST** (2019), **ACM SIGCSE** (2018, 19), **Journal of Information and Learning Sciences** (2018)
Session Chair	**ACM SIGCSE**: Technical Symposium on Computer Science Education (2023)
Organizer	**Stanford Embedded Ethics Conference** (2023)
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

Convenings and communities I have participated in to develop my research experience.

2023	Digital Promise & Gates Foundation Convening on *Designing Emerging Learning Technologies*
2023	NYU & Spencer Foundation Conference on *Innovating a New Generation of Learning Analytics for Educational Equity*
2022	Center for Integrative Research in Computing & Learning Sciences (CIRCLS) Emerging Scholar
2022	Dagstuhl Seminar on *Theories of Programming*
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