

Anna Noonan Rafferty

PERSONAL	<i>Address:</i> One North College St. Northfield, MN 55057 <i>Webpage:</i> sites.google.com/site/annanrafferty/	<i>E-mail:</i> arafferty@carleton.edu <i>Telephone:</i> (507)-222-5173
EMPLOYMENT	Carleton College , Northfield, MN. Assistant Professor, Computer Science.	September 2014 - present
EDUCATION	University of California, Berkeley , Berkeley, CA Ph.D., Computer Science (Awarded 05/2014) Masters of Science, Computer Science (Awarded 05/2011) <ul style="list-style-type: none">• Thesis: <i>Applying Probabilistic Models for Knowledge Diagnosis and Educational Game Design</i>• Committee: Tom Griffiths (advisor), Dan Klein, Marcia Linn, and Pieter Abbeel GPA: 3.97/4.0	August 2008 - May 2014
	Stanford University , Stanford, CA Masters of Science, Symbolic Systems (Awarded 06/2007) <ul style="list-style-type: none">• Advised by Professor Dan Schwartz; second thesis reader Professor Ken Koedinger (CMU)• Thesis: <i>Using FACT to Challenge Assumptions: Frequency, Accuracy, Choice, and Timing in Machine Learning</i> Bachelors of Science, Symbolic Systems, with Distinction (Awarded 06/2007) <ul style="list-style-type: none">• Concentration: Artificial intelligence Bachelors of Arts, Feminist Studies, with Distinction (Awarded 06/2007) Undergraduate GPA: 3.9/4.0; Masters GPA: 4.0/4.0	September 2003 - June 2007
HONORS	<ul style="list-style-type: none">• Outstanding Program Committee member, AAAI-18. (2018)• Semifinalist for National Academy of Education/Spencer Postdoctoral Fellowship. (2017)• National Academy of Education/Spencer Dissertation Fellowship: \$25,000 to support the final year of dissertation writing. Awarded to fewer than 10% of applicants. (2013)• Best Poster Award at <i>The 5th International Conference on Educational Data Mining</i>. (2012)• Department of Defense NDSEG Fellowship: 3 years of graduate funding for stipend and tuition. (2010)• University of California, Berkeley, Departmental Outstanding GSI Award for teaching performance: One GSI from each of EE and CS is chosen for this annual award. (2009)• University of California, Berkeley, University-wide Outstanding GSI Award for teaching performance: Given to fewer than 10% of all GSIs university-wide. (2009)• NSF Graduate Fellowship recipient: 3 years of graduate funding for stipend and tuition. (2008)• Best Paper Award for the Young Researcher Track, <i>Artificial Intelligence in Education</i>. (2007)• Phi Beta Kappa, Stanford University. (2007)	
PUBLICATIONS: JOURNAL ARTICLES	Walker, C. M., Lombrozo, T., Williams, J. J., Rafferty, A. N. and Gopnik, A. (2017). Explaining Constrains Causal Learning in Childhood. <i>Child Development</i> , 80(1), 229-246. Rafferty, A. N., Brunskill, E., Griffiths, T. L. & Shafto, P. (2016). Faster Teaching via POMDP Planning. <i>Cognitive Science</i> , 40(6), 1290-1332.	

Gerard, L. F., Ryoo, K., McElhaney, K. W., Liu, O.L., Rafferty, A. N., & Linn, M. C. (2016). Automated Guidance for Student Inquiry. *Journal of Educational Psychology*, 108(1), 60-81.

Linn, M. C., Eylon, B. S., Rafferty, A. N., & Vitale, J. M. (2015). Designing Instruction to Improve Lifelong Inquiry Learning. *Eurasia Journal of Mathematics, Science & Technology Education*, 11(2), 217-225.

Rafferty, A. N., LaMar, M. M., & Griffiths, T. L. (2015). Inferring learners' knowledge from their actions. *Cognitive Science*, 39(3): 584-618.

Rafferty, A. N., Zaharia, M., & Griffiths, T. L. (2014) Optimally designing games for behavioural research. *Proceedings of the Royal Society Series A*, 470(2167), 20130828.

