

Michael A. Madaio

Human-Computer Interaction Institute
School of Computer Science
Carnegie Mellon University

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EDUCATION

- 2015 - Present **Ph.D.**, Human-Computer Interaction
Carnegie Mellon University
Advisors: Dr. Justine Cassell, Dr. Amy Ogan
- 2013 - 2015 **Master of Science**, Digital Media
Georgia Institute of Technology
Advisor: Dr. Ian Bogost
- 2009 - 2010 **Master of Education**, Curriculum and Instruction
University of Maryland, College Park
- 2005 - 2009 **Bachelor of Arts**, English Language and Literature
University of Maryland, College Park

RESEARCH EXPERIENCE

- August 2015 - Present **Carnegie Mellon University**, Pittsburgh, PA
Human-Computer Interaction Institute
Graduate Research Assistant (with Justine Cassell and Amy Ogan)
National Science Foundation-funded project entitled: “Partners in Learning: Building rapport with a virtual peer tutor”
Jacobs Foundation-funded project entitled: “Phonological Literacy Training by phone to improve early reading skills”
- Summer, 2015 **Data Science for Social Good, Atlanta**
Georgia Institute of Technology, Atlanta, Georgia
Graduate Research Assistant (with Polo Chau and Bistra Dilkina)
- January, 2014 - May, 2015 **Center for 21st Century Universities**
Georgia Institute of Technology, Atlanta, Georgia
Graduate Research Assistant (with Paul Baker and Rich DeMillo)
- August, 2013 - May, 2015 **Adaptive Digital Media (ADAM) Lab**
Georgia Institute of Technology, Atlanta, Georgia
Graduate Research Assistant (with Brian Magerko)

HONORS AND AWARDS

- 2018 **ICLS Best Paper Award**, for [C8]
- 2018 **ICLS Best Student Paper Nominee**, for [C8]
- 2018 **GovTech / MetroLab Network “Innovation of the Month” Award**, for [G2]
- 2017 **CSCL Naomi Miyake Best Student Paper Award**, for [C5]
- 2017 **EDM Student Travel Award**, for [F3]
- 2017 **Ford Foundation Pre-Doctoral Fellowship, Honorable Mention and Alternate**
- 2016 **KDD Best Student Paper Runner Up, Applied Data Science Track** [for C4]
- 2016 **KDD Student Travel Award**, for [F4]
- 2016 **Ford Foundation Pre-Doctoral Fellowship, Honorable Mention and Alternate**
- 2015-
Present **Program for Interdisciplinary Education Research Fellowship**, Carnegie Mellon University, for [F2]
- 2015 **Best Thesis Award**, Digital Media Masters Program, Georgia Tech
- 2011-2012 **Excellence in Teaching Award**, John F. Kennedy High School
- 2009 **Arts Scholar**, University of Maryland, College Park
- 2005-2009 **President’s Scholarship**, University of Maryland, College Park

PUBLICATIONS

JOURNAL PUBLICATIONS (PEER-REVIEWED)

- [J1] **"I think you just got mixed up": Confident peer tutors hedge to support partners' face needs**
Michael Madaio, Justine Cassell, Amy Ogan
In *International Journal of Computer-Supported Collaborative Learning*. 4(12), pp.401-421. December, 2017.

FULL CONFERENCE PUBLICATIONS (PEER-REVIEWED)

- [C12] **A real-time pipeline for spatio-temporal fire risk prediction**
Bhavkaran Singh, Qianyi Hu, Jeffrey Chen, Fangyan Chen, Jessica Lee, Nathan Kuo, Palak Narang, Lt. Jason Batts, Geoffrey Arnold, Michael Madaio
In *Proceedings of the 2018 ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, August, 2018.
[12% acceptance rate]

- [C11] **Designing Appropriate Learning Technologies for School vs Home Settings in**

Tanzanian Rural Villages

Judith Uchidiuno, Evelyn Yarzebinski, Michael Madaio, Nupur Maheshwari, Kenneth Koedinger, Amy Ogan

In *Proceedings of the 1st ACM SIGCAS Conference on Computing and Sustainable Societies (COMPASS)* July, 2018.

