EMMA BRUNSKILL

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ACADEMIC POSITIONS

Carnegie Mellon University August 2011-Present
Assistant Professor, Tenure-track, Computer Science Department
Affiliate Professor, Machine Learning Department

University of California, Berkeley August 2009-July 2011
NSF Mathematical Sciences Postdoctoral Research Fellow, Department of Computer Science

EDUCATION

Massachusetts Institute of Technology June 2009
Doctor of Philosophy, Computer Science

Oxford University September 2002
Master of Science, Neuroscience

University of Washington June 2000
Bachelors of Science, Computer Engineering and Physics, Magna Cum Laude, With Honors

HONORS

Office of Naval Research Young Investigator Award (36 selected of 383)	2015
Received best paper award at Reinforcement Learning and Decision Making	2015
Nominated for Popular Science "Brilliant 10"	2015
National Science Foundation CAREER award	2014
Paper with Yun-en Liu nominated for best paper at Computer Human Interaction	2014
Paper with Yun-en Liu nominated for best paper at Educational Data Mining	2013
Microsoft Research New Faculty Fellow (1 of 7 worldwide)	2012
Paper with Jung In Lee nominated for best paper at Educational Data Mining	2012
CMU Wimmer Fellow	2012
National Science Foundation (NSF) Mathematical Sciences Postdoctoral Fellowship	2009-2011
MIT Hugh Hampton Young Memorial Fund Fellowship	2008
IEEE Robotics and Autonomous Systems Fellowship Honorable Mention	2007
MIT Public Service Fellowship	2006,2009
National Science Foundation (NSF) Graduate Fellowship	2001
Rhodes Scholar	2001
Marshall Scholar (declined)	2001
MIT Presidential Scholar (awarded to outstanding incoming graduate students)	2000
Runner up, Computing Research Association (CRA) Outstanding Undergraduate Award	2000
Goldwater Scholar (national award for excellence in science & engineering)	

JOURNAL PUBLICATIONS

1. Anna Rafferty, Emma Brunskill, Thomas Griffiths and Patrick Shafto. Faster Teaching via POMDP Planning. ***Cognitive Science***. Accepted.

2. Ken Koedinger, Emma Brunskill, Ryan Baker, Elizabeth McLaughlin and John Stamper. New Potentials for Data-Driven Intelligent Tutoring System Development and Optimization. ***AI Magazine***. 2013.

3. Gretchen Stevens, Seth Flaxman, Emma Brunskill, Maya Mascarenhas, Colin Mathers and Mariel Finucane. Global and Regional Hearing Impairment Prevalence: an Analysis of 42 Studies in 29 Countries, ***European Journal of Public Health***, 2012.

4. Indrani Medhi, Somani Patnaik, Emma Brunskill, S.N. Nagesena Gautama, William Thies, Kentaro Toyama. Designing Mobile Interfaces for Novice and Low-Literacy Users, ***ACM Transactions on Computer-Human Interaction***, v18 (2011).

5. Ruijie He, Emma Brunskill, and Nicholas Roy. Efficient Planning under Uncertainty with Macro-actions, ***Journal of Artificial Intelligence Research (JAIR)***, v40 (2011).

6. Emma Brunskill, Leslie Pack Kaelbling, Tomás Lozano-Pérez, and Nicholas Roy. Planning in Partially-observable Switching-mode Continuous Domains, ***Annals of Mathematics and Artificial Intelligence***, v58 (2010).

7. Emma Brunskill, Bethany Leffler, Lihong Li, Michael L. Littman, and Nicholas Roy. Provably Efficient Learning with Typed Parametric Models, ***Journal of Machine Learning Research (JMLR)***, v10 (2009).

8. Kristine Krug, Emma Brunskill, Anna Scarna, Guy Goodwin, and Andrew Parker. Perceptual Switch Rates with Ambiguous Structure-from-motion Figures in Bipolar Disorder, ***Proceedings of the Royal Society B***, v275 (2008).

HIGHLY REFEREED CONFERENCE PUBLICATIONS

9. Travis Mandel, Yun-En Liu, Emma Brunskill and Zoran Popović. Offline Evaluation of Online Reinforcement Learning Algorithms, ***Proceedings of the AAAI Conference on Artificial Intelligence (AAAI)***, 2016.

