

ERIN J. TALVITIE

Curriculum Vitae

EDUCATION

Ph.D. Computer Science, University of Michigan Thesis: <i>Simple Partial Models for Complex Dynamical Systems</i> Committee: Satinder Singh (chair), John E. Laird, Benjamin Kuipers, Ryan M. Eustice	2004-2010
M.S. Computer Science, University of Michigan	2004-2007
B.A. Computer Science (Highest Honors) and Mathematics, Oberlin College	2000-2004

PROFESSIONAL APPOINTMENTS

Harvey Mudd College

Associate Professor of Computer Science	2019-present
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Franklin & Marshall College

Associate Professor of Computer Science	2016-2019
Assistant Professor of Computer Science	2010-2016

University of Michigan

Research fellow, working with Satinder Singh	2004-2010
Graduate student instructor for Discrete Mathematics	2008-2009

OTHER EXPERIENCE

Santa Fe Institute

NSF REU summer intern. Advisor: Jim Crutchfield	2003
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Orbital Research

Consultant, working with Dan Palmer	2001
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Oberlin College

Grader (multiple courses)	2002-2004
Tutor, Theory of Computation	2003

HONORS

International Conference on Machine Learning Top Reviewer	2020, 2022
Neural Information Processing Systems Outstanding Reviewer Award	2014, 2018, 2021
Association for the Advancement of Artificial Intelligence Outstanding Program Committee Member	2015, 2018
Best Paper Award: The 3 rd Interdisciplinary Conference on Reinforcement Learning and Decision Making (RLDM 2017)	2017

Best Paper nomination (4 nominees total): The Fifteenth International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS 2016)	2016
NSF CAREER Award	2016
Honorable Mention: University of Michigan EECS Outstanding Graduate Student Instructor Award	2009
First Place: University of Michigan EECS Honors Competition	2008
Best Poster: University of Michigan College of Engineering Graduate Symposium (Computer Science and Signal Processing Category)	2007
NSF Graduate Research Fellowship	2006-2010
STIET Fellowship	2005-2006
Dwight F. Benton Fellowship	2004-2005
Phi Beta Kappa honors society	2003
Barry M. Goldwater Scholarship	2003-2004
John N. Stern Merit Scholarship in the Natural Sciences	2000-2004
National Merit Scholarship	2000-2004

PUBLICATIONS († best paper nomination, ‡ best paper award)

HIGHLY REFEREED CONFERENCE PAPERS

Zaheer Abbas, Samuel Sokota, Erin J. Talvitie, Martha White. Selective Dyna-Style Planning Under Limited Model Capacity. In *Proceedings of the Thirty-seventh International Conference on Machine Learning (ICML)*, 2020.

E. Talvitie. Learning the Reward Function for a Misspecified Model. In *Proceedings of the Thirty-fifth International Conference on Machine Learning (ICML)*, 2018.

E. Talvitie. Self-Correcting Models for Model-Based Reinforcement Learning. In *Proceedings of the Thirty-first AAAI Conference on Artificial Intelligence (AAAI)*, 2017.

† Yitao Liang, Marlos C. Machado, E. Talvitie, and Michael Bowling. State of the Art Control of Atari Games Using Shallow Reinforcement Learning. In *Proceedings of the Fifteenth International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS)*, 2016.

E. Talvitie. Agnostic System Identification for Monte Carlo Planning. In *Proceedings of the Twenty-ninth AAAI Conference on Artificial Intelligence (AAAI)*, 2015.

Sriram Srinivasan, E. Talvitie, and Michael Bowling. Improving Exploration in UCT Using Local Manifolds. In *Proceedings of the Twenty-ninth AAAI Conference on Artificial Intelligence (AAAI)*, 2015.

Ujjwal Das Gupta, E. Talvitie, and Michael Bowling. Policy Tree: Adaptive Representation for Policy Gradient. In *Proceedings of the Twenty-ninth AAAI Conference on Artificial Intelligence (AAAI)*, 2015.

