

Kenneth Holstein

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Education

PhD in Human-Computer Interaction

2015 - 2020 (expected)

Carnegie Mellon University

Advisor: Dr. Vincent Aleven

Honors: Program in Interdisciplinary Education Research (PIER) Fellow,
NSF GRFP Honorable Mention (2016)

BS in Psychology (Cognitive focus)

2010 - 2014

University of Pittsburgh

Honors: Summa Cum Laude, University Scholar (top 2% of graduating class), Psi Chi

Refereed Journal and Conference Papers

Holstein, K., McLaren, B. M., & Aleven, V. (2017). Intelligent tutors as teachers' aides: exploring teacher needs for real-time analytics in blended classrooms. In *Proceedings of the Seventh International Learning Analytics & Knowledge Conference* (pp. 257-266). ACM.

Holstein, K., McLaren, B. M., & Aleven, V. (2017). SPACLE: investigating learning across virtual and physical spaces using spatial replays. In *Proceedings of the Seventh International Learning Analytics & Knowledge Conference* (pp. 358-367). ACM.

Doroudi, S., **Holstein, K.**, Aleven, V., & Brunskill, E. (2016). Sequence Matters, But How Exactly? A Method for Evaluating Activity Sequences from Data. In *Proceedings of the Ninth International Conference on Educational Data Mining*.

Doroudi, S., **Holstein, K.**, Aleven, V., & Brunskill, E. (2015). Towards Understanding How to Leverage Sense-making, Induction/refinement, and Fluency to Improve Robust Learning. In *Educational Data Mining*.

Lucas, C. G. & **Holstein, K.**, & Kemp, C. (2014). Discovering Hidden Causes using Statistical Evidence. In *Proceedings of the 36th Annual Conference of the Cognitive Science Society*.

Refereed Workshop Papers

Holstein, K., Xhakaj, F., Aleven, V., & McLaren, B. (2016). Luna: A Dashboard for Teachers Using Intelligent Tutoring Systems. In *4th International Workshop on Teaching Analytics at EC-TEL 16*.

Aleven, V., Xhakaj, F., **Holstein, K.**, & McLaren, B. (2016). Developing a Teacher Dashboard For Use with Intelligent Tutoring Systems. In *4th International Workshop on Teaching Analytics at EC-TEL 16*.

Doroudi, S., **Holstein, K.**, Alevan, V., & Brunskill, E. (2016). Sequence Matters, But How Do I Discover How? Towards a Workflow for Evaluating Activity Sequences from Data. In *Proceedings of the Ninth International Conference on Educational Data Mining*.

Lucas, C. G. & **Holstein, K.**, & Pacer, M. (2015). Inferring Causal Structure and Hidden Causes from Event Sequences. In *37th Annual Conference of the Cognitive Science Society*.

Research Grants

Understanding, supporting, and improving mathematics teachers' communicative practices in dealing with student errors, (Under Review).

Carnegie Mellon University and Utrecht University

Collaborators: Vincent Alevan, Bruce McLaren, Tamara van Gog, Janneke van de Pol

Research Projects

Helping Teachers Help Their Students: Teachers' Use of Intelligent Tutoring Software Analytics to Improve Student Learning, 2016 - present

Human-Computer Interaction Institute, Carnegie Mellon University

Collaborators: Vincent Alevan, Bruce McLaren, Franceska Xhakaj

Use of Machine Learning to Adaptively Select Activity Types and Enhance Student Learning with an Intelligent Tutoring System, 2014 - 2016

Machine Learning Department and Human-Computer Interaction Institute, Carnegie Mellon University

Collaborators: Emma Brunskill, Vincent Alevan, Shayan Doroudi

Investigating Human Inductive Learning and Reasoning, 2012 - 2014

Psychology Department, Carnegie Mellon University

Collaborators: Charles Kemp, Christopher Lucas

Teaching and Research Mentorship

Mentor (REU): Mera Tegene

May - August 2017

Mentor (Independent Study): Gena Hong

February - May 2017

Mentor (RA): Zac Yu

January - April 2017

Mentor (Independent Study): Tianxin (Tim) Chu

January - March 2017

Mentor (REU): Peter Schaldenbrand

May 2016 - March 2017

Mentor (REU): Jasper Tom

June - August 2016

Mentor (REU): Nupur Chatterji

May - August 2016

Group Mentor: Pittsburgh Science of Learning Summer School

July 2016

Mentor (RA): Bo Kim

May - July 2016

Mentor (RA): Malcolm Guya

May - July 2016

Mentor (RA): Casey Hicks

April - July 2016

Mentor (RA): Patrick Bruce McLaren

September - December 2015

Other Experience

Research Associate, Carnegie Mellon University
Human-Computer Interaction Institute