10. Christoph Dann and Emma Brunskill. Sample Complexity of Episodic Fixed-Horizon Reinforcement Learning, ***Proceedings of the Neural Information Processing Systems Conference (NIPS)***, Dec 2015.

11. Daniel Guo and Emma Brunskill. Concurrent PAC RL, In ***Proceedings of the AAAI Conference on Artificial Intelligence (AAAI)***, 2015.

12. Travis Mandel, Yun-En Liu, Emma Brunskill and Zoran Popović. The Queue Method: Handling Delay, Heuristics, Prior Data, and Evaluation in Bandits, In ***Proceedings of the AAAI Conference on Artificial Intelligence (AAAI)***, 2015.

13. Joseph Rollinson and Emma Brunskill. From Predictive Models to Instructional Policies, In ***Proceedings of the International Conference on Educational Data Mining (EDM)***, 2015.

14. Shayan Doroudi, Kenneth Holstein, Vincent Aleven and Emma Brunskill. Towards Understanding How to Leverage Sense-making, Induction/Refinement and Fluency to Improve Robust Learning, In ***Proceedings of the International Conference on Educational Data Mining (EDM)***, 2015.

15. Mohammad Azer, Alessandro Lazaric and Emma Brunskill. Resource-Efficient Stochastic Optimization of a Locally Smooth Function under Correlated Bandit Feedback, ***Proceedings of the International Conference on Machine Learning (ICML)***, 2014.

16. Emma Brunskill and Lihong Li. PAC-inspired Option Discovery in Lifelong Reinforcement Learning, ***Proceedings of the International Conference on Machine Learning (ICML)***, 2014.

17. Yun-En Liu, Travis Mandel, Emma Brunskill and Zoran Popović. Trading Off Scientific Knowledge and User Learning with Multi-Armed Bandits, In ***Proceedings of the International Conference on Educational Data Mining (EDM)***, 2014.

18. Travis Mandel, Yun-En Liu, Sergey Levine, Emma Brunskill and Zoran Popović. Offline Policy Evaluation Across Representations with Applications to Educational Games, In ***Proceedings of the International Conference on Autonomous Agents and Multiagent Systems (AAMAS)***, 2014.

19. Yun-En Liu, Travis Mandel, Eric Butler, Erik Andersen, Eleanor O'Rourke, Emma Brunskill and Zoran Popović. Towards Automatic Experimentation of Educational Knowledge, ***Computer Human Interaction (CHI)***, 2014.

20. Mohammad Azer, Alessandro Lazaric and Emma Brunskill. Sequential Transfer in Multi-armed Bandit with Finite Set of Models, ***Proceedings of the Neural Information Processing Systems Conference (NIPS)***, Dec 2013.

21. Mohammad Azer, Alessandro Lazaric and Emma Brunskill. Regret Bounds for Reinforcement Learning with Policy Advice, ***Proceedings of the European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML/PKDD)***, 2013.

22. Emma Brunskill and Lihong Li. Sample Complexity of Transfer Reinforcement Learning, ***Proceedings of the Conference on Uncertainty in Artificial Intelligence (UAI)***, 2013.

23. Anna Rafferty, Jodi Davenport and Emma Brunskill. Estimating Student Knowledge from Paired Interaction Data, In ***Proceedings of the International Conference on Educational Data Mining (EDM)***, 2013.

24. Yun-En Liu, Travis Mandel, Eric Butler, Erik Andersen, Eleanor O'Rourke, Emma Brunskill and Zoran Popović. Predicting Player Moves in an Educational Game: A Hybrid Approach, In ***Proceedings of the International Conference on Educational Data Mining (EDM)***, 2013.

25. Siyuan Liu, Miguel Araújo, Ramayya Krishnan, Emma Brunskill, Rosaldo Rossetti and João Barros. Understanding Sequential Decisions via Inverse Reinforcement Learning, In ***International Conference on Mobile Data Management (MDM)***, 2013.

26. Sashank Reddi and Emma Brunskill. Incentive Decision Processes, In ***Proceedings of the Conference on Uncertainty in Artificial Intelligence (UAI)***, 2012.

27. Jung In Lee and Emma Brunskill. The Impact on Individualizing Student Models on Necessary Practice Opportunities, In ***Proceedings of the International Conference on Educational Data Mining (EDM)***, 2012.

28. Michael Yudelson and Emma Brunskill. Policy Building – An Extension To User Modeling, In ***Proceedings of the International Conference on Educational Data Mining (EDM)***, 2012.