E. Talvitie. Model Regularization for Stable Sample Rollouts. In *Proceedings of the Thirtieth Conference on Uncertainty in Artificial Intelligence (UAI)*, 2014.

Marc Bellemare, Joel Veness, and E. Talvitie. Skip Context Tree Switching. In *Proceedings of the Thirty-first International Conference on Machine Learning (ICML)*, 2014.

E. Talvitie. Learning Partially Observable Models Using Temporally Abstract Decision Trees. In *Advances in Neural Information Processing Systems 25 (NIPS)*, 2012.

E. Talvitie and Satinder Singh. Maintaining Predictions Over Time Without a Model. In *Proceedings of*

the Twenty-first International Joint Conference on Artificial Intelligence (IJCAI), 2008.

E. Talvitie and Satinder Singh. Simple Partial Models for Complex Dynamical Systems. In *Advances in Neural Information Processing Systems 22 (NIPS)*, 2009.

E. Talvitie and Satinder Singh. An Experts Algorithm for Transfer Learning. In *Proceedings of the Twentieth International Joint Conference on Artificial Intelligence (IJCAI)*, 2007.

JOURNAL ARTICLES

Marlos C. Machado, Marc G. Bellemare, E. Talvitie, Joel Veness, Matthew Hausknecht, and Michael Bowling. Revisiting the Arcade Learning Environment: Evaluation Protocols and Open Problems for General Agents. *Journal of AI Research* 61:523-562, 2018.

E. Talvitie and Satinder Singh. Learning to Make Predictions in Partially Observable Environments Without a Generative Model. *Journal of AI Research* 42:353-392, 2011.

REFEREED WORKSHOP AND SYMPOSIUM PAPERS

Muhammad Zaheer, Samuel Sokota, Erin Talvitie, Martha White. Selectively Planning with Imperfect Models vis Learned Error Signals. Presented at *The NeurIPS 2019 Optimization Foundations for Reinforcement Learning Workshop*, 2019.

G. Zacharias Holland, E. Talvitie, and Michael Bowling. The Effect of Planning Shape on Dyna-Style Planning in High-Dimensional State Spaces. Presented at *The Fourth International Conference on Reinforcement Learning and Decision Making (RLDM)*, 2019.

G. Zacharias Holland, E. Talvitie, and Michael Bowling. The Effect of Planning Shape on Dyna-Style Planning in High-Dimensional State Spaces. Presented at *The ICML Workshop on Prediction and Generative Models for Reinforcement Learning (PGMRL)*, 2018.

‡ E. Talvitie. Self-Correcting Models for Model-Based Reinforcement Learning. Presented at *The Third International Conference on Reinforcement Learning and Decision Making (RLDM)*, 2017.

E. Talvitie and Michael Bowling. Pairwise Offset Features for Atari 2600 Games. Presented at *The AAAI Workshop on Learning for General Competency in Video Games*, 2015.

E. Talvitie, Britton Wolfe, and Satinder Singh. Building Incomplete But Accurate Models. In *Proceedings of the Tenth International Symposium on AI and Mathematics (ISAIM)*, 2008.

GRANTS

NSF IIS-1552533. CAREER: Using Imperfect Predictions to Make Good Decisions. PI: E. Talvitie. \$498,118 awarded. 7/16-6/22

INVITED TECHNICAL PRESENTATIONS

“Beyond Model-Free Reinforcement Learning.” Canadian Institute for Advanced Research Deep Learning and Reinforcement Learning Summer School. 7/2022

“A Model-Based Reinforcement Learning Wishlist.” ICML Workshop on Decision-Awareness in Reinforcement Learning. 7/2022

“A Model-Based Reinforcement Learning Wishlist.” Harvey Mudd College Summer Seminar. 7/2020

“Using Imperfect Predictions to Make Good Decisions.” StarAI Lab, University of California Los Angeles. 10/2019

“Using Imperfect Predictions to Make Good Decisions.” Harvey Mudd College Computer Science Colloquium. 1/2019