- [C10] **"I think it might help if we multiply, and not add" : Detecting Indirectness in Conversation"**
Pranav Goel, Yoichi Matsuyama, Michael Madaio, Justine Cassell
In *Proceedings of the Ninth International Workshop on Spoken Dialogue Systems Technology (IWSDS)*, May, 2018.
- [C9] **Socially-Conditioned Task Reasoning for a Virtual Tutoring Agent**
Zian Zhao, Michael Madaio, Florian Pecune, Yoichi Matsuyama, Justine Cassell
In *Proceedings of the 17th International Conference of Autonomous Agents and Multi-Agent Systems (AAMAS)*, October, 2018.
- [C8] **A climate of support: a process-oriented analysis of the impact of rapport on peer tutoring**
Michael Madaio, Kun Peng, Amy Ogan, Justine Cassell
In *Proceedings of the 12th International Conference of the Learning Sciences (ICLS)*. June, 2018.
- [C7] **Temporally Selective Attention Model for Social and Affective State Recognition in Multimedia Content**
Hongliang Yu, Liangke Gui, Michael Madaio, Amy Ogan, Justine Cassell, Louis-Philippe Morency
In *Proceedings of the 25th ACM SIGMM Multimedia Conference (ACM SIGMM)*, October, 2017
- [C6] **Using Temporal Association Rule Mining to Predict Dyadic Rapport in Peer Tutoring**
Michael Madaio, Rae Lasko, Amy Ogan, Justine Cassell
In *Proceedings of the 10th International Conference on Educational Data Mining (EDM)*. June, 2017
- [C5] **The Impact of Peer Tutors' Use of Indirect Feedback and Instructions.**
Michael Madaio, Justine Cassell, Amy Ogan
In *Proceedings of the 12th International Conference on Computer-Supported Collaborative Learning (CSCL)*, June, 2017
[Best Student Paper]
- [C4] **Firebird: Predicting Fire Risk and Prioritizing Fire Inspections in Atlanta**
Michael Madaio, Shang-Tse Chen, Oliver L. Haimson, Wenwen Zhang, Xiang Cheng, Matthew Hinds-Aldrich, Duen Horng (Polo) Chau, Bistra Dilikina
In *Proceedings of the ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)* (p. 185-194), August 2016

[full paper acceptance rate: 12%] [**Best Student Paper Runner-Up**]

- [C3] **The Effect of Friendship and Tutoring Roles on Reciprocal Peer Tutoring Strategies**
Michael Madaio, Amy Ogan, Justine Cassell
In *International Conference on Intelligent Tutoring Systems (ITS)* (pp. 423-429), June, 2016.
- [C2] **Experiences with MOOCs in a West-African Technology Hub**
Michael Madaio, Rebecca Grinter, Ellen Zegura
In *Proceedings of the Eighth International Conference on Information-Communication Technology for Development (ICTD)*, June, 2016.
- [C1] **Beyond bootstrapping: the Liberian iLab as a maturing community of practice.**
Ellen Zegura, Michael Madaio, Rebecca Grinter
In *Proceedings of the Seventh International Conference on Information-Communication Technology for Development (ICTD)*, June, 2015.

BOOK CHAPTERS

- [BC1] **Towards an Ethics of Machine Learning for the “Smart City”**
Michael Madaio, Sarah E. Martin
Invited Chapter in L. Scherling & A. DeRosa (Eds.), *Ethics in Design*. Bloomsbury Academic (in press).

WORKSHOP PAPERS AND REFEREED SHORT PAPERS (LIGHTLY PEER-REVIEWED)

- [W3] **Supporting Parent-Child Literacy Interactions with Feature Phones in Cote d’Ivoire**
Michael Madaio, Amy Ogan
In the *HCI Across Borders* Symposium at the 2018 ACM SIGCHI *Conference on Human Factors in Computing Systems*. April, 2018.
- [W2] **Exploring Student Control over Data Privacy through Speculative Design**
Michael Madaio
In *Spark UAL Creative Teaching and Learning Journal*. Vol 2, No 2, October, 2016.
- [W1] **Identifying and Prioritizing Fire Inspections: A Case Study of Predicting Fire Risk in Atlanta**
Michael Madaio, Shang-Tse Chen, Oliver L. Haimson, Wenwen Zhang, Xiang Cheng, Matthew Hinds-Aldrich, Duen Horng (Polo) Chau, Bistra Dilikina
In *Bloomberg Data for Good Exchange*, September, 2015.