Linn, M. C., Gerard, L. F., Ryoo, K., Liu, L., & Rafferty, A. N. (2014). Computer-guided inquiry to improve science learning. *Science*, 344: 155-156. [Education Forum paper]

Rafferty, A. N., Griffiths, T. L., & Klein, D. (2014). Analyzing the rate at which languages lose the influence of a common ancestor. *Cognitive Science*, 38(7): 1406-1431.

Rafferty, A. N., Griffiths, T. L., & Ettliger, M. (2013). Greater learnability is not sufficient to produce cultural universals. *Cognition*, 129, 70-87.

PUBLICATIONS:
CONFERENCE
PROCEEDINGS

* indicates that an oral presentation was given by Anna Rafferty.

Williams, J. J., Rafferty, A. N., Tingley, D., Ang, A., Lasecki, W., & Kim, J. (2018). Enhancing Online Problems Through Instructor-Centered Tools for Randomized Experiments. *Proceedings of the ACM CHI Conference on Human Factors in Computing Systems (CHI 2018)*.

Wiese, E. S., Rafferty, A. N., & Linn, M. C. (2017). Eliciting Middle School Students' Ideas About Graphs Supports Their Learning from a Computer Model. *Proceedings of the 39th Annual Conference of the Cognitive Science Society*.

Jansen, R. A., Rafferty, A. N., & Griffiths, T. L. (2017). Algebra is not like trivia: Evaluating self-assessment in an online math tutor. *Proceedings of the 39th Annual Conference of the Cognitive Science Society*.

Williams, J. J., Rafferty, A. N., Maldonado, S., Ang, A., Tingley, D., & Kim, J. (2017). MOOClets: A Framework for Dynamic Experimentation and Personalization. In *Fourth (2017) ACM Conference on Learning @ Scale* (pp. 287-290). [extended abstract]

Rafferty, A. N., Jansen, R. A., & Griffiths, T. L. (2016) Using Inverse Planning for Personalized Feedback. *Proceedings of the 9th International Conference on Educational Data Mining* (pp. 472-477). *

Williams, J. J., Kim, J., Rafferty, A. N., Maldonado, S., Gajos, K. Z., Lasecki, W. S., & Heffernan, N. (2016). AXIS: Generating Explanations at Scale with Learnersourcing and Machine Learning. *Proceedings of the Third (2016) ACM Conference on Learning @ Scale*. Honorable Mention for Best Paper.

Rafferty, A. N., & Griffiths, T. L. (2015). Interpreting Freeform Equation Solving. *Proceedings of the 17th International Conference on Artificial Intelligence in Education* (pp. 387-397). *

Neumann, R., Rafferty, A. N., & Griffiths, T. L. (2014). A bounded rationality account of wishful thinking. *Proceedings of the 36th Annual Conference of the Cognitive Science Society*.

