Emma Tosch
PhD Candidate
University of Massachusetts Amherst
College of Information and Computer Sciences
Advisors: Drs. Eliot Moss & David Jensen

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Education

Ph.D. **Computer Science**. University of Massachusetts Amherst. Amherst, MA. 2011 – present.
M.S. **Computer Science**. University of Massachusetts Amherst. Amherst, MA. 2011 – 2015.
M.A. **Computer Science**. Brandeis University. Waltham, MA. 2009 – 2011.
B.A. **English Literature**. Wellesley College. Wellesley, MA. 2006 – 2008.

Research Experience

Research Assistant. May 2018 – Present. University of Massachusetts Amherst, Knowledge Discovery Lab.
Supervisor: David Jensen. *Topic*: Developing tools and methods to assist with evaluation on the DARPA Explainable AI (XAI) program.

Research Assistant. May 2013 – December 2016. University of Massachusetts Amherst, PLASMA Lab.
Supervisor: Emery Berger. *Topic*: Developing a domain specific programming language and runtime system to design, debug, and deploy scientific surveys on the web, at scale.

Research Intern. June 2015 – August 2015. Facebook, Inc., Core Data Science – Economic Research Team, Statistics and Decision Science Team.
Supervisor: Eytan Bakshy. *Topic*: Static Analysis for the PlanOut DSL.

Research Assistant. September 2011 – January 2013. University of Massachusetts Amherst, CI Lab.
Supervisor: Lee Spector. *Topic*: New metrics for evaluating parameters of evolutionary search based on techniques from nonparametric statistics.

Visiting Researcher. June 2010 – August 2010. Institute for Creative Technologies (Playa Vista, CA).
Supervisor: Ron Artstein. *Topic*: Augmenting and evaluating a natural language generation and question-answering system for virtual humans.

Publications

E. Tosch, J. Foley, K. Clary, D. Jensen. Toybox: A Behavioral Testing Framework for Deep Reinforcement Learning. *Under review.* 2019.

E. Tosch, E. Bakshy, E. Berger, D. Jensen, E. Moss. PlanAlyzer: Assessing Threats to the Validity of Online Experiments. *Proceedings of the 2019 ACM International Conference on Object Oriented Programming Systems Languages and Applications (OOPSLA)*. 2019.

J. Foley,* **E. Tosch**,* K. Clary, D. Jensen. ToyBox: Better Atari Environments for Testing Reinforcement Learning Agents. *Systems for Machine Learning Workshop at the 32nd Conference on Neural Information Processing Systems (NeurIPS)*. 2018.

S. Witty, J. K. Lee, **E. Tosch**, A. Atrey, M. Littman, D. Jensen. Measuring and Characterizing Generalization in Deep Reinforcement Learning. *Critiquing and Correcting Trends in Reinforcement Learning Workshop at the 32nd Conference on Neural Information Processing Systems (NeurIPS)*. 2018.

K. Clary, **E. Tosch**, J. Foley, D. Jensen. Let's Play Again: Variability of Deep Reinforcement Learning Agents in Atari Environments. *Critiquing and Correcting Trends in Reinforcement Learning Workshop at the 32nd Conference on Neural Information Processing Systems (NeurIPS)*. 2018.

E. Tosch, E. Bakshy. Formal Verification and Automated Causal Inference for Internet-Scale Experiments. *Conference on Digital Experimentation (CODE@MIT)*. 2015.

E. Tosch, E. Berger. SurveyMan: Programming and Debugging Surveys at Scale (**Best Paper Award**). *Proceedings of the 2014 ACM International Conference on Object Oriented Programming Systems Languages and Applications (OOPSLA)*. 2014.

E. Tosch, L. Spector. Achieving COSMOS: A metric for determining when to give up and when to reach for the stars. *Proceedings of the 14th International Conference on Genetic and Evolutionary Computation Conference Companion (GECCO)*. 2012.

K. Harrington, **E. Tosch**, L. Spector, J. Pollack. Compositional Autoconstructive Dynamics. *Proceedings of the 8th International Conference on Complex Systems*. 2011.

G. Chen, **E. Tosch**, R. Artstein, A. Leuski, D. Traum. Evaluating Conversational Characters Created through Question Generation. *Proceedings of the 24th International Florida Artificial Intelligence Research Society Conference (FLAIRS)*. 2011.

Teaching Experience

Instructor. Reasoning Under Uncertainty (Undergraduate). University of Massachusetts Amherst. Co-taught with Luis Pineda. Spring 2018.

Teaching Assistant. Advanced Logic (Upper Undergraduate/Graduate). University of Massachusetts Amherst. Taught by Prof. Neil Immerman. Fall 2017.

Teaching Assistant, Guest Lecturer. Reasoning Under Uncertainty (Undergraduate). University of Massachusetts Amherst. Taught by Prof. Andrew McGregor. Spring 2017.

Mentor. Project on detecting adversarial behavior amongst online survey-takers (Rosario Huamani Carpio, Pomona College, B.A. 2018). University of Massachusetts Amherst REU Program. PLASMA Lab. Summer 2016.

Mentor. Project for developing a SurveyMan graphical interface in React (Prakhar Srivastav, Columbia University, M.S. 2016). Google Summer of Code. PLASMA Lab. Summer 2015.

Mentor. Early-stage research project on developing tools for writing sound online surveys (Molly McMahon, University of Massachusetts Amherst, B.A. 2015). University of Massachusetts Amherst REU Program, Independent study. PLASMA Lab. Summer 2013, Spring 2014.

Teaching Assistant. Reasoning Under Uncertainty (Undergraduate). University of Massachusetts Amherst. Taught by Prof. Andrew McGregor. Spring 2013.

