

# MATT J. DAVIDSON

---

6012 South Ryan St \* Seattle, WA  
mattjohndavidson.github.io \* mattjd@uw.edu \* +1 512-626-7585

EDUCATION	<b>Doctoral Student, Measurement and Statistics, College of Education, University of Washington</b> Advisor: Dr. Min Li Committee Members: Dr. Chun Wang, Dr. Mo Zhang, Dr. Amy J. Ko	Expected Dec 2021
	<b>Master of Education, Learning Sciences, College of Education, University of Washington</b> Advisor: Dr. Virginia W. Berninger Thesis: Thinking Aloud before Composing: Effects of Oral Production of Ideas and Plans for Writing on Essays	Jun 2014
	<b>Bachelor of Arts, History, Philosophy, and English, University of Texas</b>	Dec 2007
	<b>Certification</b> Massachusetts Preliminary Teacher Certification, English 8-12	Feb 2015
	<b>Workshops</b> National Assessment of Educational Progress (NAEP) Data Training Workshop, Washington, D.C.	Jun 2018
	International Baccalaureate Theory of Knowledge Category 1, <i>GEMS World School, Singapore</i>	Feb 2016
RESEARCH EXPERIENCE	International Baccalaureate Psychology Category 1, <i>Online</i>	Apr 2016
	<b>Research Assistant, University of Washington: Seattle, WA</b> Investigating the Effects of Computational Thinking Games on Mathematical and Scientific Practices (NSF-1639576) PI: Dr. Zoran Popovic, <i>Paul G. Allen School of Computer Science and Engineering</i> I will be analyzing action sequences collected while K-12 students played an educational game designed to develop computational thinking skills. After filtering and wrangling the data into a format for analysis, I plan to use sequential pattern mining to discover clusters of students, then explore how those clusters are related to how students develop and apply computational thinking skills.	Jan 2021 – Jun 2021
	<b>Research Assistant, University of Washington: Seattle, WA</b> Automatically Synthesizing Valid, Personalized, Formative Assessments of CS1 Concepts (NSF-1735123) PI: Dr. Amy J. Ko, <i>The Information School</i> I provided psychometric support and guidance to the research team in its goal to develop an adaptive learning tool for introductory Python programming, called Codeitz (codeitz.com). I analyzed existing computer science assessments to guide the design of items for Codeitz, including designing and conducting a thinkaloud study to understand student response processes to items. I actively collaborated with group members on study designs, writing, and conference presentations.	Sep 2017 – Dec 2020

**Psychometric Intern**, *National Commission on Certification of Physician Assistants: Johns Creek, Georgia*

Jun 2019 –  
Aug 2019

I developed and independently explored research questions arising from a new, longitudinal format for the NCCPA recertification exam. I used data from the exam pilot to assess whether IRT model assumptions held for a longitudinal exam. I explored this by fitting and interpreting multidimensional item response theory models, with and without person-level covariates, using *flexMIRT*. Insights from my analysis were accepted for presentation at the 2020 NCME conference, and also guided development of the operational exam.

#### IN PROGRESS

**Davidson, M.J.** and Ko, A.J. Justice-oriented assessment for the secondary computer science classroom. *Book chapter in preparation*.

**Davidson, M.J.**, Li, M. and Ko, A.J. Exploring the effect of non-construct related item features on student responses in assessment of introductory programming skills. *Manuscript in preparation*.

#### PUBLICATIONS

Xie, B., **Davidson, M.J.**, Franke, B., McLeod, E., Li, M., & Ko, A.J. Domain Experts' Interpretations of Assessment Bias in a Scaled, Online Computer Science Curriculum. In *L@S '21: Proceedings of the 8th ACM Conference on Learning @ Scale*, Virtual Event. <https://dx.doi.org/10.1145/3430895.3460141>

**Davidson, M.J.**, Wortzman, B., Ko, A.J., and Li, M. (2021, March). Investigating item bias in a CS1 exam with differential item functioning. In *Proceedings of the 52nd ACM Technical Symposium on Computer Science Education*, Virtual Event. <https://doi.org/10.1145/3408877.3432397>

Ko, A.J., Oleson, A., Ryan, N., Register, Y., Xie, B., Tari, M., **Davidson, M.**, Druga, S., and Loksa, D. (2020, November). It is time for more critical CS education. *Communications of the ACM* 63:11, 31–33. <https://dl.acm.org/doi/10.1145/3424000>

Xie, B., **Davidson, M.J.**, Li, M. & Ko, A. (2019, February). An item response theory evaluation of a language-independent CS1 knowledge assessment. In *Proceedings of the 50th ACM Technical Symposium on Computer Science Education*, Minneapolis, Minnesota. <https://doi.org/10.1145/3287324.3287370>

Xie, B., Loksa, D., Nelson, G.L., **Davidson, M.J.**, Dong, D., Kwik, H., Tan, A.H., Hwa, L., Li, M., & Ko, A.J. (2019). A theory of instruction for introductory programming skills. *Computer Science Education*. <https://doi.org/10.1080/08993408.2019.1565235>

#### CONFERENCE PRESENTATIONS

**Davidson, M.J.**, and Li, M. (2021, July). Investigating student response processes on computer programming items: Combining evidence from keystroke logs and thinkalouds for validity arguments. To be presented at the 12th International Test Commission Conference, Virtual Event.