- Rafferty, A. N. & Griffiths, T. L. (2014) Diagnosing Algebra Understanding via Bayesian Inverse Planning. *Proceedings of the 7th International Conference on Educational Data Mining* (pp. 351-352). [extended abstract]
- Rafferty, A. N., Gerard, L., McElhaney, K., & Linn, M. C. (2014) Promoting Student Learning Through Automated Formative Guidance on Chemistry Drawings. *Proceedings of the International Conference of the Learning Sciences (ICLS) 2014* (pp. 386-393). *
- Rafferty, A. N., Davenport, J., & Brunskill, E. (2013) Estimating Student Knowledge from Paired Interaction Data. *Proceedings of the 6th International Conference on Educational Data Mining* (pp. 260-263). *
- Rafferty, A. N., Gerard, L., McElhaney, K., & Linn, M. C. (2013) Automating Guidance for Students' Chemistry Drawings. *Proceedings of the Workshops at the 16th International Conference on Artificial Intelligence in Education AIED 2013* (pp. 1-8). *
- Rafferty, A. N., Zaharia, M., & Griffiths, T. L. (2012) Optimally Designing Games for Cognitive Science Research. *Proceedings of the 34th Annual Conference of the Cognitive Science Society* (pp. 893-898). *
- Rafferty, A. N., LaMar, M. M., and Griffiths, T. L. (2012) Inferring learners' knowledge from observed actions. *Proceedings of the 5th International Conference on Educational Data Mining* (pp. 226-227). [extended abstract]
- Davenport, J., Rafferty, A. N., Timms, M., Yaron, D., & Karabinos, M. (2012). ChemVLab+: Evaluating a Virtual Lab Tutor for High School Chemistry. *Proceedings of the 10th International Conference of the Learning Sciences* (pp. 381-385).
- Rafferty, A. N., Brunskill, E., Griffiths, T. L., & Shafto, P. (2011). Faster teaching by POMDP planning. *Proceedings of the 15th International Conference on Artificial Intelligence in Education* (pp. 280-287). *
- Rafferty, A. N., Griffiths, T. L., & Ettliger, M. (2011) Exploring the relationship between learnability and linguistic universals. *Proceedings of the 2nd Workshop on Cognitive Modeling and Computational Linguistics at ACL 2011* (pp. 49-57). *
- Rafferty, A. N. & Griffiths, T. L. (2010) Optimal language learning: The importance of starting representative. *Proceedings of the 32nd Annual Conference of the Cognitive Science Society* (pp. 2069-2074).
- Rafferty, A. N., Griffiths, T. L., & Klein, D. (2009) Convergence Bounds for Language Evolution by Iterated Learning. *Proceedings of the 31st Annual Conference of the Cognitive Science Society* (pp. 2451-2456). *
- Ramage, D., Rafferty, A. N., & Manning, C. D. (2009) Random Walks for Text Semantic Similarity. *Proceedings of the 2009 Workshop on Graph-based Methods for Natural Language Processing* (pp. 23-31).
- Pado, S., de Marneffe, M.-C., MacCartney, B., Rafferty, A. N., Yeh, E., & Manning, C. D. (2008) Deciding entailment and contradiction with stochastic and edit distance-based alignment. *Text Analysis Conference 2008 (RTE Track)* (pp. 1-10).
- Rafferty, A. N. & Manning, C. D. (2008) Parsing Three German Treebanks: Lexicalized and Unlexicalized Baselines. *Proceedings of the Workshop on Parsing German, ACL-HLT 2008* (pp. 40-46).

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de Marneffe, M.-C., Rafferty, A. N., & Manning, C. D. (2008) Finding Contradictions in Text. *Proceedings of ACL-08: HLT* (pp. 1039-1047).

Rafferty, A. N. & Yudelson, M. (2007) Applying Learning Factors Analysis to Build Stereotypic Student Models." *Proceedings of the 13th International Conference on Artificial Intelligence in Education* (pp. 697-698). *

de Marneffe, M.-C., MacCartney, B., Grenager, T., Cer, D., Rafferty, A. N. & Manning, C. D. (2006) Learning to distinguish valid textual entailments. *Proceedings of The Second PASCAL Challenges Workshop* (pp. 1-6).

GRANTS AND
FUNDING**Awarded - External**

- 2014-2017: "Diagnosing Misconceptions About Algebra Using Bayesian Inverse Reinforcement Learning." National Science Foundation, DRL-1420732 (\$443,248). Co-Principle Investigator.

Awarded - Internal

- 2017: Large Faculty Development Endowment Grant from Carleton College to support a term of sabbatical.
- 2017: Class of 1949 Fellowship from Carleton College to support a term of sabbatical.
- 2015-2017: Funding from Carleton College to support one summer research student for 10 weeks of research.

TEACHING

Carleton College

Artificial Intelligence, Computer Science 321

Winter 2015; Winter 2017

Upper-level elective course focused on a broad survey of techniques in artificial intelligence. Course-work includes a mixture of programming and written activities, and culminated with a final project.

Computability and Complexity, Computer Science 254

Spring 2015; Fall 2015; Spring 2016

Required computer science course, with additional students from mathematics and linguistics. Class focuses on developing an understanding of the theoretical ideas in computer science, with students deepening their ability to write and understand proofs.