29. Emma Brunskill. Bayes-Optimal Reinforcement Learning for Discrete Uncertainty Domains, In ***International Conference on Autonomous Agents and Multiagent Systems (AAMAS)***, 2012 Extended Abstract.

30. Emma Brunskill and Stuart Russell. Partially Observable Sequential Decision Making for Problem Selection in an Intelligent Tutoring System, In ***Proceedings of the International Conference on Educational Data Mining (EDM)***, 2011.

31. Emma Brunskill. Estimating Prerequisite Structure From Noisy Data, In ***Proceedings of the International Conference on Educational Data Mining (EDM)***, 2011.

32. Anna Rafferty, Emma Brunskill, Tom Griffiths, and Patrick Shafto. Faster Teaching by POMDP Planning, In ***Proceedings of the International Conference on Artificial Intelligence in Education (AIED)***, 2011.

33. Emma Brunskill, Sunil Garg, Clint Tseng, Joyojeet Pal, and Leah Findlater. Evaluating an Adaptive Multi-user Educational Tool for Low-resource Regions, In ***Proceedings of the International Conference on Information and Communication Technologies and Development (ICTD)***, 2010.

34. Emma Brunskill and Stuart Russell. RAPID: A Reachable Anytime Planner for Imprecisely-sensed Domains, In ***Proceedings of the Conference on Uncertainty in Artificial Intelligence (UAI)***, 2010.

35. Ruijie He, Emma Brunskill, and Nicholas Roy. PUMA: Planning under Uncertainty with Macro-actions, In ***Proceedings of the AAAI Conference on Artificial Intelligence (AAAI)***, 2010.

36. Emma Brunskill. When Policies Can Be Trusted: Analyzing a Criteria to Identify Optimal Policies in MDPs with Unknown Model Parameters, In ***Proceedings of the International Conference on Automated Planning and Scheduling (ICAPS)***, 2010.

37. Somani Patnaik, Emma Brunskill, and William Thies. Evaluating the Accuracy of Data Collection on Mobile Phones: A Study of Forms, SMS, and Voice, In ***Proceedings of the International Conference on Information and Communication Technologies and Development (ICTD)***, 2009.

38. Yuan Wei, Emma Brunskill, Thomas Kollar and Nicholas Roy. Where to Go: Interpreting Natural Directions Using Global Inference, In ***Proceedings of the International Conference on Robotics and Automation (ICRA)***, 2009.

39. Emma Brunskill, Bethany Leffler, Lihong Li, Michael L. Littman and Nicholas Roy. CORL: A Continuous-state Offset-dynamics Reinforcement Learner, In ***Proceedings of the Conference on Uncertainty in Artificial Intelligence (UAI)***, 2008.

40. Finale Doshi, Emma Brunskill, Alec Shkolnik, Thomas Kollar, Khash Rohanimanesh, Russ Tedrake and Nicholas Roy. A Supervised Learning Approach for Collision Detection in Legged Locomotion, In ***Proceedings of the International Conference on Intelligent Robots and Systems (IROS)***, 2007.

41. Emma Brunskill, Thomas Kollar, and Nicholas Roy. Topological Mapping using Spectral Clustering and Classification, In ***Proceedings of the International Conference on Intelligent Robots and Systems (IROS)***, 2007.

42. Emma Brunskill, Eiji Uchibe, and Kenji Doya. Adaptive State Space Construction with Reinforcement Learning for Robots, In ***Proceedings of the International Conference on Robotics and Automation (ICRA)***, 2006.

43. Emma Brunskill and Nicholas Roy. SLAM using Incremental Probabilistic PCA and Dimensionality Reduction, In ***Proceedings of the International Conference on Robotics and Automation (ICRA)***, 2005.

REFEREED WORKSHOP AND SYMPOSIUM PUBLICATIONS

44. Min Hyung Lee, Joe Runde, Warfa Jabril, Zhouying Wang, and Emma Brunskill. Learning the Features Used to Decide How to Teach, In ***Proceedings of Learning at Scale***, Work in Progress Paper, 2015.

45. Ted McCarthy, Brian DeRenzi, Josh Blumenstock and Emma Brunskill. Towards Operationalizing Outlier Detection in Community Health Programs, In ***Proceedings of the International Conference on Information and Communication Technologies and Development (ICTD)***, Note, 2013.