Teaching Assistant, Guest Lecturer. Introduction to Theory of Computation (Undergraduate). Brandeis University. Taught by Dr. Antonella DiLillo. Spring 2011.

Teaching Assistant. Structure and Interpretation of Computer Programs (Undergraduate). Brandeis University. Taught by Prof. Harry Mairson. Fall 2010.

Teaching Assistant. Data Structures (Undergraduate). Brandeis University. Taught by Dr. Antonella DiLillo. Spring 2010.

Teaching Training

28 September 2015. Active Learning Training with Rachel Rybaczuk.
Fall 2015. CIRTL Course. Diversity in College Classroom: Teaching the STEM Undergraduate.

Work Experience

Project Assistant. May 2017 – Aug. 2017. UMass, Prof. Charles Weems. Amherst, MA.
Software Engineering Intern. Sept. 2014 – Dec. 2014. Google, Inc. Mountain View, CA.
Data Warehouse Analyst. March 2008 – May 2009. Recombinant Data Corp. Newton, MA.
Assistant Loan Processor. June 2005 – October 2006. Hoffman Companies. Brookline, MA.
Intern. June 2004 – August 2004. New Jersey Division of Law and Public Service. Trenton, NJ.

Talks and Presentations

Software Infrastructure for Machine Learning.
Poster presentation. NeurIPS Systems for ML Workshop. 7 December 2018. Montreal, QC.
Oral presentation (full). IBM AI Systems Day. 4 October 2018. Cambridge, MA.

Programming Languages and Experimentation.
Oral Presentation (full). OOPSLA 2019. 23 October 2019. Athens, Greece.
Invited talk. Wellesley College. 9 December 2016. Wellesley, MA.
Oral presentation (full). NEPLS Spring 2016. 31 May 2016. Amherst, MA.
Poster presentation. CODE@MIT. 17 October 2015. Cambridge, MA.

Programming and Debugging Surveys.
Invited talk. SPLASH-I. 8 November 2016. Amsterdam, Netherlands.
Invited talk. Union College. 1 October 2015. Schenectady, NY.
Invited talk. Google, Inc. 13 May 2015. Cambridge, MA.
Poster presentation. UMass Center for Data Science launch symposium. 9 April 2015. Amherst, MA.
Oral pressentation (full). OOPSLA 2014. 22 October 2014. Portland, OR.
Oral presentation (short). PLDI Student Research Competition. 11 June 2014. Edinburgh, Scotland.
Poster presentation. CRA-W Graduate Cohort Workshop. 11 April 2014. Santa Clara, CA.
Oral presentation. UMass CS Women. 12 March 2014. Amherst, MA.
Lightning talk. Google PhD Summit. 31 January 2014. Cambridge, MA.
Oral presentation (full). POPL OBT Workshop. 25 January 2014. San Diego, CA.

Programming Language Research and Social Science.
Oral presentation. REUMass Summer '16 Lunch Series. 30 June 2016. Amherst, MA.

Achieving COSMOS.
Oral presentation (full). GECCO UP Workshop. 7 July 2012. Philadelphia, PA.

General Non-technical Topics in Computing.
Panelist. Programming Languages Mentoring Workshop. 22 October 2019. Athens, Greece.
Panelist. Programming Languages Mentoring Workshop. 23 June 2019. Pheonix, AZ.
Panelist. MassMutual Women in Technology Conference. 24 April 2015. Springfield, MA.

Professional Activities and Service

SLE Artifact Evaluation Commitee. Member. 2019.
ECOOP Artifact Evaluation Committee. Member. 2018.
CICS Graduate Representative. January 2016 – January 2017.
Student Volunteer, PLDI 2016. June 2016.
UMass CS Women. Webmaster. June 2016 – January 2017.
UMass CS Women. Treasurer. January 2016 – May 2016.
UMass CS Women. Co-Chair. January 2015 – January 2016.
PLDI External Review Committee. Member. 2016.
ECOOP External Review Committee. Member. 2016.
POPL OBT Workshop Program Committee. Member. 2016.
WPI STEM Faculty Launch. Participant. September 2015.
ACM-W Early Career Mentoring Workshop. Participant. June 2015.
Program Comittee Member. ECOOP DSLDI Workshop 2016.
Artifact Evaluation Reviewer. PLDI 2016.
Computer Science Graduate Admissions Committee. Reviewer. December 2014 – February 2015.
NCWIT Aspirations Scholarship Reviewer. November 2014.
Artifact Evaluation Committee. Reviewer. POPL 2015.
Student Volunteer, SPLASH 2014. October 2014.
Graduate Employee Organization, UAW 2322. Steward. September 2011 – May 2014.
NSF REU Graduate Student Mentor. Summer 2013.
Oregon Programming Languages Summer School. Attendee. July – August 2013.
Brandeis University Women in Computing (for Undergraduates). Founder. April 2010 – May 2011.

Honors, Scholarships, and Awards

2015 WPI STEM Faculty Launch participant and travel grant.
2015 NCWIT Symantec Student Seed Funding (for UMass CS Women)
2015 UMass Amherst School of Computer Science Outstanding Synthesis Award
2014 OOPSLA Best Paper Award
2014 PLDI ACM Student Research Competition (1st Place)
2013 Future of Software Engineering Symposium Scholarship at Microsoft Research
2013 Programming Languages Mentoring Workshop Scholarship
2012 ACM-W conference scholarship (attended SIG-EVO)
2010 Grace Hopper Celebration of Women in Computing Scholarship
2005 Humanities Foundation Award in English Literature