Computational Models of Cognition, Computer Science 328

Spring 2016

Upper-level, research-focused elective course about the intersection of cognitive science and computer science. Topics include neural networks and probabilistic modeling, with applications to language, categorization, and memory. A final research project provided depth in a particular area.

Math of Computer Science, Computer Science 202

Spring 2017

Foundational course introducing key mathematical concepts for computer science, including probability, combinatorics, logic, and proofs.

Data Structures, Computer Science 201

Fall 2014; Winter 2015; Spring 2015; Fall 2016

Major and non-major course focused on developing an understanding of the problem solving patterns used in computer science and on learning a second programming language (Java). Learning and engagement promoted through a mixture of lecture, discussion, and in class activities and labs.

Intro to Computer Science, Computer Science 111

Fall 2015; Winter 2016; Spring 2017

Major and non-major course targeted at students with no background in computer science. Small group activities and interdisciplinary applications foster understanding and motivation.

University of California, Berkeley (Graduate Student Instructor/Teaching Assistant)
Computational Models of Cognition, Cognitive Science 131 **Fall 2010**
Introduction to Artificial Intelligence, Computer Science 188 **Fall 2008**

Mentoring

Carleton College

2015-present

Mentor undergraduate student researchers and include them in my ongoing research. Students have worked on projects about applying machine learning to algebra understanding and using educational data mining to interpret learners' interactions with virtual chemistry labs. Total of sixteen students, both in the summer and during the term. Mentor senior students in comprehensive project groups (2016-2017); topics include building iPad apps, self-driving cars, and book recommendation systems.

University of California, Berkeley

January 2009-May 2014

Manage and mentor undergraduate research assistants. Teach research skills and assist students in discovering their own research interests. Advise students on senior honors theses.

DEPARTMENTAL AND INSTITUTIONAL SERVICE

- Coordinator of senior comprehensive project logistics across the computer science department. (2016-2017)
- Attended and presented at the Liberal Arts Consortium for Online Learning (LACOL) 2016 Workshop as part of a group of Carleton professors. Collaborated to form ongoing connections and determine how the consortium can meet individual member schools' needs. (2016)
- Member of the Future Learning Technologies Group. Identify opportunities for Carleton to improve pedagogy through engagement with technology and assist in reviewing internal grant proposals aimed at pedagogical innovation using technology. (2015-2017)
- Member of the Science Planning Group. Coordinate departmental input on program needs and architectural designs, and contribute to meetings focused on the overall design of the complex and ways it can support interdisciplinary science engagement. (2015-2017)
- Spoke to the Carleton Board of Trustees about how the new science complex will support engaging students in interdisciplinary research. (2015)
- Presented current research at the annual Carleton faculty retreat. (2015)
- Chaperoned students at MinneWIC, a regional conference supporting women in computing. (2015, 2017)

BOOK CHAPTERS

Williams, J. J., Kim, J., Glassman, E., Rafferty, A. N., & Lasecki, W. S. (2016). Making Static Lessons Adaptive through Crowdsourcing and Machine Learning. In Sottolare, R. A., Graesser, A. C., Hu, X., Olney, A., Nye, B., Sinatra, A. M. (Eds.), *Design Recommendations for Intelligent Tutoring Systems: Volume 4 - Domain Modeling* (pp. 127-137). US Army Research Laboratory.

CONFERENCE PRESENTATIONS

*Includes abstracts and conferences where papers are not published in proceedings. * indicates that an oral presentation was given by Anna Rafferty.*

Williams, J. J., Rafferty, A. N., Ang, A., Tingley, D., Lasecki, W. S., & Kim, J. (2017, May). Connecting Instructors and Learning Scientists via Collaborative Dynamic Experimentation. In *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems* (pp. 3012-3018). ACM.

Rafferty, A. N., Jansen, R. A., & Griffiths, T. L. (2017). Understanding Equation Solving Skills Using Inverse Planning. Presented as part of a symposium on "Understanding Student Decision Making using Markov Decision Processes" at the Annual Meeting of the National Council on Measurement in Education (NCME). San Antonio, TX.