46. Sukhada Palkar and Emma Brunskill. Analysis of the Impact of Errors Made During Health Data Collection Using Mobile Phones: Exploring Error Modeling and Automatic Diagnosis, In ***Symposium on Computing for Development (DEV)***, Poster, 2013.

47. Emma Brunskill and Neal Lesh. Routing for Rural Health: Optimizing Community Health Worker Visit Schedules, In *AAAI Spring Symposium on Artificial Intelligence for Development*, 2010.

48. Kuang Chen, Emma Brunskill, Jonathan Dick and Prabhjot Dhadialla. Learning to Identify Locally Actionable Health Anomalies, In *AAAI Spring Symposium on Artificial Intelligence for Development*, 2010.

49. Emma Brunskill and Tapan Parikh. Lessons From Prototyping a Microfinance Distance Learning Tool, In *Computer Human Interaction (CHI) workshop on User Centered Design for International Development*, 2007.

50. Frank Dabek, Emma Brunskill, Frans Kaashoek, David Karger, Robert Morris, Ion Stoica, and Hari Balakrishnan. Building Peer-to-peer Systems with Chord, a Distributed Lookup Service, In *Proceedings of the Workshop on Hot Topics in Operation Systems (HotOS)*, 2001.

INVITATION-ONLY MEETINGS

CCC Workshop on Computer-Aided Personalized Education	2015
CCC Workshop for Multidisciplinary Research for Online Education	2013
CCC Symposium on Computing and Health: New Opportunities and Directions	2012
Science Foo	2012
Google Faculty Summit	2012
Microsoft Faculty Summit	2012-4
UW MSR Summer Institute: Crowdsourcing Personalized Online Education	2012

INVITED TALKS AND PANELS

- Nov 2015, Invited Speaker, AAAI Fall Symposium on Sequential Decision Making for Intelligent Agents
- Nov 2015, Invited Colloqium, Johns Hopkins University
- Jun 2015, Invited Speaker, Reinforcement Learning and Decision Making Conference
- Apr 2015, Invited Colloqium, University of Texas at Austin
- Mar 2015, Invited Colloqium, University College London
- Dec 2014, Invited Speaker, NIPS Workshop on Personalization
- Dec 2014, Invited Speaker, NIPS Workshop on Novel and Applications in RL

- Dec 2014, Invited Speaker, NIPS Workshop on Human Propelled Machine Learning
- Nov 2014, Invited Colloqium, Princeton University
- Oct 2014, Invited Colloqium, Harvard University
- Jul 2014, Invited Speaker, AAAI-14 Workshop on Sequential Decision-Making with Big Data
- Apr 2014, Invited Colloqium, Duke University
- Mar 2014, Invited Colloqium, McGill University
- Jan 2014, CMU Ideas Lab Presenter, World Economic Forum, Davos
- Apr 2013, CMU Statistics Tea on Online Education Panelist
- Dec 2012, "Machine Learning for Student Learning," joint tutorial with Geoff Gordon at NIPS Conference
- Dec 2012, "Pedagogical Activity Selection: Drawing Insight From Sequential Decision Making Under Uncertainty," NIPS Workshop on Personalizing Education With Machine Learning
- Oct 2012, "The Application of AI to Sequential Decision Making and Personalized Tutoring in K-12 Education," Annual Pennsylvania Charter School Conference
- Sep 2012, CMU Ideas Lab Presenter, World Economic Forum, China
- Jul 2012, "Student Variability and Automated Instructional Policies," UW MSR Summer Institute
- Mar 2012, ACM DEV Conference Panelist
- Sep 2011, "Leveraging Structure to Efficiently Make Good Decisions in an Uncertain World," CMU Robotics Institute Seminar
- Jul 2011, "Machine Learning for Development: Big Data, Small Data and Closing the Loop," ICML Workshop on Machine Learning for Global Challenges
- Apr 2010, "Tractable, Approximate POMDP Planning for Robotics," POMDP Practitioners Workshop, ICAPS

External Professional Activities

Organizer or Board Member

Tutorials Co-chair, International Conference on Automated Planning and Scheduling (ICAPS)	2015
Tutorials Co-chair, AAAI Conference on Artificial Intelligence (AAAI)	2014-15
Doctoral Consortium Co-chair, International Conference on Automated Planning and Scheduling	2013
Editorial Board, Journal of Artificial Intelligence	2012-present
Women in Machine Learning Board Member	2012-present
IJCAI Workshop on Decision Making in Partially Observable, Uncertain Worlds	2011
Women in Machine Learning Mentor Match Up	2010
North-Eastern Student Artificial Intelligence Conference Committee	2008
MIT Reading Group on Information and Communication Technologies for Development	2007
MIT Machine Learning Tea	2006-2007