August 2014 - August 2015
Supervisors: Dr. Vincent Alven &
Dr. Emma Brunskill

- Collaborated with an interdisciplinary research team on the **development and in-classroom testing of a data-driven, self-improving intelligent tutoring system** that adaptively selects educational activities based on online estimates of students' knowledge and motivational states.
- Developed predictive models of student knowledge, and explored the development of novel methods for **adaptive selection among alternative student models** in a reinforcement learning setting.
- Designed and implemented web-based **intelligent tutor activities and computer-based assessments for 4th and 5th grade level fractions topics**, and iteratively improved these materials based on observation of students, analyses of tutor log data, and feedback from mathematics educators.
- **Ran in-vivo experiments** in elementary school classrooms.

Undergraduate Researcher, Carnegie Mellon University
Computational Cognitive Science Lab

December 2012 - December 2014
Supervisors: Dr. Charles Kemp &
Dr. Christopher Lucas

- Collaborated both in-person and remotely on the **design and development of a group of experiments** that evaluate computational models of human causal learning and reasoning, when presented with visualizations of noisy data.
- Designed and implemented **interactive, web-based interfaces** for a set of experiments. Iteratively designed user-interfaces based on "think-aloud" sessions, laboratory discussions, and data-based insights.
- Wrote scripts to **analyze experimental data**, to covertly **record user-click** and other **interaction data**, and to **generate video stimuli from continuous-time probabilistic models**.
- **Ran human research participants** both in-lab and via Amazon's Mechanical Turk.

Maker Corps Mentor, Maker Education Initiative
Maker Corps

April 2014 - July 2014
Supervisor: Steve Davee

- Designed, implemented, and **led hands-on science education workshops** -- centered around custom-built software and physical computing interfaces -- **for elementary and middle school students** in socioeconomically disadvantaged regions.
- Worked with children and teenagers **in both group and individual contexts**, to help them **overcome technical challenges and achieve their creative goals**.
- Participated in a 4-week "Maker Education" development camp. **Designed, prototyped, and presented a new educational toy or interactive science exhibit each week** of the camp.

Data Visualizer, University of Pittsburgh
Department of English

January 2014 - April 2014
Supervisor: Hali Felt

- **Produced lesson plans** for a hands-on workshop designed to introduce undergraduate writers and journalists to archival research, data visualization, and computer programming.
- Created **visualizations of publication and co-authorship data** from academic databases for an **interdisciplinary 'Science of Science' research project**.

Summer Research Fellow, Carnegie Mellon University
Center for the Neural Basis of Cognition

May 2013 - August 2013
Supervisors: Dr. Charles Kemp &
Dr. Christopher Carroll

- Wrote and modified **stochastic simulations** to compare measures of statistical "surprise", and designed experiments to evaluate cognitive models of human surprise.

Research Assistant, University of Pittsburgh
Cognitive Science Learning Laboratory

August 2012 - December 2012
Supervisors: Dr. Timothy Nokes-Malach &
Dr. Soniya Gadgil-Sharma

- Conducted literature reviews, transcribed videos, and coded experimental data for a **research study on student motivation** in collaborative, statistics learning contexts.

Service

Learning Analytics Dashboard Development Tutor, HCII
Volunteer, HCII Open House
Student Host, Carnegie Mellon University Fusion Forum

2017
2016 - 2017
2016

Independent Work & Consulting

Learning Analytics Consultant, Naming Nature
Math, Statistics, & Programming Tutor
Volunteer ESL Tutor, Greater Pittsburgh Literacy Council

May 2015 - August 2015
April 2014 - June 2015
September 2011 - January 2012