Timms, M., Davenport, J., Schwab, C. J., Rafferty A. N., & Yaron D. (2016). Measuring the Next Generation Science Standards in the Classroom: Embedded Assessment in the ChemVlab+.

Presented at the Annual Meeting of the American Educational Research Association (AERA). Washington, D.C.

Linn, M., Gerard, L., Liu, O. L., Rafferty, A. N., & Vitale, J. (2015). Using Automated Scoring to Promote Knowledge Integration in Science. Presented at the Annual Meeting of the American Educational Research Association (AERA). Chicago, IL.

Davenport, J., Rafferty, A. N., Karabinos, M. & Yaron, D. (2015). Investigating Chemistry Learning Using Virtual Lab Activities in Real Classrooms. Presented at the Annual Meeting of the American Educational Research Association (AERA). Chicago, IL.

Rafferty, A. N., Davenport, J., & Yaron, D. (2014). Tracking Student Understanding of Chemical Reactions in ChemVLab+. Presented at the 36th Annual Conference of the Cognitive Science Society. Quebec City, Canada.

Rafferty, A. N. & Griffiths, T. L. (2014). Using Bayesian Inverse Planning to Infer Learners' Misunderstandings. Part of a symposium on "Computational Models for Learning: From Basic Processes to Real World Education," presented at the 26th Annual Convention of the Association for Psychological Science (APS). San Francisco, CA. *

Rafferty, A. N. (2014). Applying Probabilistic Models for Knowledge Diagnosis and Educational Game Design. Presented at the Annual Meeting of the American Educational Research Association (AERA). Philadelphia, PA.

Davenport, J., Powers, J., Rafferty, A. N., Timms, M., Karabinos, M., & Yaron, D. (2014). Mitigating Factors of Student Learning Using Online Virtual Chemistry Lab Activities. Presented at the Annual Meeting of the American Educational Research Association (AERA). Philadelphia, PA.

Davenport, J., Rafferty, A. N., Yaron, D., Karabinos, M., & Timms, M. (2014). ChemVLab+: Simulation-Based Lab Activities to Support Chemistry Learning. Presented at the Annual Meeting of the American Educational Research Association (AERA). Philadelphia, PA.

LaMar, M. M., Rafferty, A. N., & Griffiths, T. L. (2013). Using Markov Decision Processes to Infer Student Understanding in Complex Tasks. Presented at the 78th Annual Meeting of the International Psychometric Society (IMPS). Arnhem, Netherlands.

McElhaney, K., Gerard, L., Rafferty, A. N., Zertuche, A., & Linn, M. C. (2013). Comparing the benefits of automated and teacher feedback on student-generated molecular representations." Presented at the Annual Meeting of the American Educational Research Association (AERA). San Francisco, California, USA.

Davenport, J., Rafferty, A. N., Timms, M., Yaron, D., & Karabinos, M. (2013). Exploring the Usability and Feasibility of a Virtual Chemistry Lab Tutor for High School Science. Presented at the Annual Meeting of the American Educational Research Association (AERA). San Francisco, California, USA.

LaMar, M. M., Rafferty, A. N., & Griffiths, T. L. (2013). Diagnosing student understanding using Markov Decision Process models. Presented at the Annual Meeting of the National Council on Measurement in Education (NCME). San Francisco, California, USA.

Ettlinger, M., Rafferty, A. N., & Griffiths, T. L. (2012). Are phonological biases enough or are they too much? Exploring the relationship between learnability and linguistic universals. Presented at the 86th Annual Meeting of the Linguistics Society of America (LSA). Portland, Oregon, USA.

Rafferty, A. N., Brunskill, E., Griffiths, T. L., & Shafto, P. (2011). Faster Teaching by POMDP Planning. Presented at the 44th Annual Meeting of the Society for Mathematical Psychology. Boston, Massachusetts, USA. *

Griffiths, T. L., Rafferty, A. N., & Ettliger, M. (2011). Analyzing the relationship between cultural transmission and cultural universals. Presented at the Annual Meeting of the Society of Philosophy and Psychology. Montreal, Canada.