REGULATORY FILINGS

- [RF1] **Comments filed in response to the Office of Science and Technology Policy's Notice of Request for Information (RFI) requesting public comments to inform its policy development related to high-impact learning technologies**

Paul M.A. Baker, Michael A. Madaio
Federal Register Vol. 79, Number 8 (Monday, January 13, 2014) pp. 2201-2204.

GRANTS AND RESEARCH AWARDS

- [G4] **Putting Data to Work: Supporting Workforce Development through Data-Driven Skill Retraining and Job Recommendations**
Michael Madaio, Kenneth Holstein
Metro21 Smart Cities Institute, Accepted September, 2018. \$42,968
- [G3] **Bridging the Gap: An NSF Workshop on Conversational Agents and Human-Robot Interaction**
Justine Cassell, Brian Scassellati, Michael Madaio, Jake Brawer
NSF Cyber-Human Systems (CHS), Robust Intelligence, National Robotics Initiative.
Award #1829237
Accepted March, 2018. \$49,869
- [G2] **Investigating the Role of Rapport in Learning with a Virtual Peer Tutor**
Michael Madaio, Justine Cassell
Collaborative Research Experience for Undergraduates (CREU),
Accepted June, 2017. \$9,000
- [G1] **Using Spatio-Temporal Machine Learning to Inform Fire Risk Reduction Policies**
Michael Madaio
Metro21 Smart Cities Institute, Accepted January, 2017. \$17,600

FUNDING

- [F5] **Collaborative Research Experience for Undergraduates (CREU) Grant** \$9,000
National Science Foundation 2017-2018
- [F4] **Educational Data Mining Conference Travel Award** \$1,500
International Education Data Mining Society June, 2017
- [F3] **ACM SIGKDD Conference Student Travel Award** \$750
Association for Computing Machinery August, 2016
- [F2] **Program for Interdisciplinary Education Research Fellowship** \$127,500
Institute for Education Sciences, Department of Education 2015-2018
- [F1] **Wearable Technology Design Workshop Student Travel Award** \$1,200
National University of Singapore, CUTE Center March, 2015

INVITED TALKS AND PRESENTATIONS

TALKS AT CONFERENCES AND SYMPOSIA (NON-ARCHIVAL)

- [P7] **How Technology Can Help Us Understand and Enhance Curiosity and Human Relationships.**
Forward with Google for Education, Amsterdam, NL.
October, 2018.

- [P6] **Using Machine Learning to Design Socially-Aware Artificial Intelligence**
Google Cloud NEXT, San Francisco, CA.
July, 2018.

- [P5] **Using Google Cloud Platform and TensorFlow to Develop Socially-Aware Artificial Intelligence**
EDUCAUSE Annual Conference. Philadelphia, PA.
October, 2017.

- [P4] **Speculative Design as a Research Method to Explore Challenges in Student Data Privacy**
Designs of eLearning, The New School, and Parsons School of Design, New York, NY.
September, 2016.

- [P3] **The Possibilities and Perils of Automating Personalized Learning**
The Career, Research, and Innovation Development Conference (CRIDC), Georgia Tech.
January, 2015.

- [P2] **Learning with Autonomous Agents: Distributed Cognition in the Classroom**
The Georgia Tech Research Innovation Conference (GTRIC), Georgia Tech, GA.
January, 2014.

- [P1] **Adaptive Learning: The State of the Field**
Center for 21st Century Universities Seminar Series. Georgia Tech, GA.
April, 2015.

OTHER RESEARCH ACTIVITIES

WORKSHOPS AND PANELS CO-ORGANIZED (NOT PEER-REVIEWED)

Bridging the Gap: Bridging the Gap: An NSF Workshop on Conversational Agents and Human-Robot Interaction

Justine Cassell, Brian Scassellati, Michael Madaio, Jake Brawer
NSF Cyber-Human Systems (CHS), ROBUST INTELLIGENCE, National Robotics Initiative. Award #1829237
Planned, November, 2018.

Future of the Campus Workshop

Hosted by the Center for 21st Century Universities, Atlanta, GA, April, 2015.

Special Session on Technology and Innovation in Education

At the Foro de Rectores de las Américas (Forum of University Presidents), held at the 7th Summit of the Americas, Universidad Tecnológica de Panama, March, 2015.