**Davidson, M.J.**, and Li, M. (2021, April). Non-construct item features and response processes in CS assessments: Evidence from thinkalouds and sequence analysis. To be presented at American Education Research Association Annual Meeting, Virtual Event.

**Davidson, M.J.**, Fan, F. Dallas, D., Goodman, J., Weir, J.B. (2020, April). *Modeling latent ability change in a longitudinal assessment: a MIRT approach*. Accepted for presentation at National Council on Measurement in Education Annual Meeting, original location San Francisco, California.

**Davidson M.J.**, Dong, D., Xie, B., Li, M., & Ko, A. (2019, April). *Exploring item difficulty in assessments of computer programming with cognitive interviews*. Accepted for presentation at National Council on Measurement in Education Annual Meeting, Toronto, Ontario, Canada.

**Davidson, M.**, Dong, D., Xie, B., Loska, D., Li, M., & Ko, A. (2018, June). *Assessing programming knowledge and skills: A theory-based approach*. Presented at the 11th International Test Commission Conference, Montreal, Ontario, Canada

Hole, B., **Davidson, M.**, Keller, R.D., & Keller, R.D. (2014, April). *Transferring principles of metacognition and alignment to different learning environments*. Presented at the annual Symposium on Teaching and Learning, University of Washington, Seattle, Washington.

**Davidson, M.**, Halpin, J., Zhao, Y., Shi, B., & Pahang, J. (2013, October). *Do-it-together: Collaborative group-work with Second-language writers*. Presented at Pacific Northwest Writing Centers Association Annual Conference, Cornish College of the Arts, Seattle, Washington.

Halpin, J., **Davidson, M.**, & Zhao, Y. (2013, November). “*Who are you?*” (*Oh, now what?*): *When identity cues over-determine tutor response*. Presented at National Conference on Peer Tutors in Writing, Tampa, Florida.

## TEACHING EXPERIENCE

**High School Teacher, Grades 9-12, American International School Vietnam: Ho Chi Minh City, Vietnam**

Aug 2015 –  
Aug 2017

- Taught IB Psychology, IB Theory of Knowledge, AP Psychology, English 9, AP English Language
- Developed unit plans and daily lessons for all subjects based on the principles of Understanding By Design
- Analyzed statistical properties of assessment data to guide instructional choices and interventions
- Differentiated content, exams, and instruction for entirely English Language Learner international student population
- Facilitated and chaperoned service-learning trip to local city schools in Siem Reap, Cambodia

**Assistant Director, Odegaard Writing and Research Center (OWRC): Seattle, WA**

Aug 2012 –  
Aug 2014

- Facilitated close staff connections through mentoring program, quarterly interviews, and community-building activities

- Established collaborative partnerships across university to facilitate discussion on English Language Learners and teaching and learning of writing
- Reviewed applications, interviewed applicants, and made hiring decisions
- Developed assessment and record-keeping procedures to evaluate current practices and plan for future growth

**Teaching Assistant, College of Education, University of Washington: Seattle, WA**

Jul 2013 –  
Aug 2014

- Conducted one-on-one meetings with College of Education students to provide feedback on writing process and written work
- Utilized respectful, responsive tutoring practices to foster strong cross-cultural relationships
- Collaborated with Student Services and faculty to assess students' writing needs in the College of Education

**Writing Consultant, Odegaard Writing and Research Center: Seattle, WA**

Sep 2013 –  
Sep 2014

- Employed a question-based approach to better understand students' goals and anxieties with writing
- Taught writers transferable strategies for writing to aid in their development as academic English writers
- Collaborated regularly with administrators and colleagues to ensure continued growth and reflection in tutoring practice

**Classroom Instructor, Grades 4-9, ACE Academy: Austin, TX**

Aug 2008 –  
Aug 2011

- Taught Social Studies 4<sup>th</sup> -9<sup>th</sup>, Philosophy and Logic 3<sup>rd</sup>-8<sup>th</sup>, Language Arts 4<sup>th</sup>-9<sup>th</sup>, Debate 7<sup>th</sup>-9<sup>th</sup>
- Designed and taught personalized, inquiry-based unit plans and daily lessons to meet the learning needs of gifted and twice exceptional students
- Collaborated with teachers and administration to create and implement new high school program
- Led effort to include Philosophy and Symbolic Logic courses for all students

## COMMUNITY ENGAGEMENT

**Member, Design Use Build Group (DUB), University of Washington: Seattle, WA**

Mar 2018 –

**Model United Nations Sponsor, American International School, Vietnam: Ho Chi Minh City, Vietnam**

Aug 2015 –  
Jun 2016

## PROFESSIONAL AFFILIATIONS

International Educational Data Mining Society (IEDMS)  
American Education Research Association (AERA), Division D, Measurement and Research Methodologies  
National Council on Measurement in Education (NCME)  
Association for Computing Machinery Special Interest Group in Computer Science Education (ACM SIGCSE)  
Anita B.org

## STATISTICAL COMPUTING

R, Python, *flexMIRT* 3.0, HLM 7, (ur)GENOVA, *Mplus*, git and GitHub

## LANGUAGES

**English:** Native Language  
**Spanish:** Novice Listening and Speaking, Intermediate Reading and Writing