INVITED TALKS

“Automatically evaluating students’ work in interactive science learning environments.” (2018) Institute for Child Development seminar series, University of Minnesota. Minneapolis, Minnesota, USA.

“Recognizing and responding to misunderstandings via computational modeling.” (2017) Psychological Foundations colloquium series, University of Minnesota. Minneapolis, Minnesota, USA.

“Leveraging computational models of human cognition for educational interventions.” (2017) Dagstuhl seminar 17351: *Machine Learning and Formal Methods*. Dagstuhl, Germany.

“Using Computational Methods to Improve Feedback for Learners.” (2016) Machine Learning for Education. Workshop held at *Neural Information Processing Systems (NIPS) 2016*. Barcelona, Spain.

“Adaptive Teaching and Learning.” (2016) LACOL Consortium-wide Workshop. Haverford, PA.

“Optimal game design for behavioral research and educational assessment.” (2015) Optimizing Experimental Designs: Theory, Practice, and Applications. Workshop held at *Cognitive Science 2015*. Pasadena, CA.

“Games for Assessment: From Observed Actions to Knowledge Diagnosis.” (2013) NYUConCats (Concepts and Cognition), New York University. New York, NY.

“Assessment in Virtual Environments: Inferring Learners’ Knowledge Through Observation.” (2013) Language and Cognition Lab, Stanford University. Stanford, CA.

“Automatically Evaluating Innovative Assessments.” (2013). Personalizing Learning Workshop. Rice University. Houston, Texas, USA.

“Applying Probabilistic Models for Knowledge Diagnosis and Educational Game Design.” (2013) Departmental seminar, Educational Psychology, University of Minnesota. Minneapolis, Minnesota, USA.

“Using Inverse Reinforcement Learning To Diagnose Learners’ Misconceptions.” (2012) Personalizing Education With Machine Learning. Workshop held at *Neural Information Processing Systems (NIPS) 2012*. Lake Tahoe, Nevada, USA.

“Inferring Student Misconceptions from Problem Solutions.” (2012) Khan Academy. Mountain View, California, USA.

MINOR ACADEMIC AWARDS

- Glushko Travel Grant: Support for travel to the 34th Annual Conference of the Cognitive Science Society, awarded to students based on quality of accepted paper. (2012)
- AIED 2011 Travel Grant: Support for travel to the 15 Annual Conference of Artificial Intelligence in Education. (2011)
- Women in Cognitive Science Travel Grant: Support for travel to the 31st Annual Conference of