Top Level Program Committee Member

Area Chair, International Joint Conference on Artificial Intelligence	2016
Area Chair, Neural Information Processing Systems	2015
Area Chair, International Conference on Machine Learning	2015
Senior Program Committee, Uncertainty in Artificial Intelligence	2015
Senior Program Committee, Association for the Advancement in Artificial Intelligence	2015/16
Program Committee, Reinforcement Learning and Decision Making Conference	2015
Program Committee, Learning at Scale	2015/16
Senior Program Committee International Joint Conference on Artificial Intelligence	2011/13/15
Associate Editor for International Conference on Robotics and Automation (ICRA)	2012

Program Committee Member

AAAI Conference on Artificial Intelligence (AAAI)	2009/10/11/13/14
ACM Symposium on Computing for Development (DEV)	2012/13
European Workshop on Reinforcement Learning (EWRL)	2011/12
International Conference on Machine Learning (ICML)	2009/10/12/13
International Joint Conference on Artificial Intelligence (IJCAI)	2009
International Symposium on Artificial Intelligence and AI (ISAIM)	2012
Neural Information Processing Systems (NIPS)	2010/11
Robotics: Science and Systems (RSS)	2011
Conference on Uncertainty in Artificial Intelligence (UAI)	2010/11/12/13/14
Workshop on the Algorithmic Foundations of Robotics (WAFR)	2012

Reviewer
Conferences: ICRA, ISRR, WAFR
Journals: International Journal of Robotics Research, IEEE Transactions on Robotics and Automation, Journal of Machine Learning Research, Machine Learning, IEEE Transactions in Automated Control
Grants: NSF Panelist (2011, 2012)

Contract and Grant Support

NSF BIGDATA Award: "Data Driven Optimization of Classroom Learning Activities" Co-PI (PI: Zoran Popović)	2015
ONR YIP Award: "Better Reinforcement Learning with Online Representation Discovery and Sample Efficient Learning"	2015
NSF CAREER Award: "Efficient Learning of Personalized Strategies."	2014
Yahoo-CMU InMind Project (Internal grant)	2014-2015
Google focused research award for research to improve MOOCs.	2014-6
CMU ProSeed internal grant for crowdtutor project (Co-PI with Jeff Bigham and Niki Kittur)	2014
IES Cognition and Student Learning: "Use of Machine Learning to Adaptively Select Activity Types and Enhance Student Learning with an Intelligent Tutoring System"	2013
Microsoft New Faculty Fellow Award	2012
Google Faculty Research Award	2012
Berkman faculty development award	2012
Pittsburgh Science of Learning Center (Internal grant)	2011–14

Student Advising

Ph.D. Student Supervision
Christoph Dann
Shayan Doroudi
Daniel Guo
Travis Mandel (joint with Zoran Popović, University of Washington)
Yun-En Liu (joint with Zoran Popović, University of Washington)

Masters Student Supervision
Rika Antonova
Qi Guo
Jung In Lee
Min Hyung Lee
Joseph Runde
Li Zhou

Doctoral Thesis Committee Member

Severin Hacker (CMU), Jose Gonzalez-Brenes (CMU), Shervin Javdani (CMU), Derek Lomas (CMU), Aasish Pappu (CMU), Felipe Trevizan (CMU)

Undergraduate Students Supervision

Christina Yuan, Yao Liu, , He Jiang, Warfa Jabril, Joseph Rollinson, Zhuoying Wang, Soojung Ha, Yashas Kumar, Christopher Mohr, Bill McDowell, Dimitar Simeonov, Somani Patnaik, Yuan Wei

UNIVERSITY SERVICE

CMU OurCS Team mentor (to encourage women to consider research)	2015
CMU CSD Faculty Hiring Committee	2013, 2015
CMU CSD DRC	2015
CMU Undergraduate SURG Selection Committee	2014–present
CMU SRC-URO Meeting of the Minds poster judging	2014
CMU OurCS workshop poster judge	2013
CMU Learning Media Research Working Group	2013