WORKSHOPS ATTENDED

Wearable Technology Design Workshop

Hosted by the National University of Singapore CUTE Center, in partnership with Georgia Institute of Technology, March, 2015.

MEDIA COVERAGE

- [M7] Data Tool Created By CMU Student Helps Predict Fire-Prone Buildings In Pittsburgh
Amy Wadas, *CBS Pittsburgh*, April, 2018.
- [M6] Where's the fire? This data approach is helping Pittsburgh pinpoint buildings at risk
Adam Smeltz, *Pittsburgh Post-Gazette*, April, 2018.
- [M5] At Carnegie Mellon University, machine learning gets social
Google for Education Blog, March, 2018.
- [M4] The Advent of Virtual Humans
Jon Skillings, *CNET*, June 2016.
- [M3] S.A.R.A Seeks to Give Artificial Intelligence People Skills
Xavier Harding, *Popular Science*, October, 2016.
- [M2] Embracing Analytics: How Communities Around the Country are Utilizing Data Analytics to Predict a Host of Risk Factors and Reduce Fires
Jesse Roman, *National Fire Protection Association Journal*, May 2016.
- [M1] When Computing Equals Social Good
Georgia Tech College of Computing, July 2015

TEACHING EXPERIENCE AND STUDENT MENTORING

TEACHING ASSISTANTSHIPS

- Fall 2017 **User-Centered Research and Evaluation**, Carnegie Mellon University
Instructor: Amy Ogan
- Fall 2013 **Introduction to Computational Media**, Georgia Institute of Technology
Instructor: Ian Bogost

INSTRUCTOR OF RECORD

- 2009-2013 **English Language and Literature**, John F. Kennedy High School
Silver Spring, MD

UNDERGRADUATE SENIOR THESES SUPERVISED

Spring 2016 Lauren Trichtinger, B.S. Psychology, Chatham University

Accepted to Notre Dame Quantitative Psychology Ph.D., Fall 2016.

UNDERGRADUATE RESEARCH ASSISTANTS SUPERVISED [AT CMU, UNLESS OTHERWISE NOTED]

Adaolisa Annamah, B.S. in HCI and Business Administration

Michelina Astle, B.S. Psychology at Chatham University

Jake Beley, B.S. Computer Science at Dickinson College

Rishabh Chatterjee, B.S. Computer Science

Naomi Eigbe, B.S. Psychology and Computer Science at Rice University

Alvaro Granados, B.S. Neuroscience at University of Pittsburgh

Robert Huerbin, B.S. Psychology, at University of Pittsburgh

Rae Lasko, B.S. Cognitive Science

Sarah Lehman, B.S. Psychology at Chatham University

Tiffany Lee, B.S. Computer Science

Jeffrey Li, B.S. Computer Science

William Liu, B.S. Cognitive Science

Kun Peng, B.S. Statistics and Machine Learning

Lynnette Ramsay, B.S. Cognitive Science

Vanessa Siriwalothakul, B.S. Computer Science

Michelle Tai, B.S. Human-Computer Interaction

Anne Widom, B.S. Psychology

Caroline Wu, B.S. Computer Science

Zian Zhao, B.S. Information Engineering at Shanghai Jiao Tong University

MASTERS RESEARCH ASSISTANTS SUPERVISED

Mohammed Alburaiqi, Masters in Educational Technology and Learning Science

Carolina Arroyo Hernandez, Masters in Public Policy and Management, Data Analytics

Qianyi Hu, Masters in Information Systems Management

Sara Jackson, Masters in Public Policy and Management, Data Analytics

Bhavkaran Singh, Masters in Information Systems Management

SERVICE

CONFERENCE STUDENT VOLUNTEERING: ACM SIGKDD, 2016

REVIEWING

ACM SIGCHI 2016, 2017, 2018, SIGCHI PLAY 2017

Artificial Intelligence in Education, 2017, 2018

Public Opinion Quarterly, 2016

Spark UAL Creative Teaching and Learning Journal, 2017

CARNEGIE MELLON UNIVERSITY

HCI Student Co-Ombudsman (2016-2017)

PIER Speaker Series Coordinator (2016-2018)

Associate Director, Students for Urban Data Systems (2017-2018)

EXTERNAL

Mentor for Uptake.org Data Science for Social Good Fellows (2018)