- the Cognitive Science Society. (2009)
 - Member of Cap and Gown, Stanford Women’s Honors Society. (2007)
 - Research Science Institute Alumnae, sponsored by the Center for Excellence in Education. (2002)
- PROFESSIONAL DEVELOPMENT
- Attended and presented at the Dagstuhl Seminar on Machine Learning and Formal Methods, an invitation only, week-long seminar. (2017).
 - Attended (by invitation) Microsoft Research Faculty Summit entitled “The Edge of AI.” (2017).
 - Attended and presented at the Alliance to Advance Liberal Arts Colleges (AALAC) Workshop on Data Ethics. (2017)
 - Attended a workshop on contemporary neural network models (*NCPW15*), with travel funding from the Estes Fund, to gain experience with deep learning models for my research and to enhance my teaching of these topics. (2016)
 - Carleton workshops: Participated in a four-day workshop for new faculty members focused on improving pedagogy (2014) and a two-day workshop on course-based research experiences (2015).
 - Participated in the Critical Conversations group at Carleton, a structured series of conversations for faculty and staff to learn to create more inclusive classrooms and campuses. (2015)
 - Attended the “CRA-W Managing the Academic Career for Women Faculty in Undergraduate Computing Programs Workshop,” a workshop targeted at new women faculty at institutions with a teaching focus. (2015)
 - Professional meetings attended not mentioned elsewhere in this document: *Cognitive Science* 2016, *SIGCSE* 2015 (conference on computer science education), *NIPS* 2009 (conference on machine learning).
- REVIEWING
- Ad hoc reviewer for NSF grant proposal. Fall 2014.
 - *Association for the Advancement of Artificial Intelligence (AAAI)*. Program committee 2018.
 - *Artificial Intelligence in Education*. Program committee 2015, 2017, 2018.
 - *Cognitive Science*. Conference (2016-2018) and journal.
 - *Computers & Education*. Journal.
 - *Educational Advances in Artificial Intelligence (EAAI)*. Program committee 2016-2018.
 - *npj Digital Medicine*. Journal.
 - *Neural Information Processing Systems (NIPS)*. Program committee 2014.
 - *Open Mind: Discoveries in Cognitive Science*. Journal.
 - *Transactions on Learning Technologies*. Journal.
 - *Women in Machine Learning* annual workshop (held at NIPS). Area chair 2017.
- RELEVANT EXTERNAL SERVICE
- Co-organizer for NIPS 2017 workshop “Teaching Machines, Robots, and Humans” (approximately 45% acceptance rate for workshops).
 - Member of Advisory Board for Project Learning with Automated, Networked Supports (NSF-1451604). Provide periodic advice and feedback to project researchers, including yearly 2-day advisory board meeting. (2015-present).
 - Volunteer as a Science Envoy, receiving training and experience sharing science with the public. Selected by faculty nomination. (September 2013-May 2014).
 - Volunteer for periodic one day events encouraging young women’s interest in science and mathematics (“Expanding Your Horizons” and “Girls Go Tech”). (August 2008-May 2014)
 - Volunteer with Girls Inc. developing and teaching girls ages 6-14 science material (4-5 hr/wk, June 2009-June 2010)
 - Women in Computer Science and Electrical Engineering Outreach Coordinator (August 2009-June 2010)
- PROFESSIONAL AFFILIATIONS
- Cognitive Science Society
 - International AIED (Artificial Intelligence in Education) Society
 - International Educational Data Mining Society
 - American Educational Research Association

RESEARCH
AFFILIATIONS**Visiting Scholar, Educational Psychology Department***University of Minnesota, Minneapolis, MN**September 2017-present*

Collaborate with STEM Thinking, Reasoning, & Learning Lab in addition to pursuing existing research interests in applying machine learning to problems in education and investigating automated detection of student ideas and automated feedback in mathematics and science activities.

Graduate Student Researcher, Computational Cognitive Science Lab*University of California, Berkeley, CA**August 2008-May 2014*

Develop computational models of cognition and apply formal modeling techniques to problems in education and cognitive science. Previous research includes experimental and theoretical work on language evolution and iterated learning. Advised by Professor Tom Griffiths.

Graduate Student Researcher, WISE Group*University of California, Berkeley, CA**May 2012-May 2014*

Work focusing on automating guidance for students' drawings of chemical reactions, including developing an automating scoring algorithm. Design classroom studies and conduct data analysis to detect differences in student learning. Advised by Professor Marcia Linn.

Research Programmer, Stanford NLP Lab*Stanford University, Stanford, CA**July 2007 - August 2008*

Conducted research in textual entailment and automatic contradiction detection using probabilistic natural language processing and machine learning techniques. Worked as part of a research team to improve statistical natural language processing tools for parsing and part-of-speech tagging. Advised by Professor Chris Manning.

Research Assistant, AAA Lab*Stanford University, Stanford, CA**June 2006 - June 2007*

Investigated data-mining techniques to understand and improve performance of computer-based tutors for teaching geometry. Used machine learning and other tools to automatically determine what students learn in computer tutors and how to create cognitive models of their progress. Advised by Professor Dan Schwartz.

INTERNSHIPS

*Data Mining Intern, WestEd***April 2010 - August 2010; May 2011-August 2014**

Analyze data from students using a computerized chemistry tutor. Prepare evidence-based reports for iterative improvement of the tutor. Use data mining techniques to create new models for predicting students' post-test scores and learning gains based on their behaviors in the tutor.

*Computational Intelligence Lab Intern, 3M***May 2013 - August 2013**

Apply machine learning techniques to problems in health information systems. Use tools such as Hadoop to work with large healthcare datasets.