“Model-Based Reinforcement Learning with Flawed Models and Plans.” University of Michigan.	11/2018
“Toward Object-Oriented Dynamics Models of Atari Games.” University of Alberta RLAI Teatime Talk.	8/2018
“Model-Based Reinforcement Learning with Flawed Models and Plans.” University of Alberta RLAI Seminar.	1/2018
“Everything my computer needs to know, it learned from playing video games.” Gettysburg College Computer Science Colloquium.	11/2016
“Deictic Decision Trees as Partial Models.” University of Alberta RLAI Teatime Talk.	7/2013
“Learning to make Predictions in High Dimensional, Partially Observable Domains.” Eighth Barbados Workshop on Reinforcement Learning.	4/2013
“This talk, given by E. Talvitie, is about what it means to build a computer Jeopardy player.” Franklin & Marshall College.	2/2011
“Learning Partial Models of Complex Environments.” MIT Computer Science and Artificial Intelligence Lab.	4/2010
“Learning Partial Models of Complex Environments.” Franklin & Marshall College.	3/2010
“Simple Partial Models for Complex Dynamical Systems.” University of Alberta RLAI Seminar.	8/2009
“Maintaining the values of predictive features without a model.” Fourth Barbados Workshop on Reinforcement Learning.	4/2009
“Learning Structurally and Temporally Local Models.” Third Barbados Workshop on Reinforcement Learning.	4/2008
“Software Demonstration: buggerLab.” Workshop on Agent/Swarm Programming.	10/2003

POPULAR MEDIA AND OTHER PRESENTATIONS

“ The Honor Code My Happy Place.” Convocation keynote, Harvey Mudd College	8/30/2022
“Wrong in the Right Way.” Embedded.fm podcast episode 326.	4/2/2020
“Rise of the robots.” WITF Radio Smart Talk interview.	10/8/2017
“Light in a Sea of Light.” Commencement keynote, Abington Friends School	6/9/2017
“Atari Awakened.” Franklin & Marshall Magazine Issue 86 cover story.	9/16/2016
“Can computers learn from mistakes?” WITF Radio Smart Talk interview.	8/1/2016

TEACHING

COURSES AT HARVEY MUDD COLLEGE

CS 181V: Reinforcement Learning	Spring 2022
CS 70: Data Structures and Program Development	Spring 2019 – 2022; Fall 2020 – 2021
CS 151: Artificial Intelligence	Fall 2019

COURSES AT FRANKLIN & MARSHALL COLLEGE (* courses new to the institution)

CPS 111: Computer Science I	Fall 2010, 2011, 2014
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CPS 112: Computer Science II	Spring 2010, 2016, 2017
* CPS 222: Computer Science III	Fall 2011 – 2012, 2014 – 2016, 2018
CPS/MAT 237: Discrete Mathematics	Fall 2016
* CPS 337: Theoretical Foundations of Computer Science	Spring 2011 – 2013, 2015, 2016, 2019; Fall 2014 (tutorial)
* CPS 367: Artificial Intelligence	Spring 2012, 2015, 2017; Fall 2018
* CPS 370: Machine Learning	Fall 2013
COURSES AT UNIVERSITY OF MICHIGAN (taught discussion sections as graduate student instructor)	
EECS 203: Discrete Mathematics	Fall 2008, Spring 2009

STUDENT RESEARCH ADVISING (* resulted in publication)

STUDENTS AT HARVEY MUDD COLLEGE

Zoe Shao (summer scholar, independent study) Topics: “Identifying and removing irrelevant objects” “Object Deep Q-Networks”	Summer 2022 Fall 2022
Ryan Butler (summer scholar) Topic: “Prioritization methods for experience replay”	Summer 2022
Alina Hu (summer scholar) Topic: “Range-to-range neural networks”	Summer 2022
Bowen Jiang (summer scholar, independent study) Topics: “Sampling methods for uncertainty propagation” “Object-based neural network models” “Research in machine learning methods for set input and output”	Summer 2020 Spring 2021 Summer 2020
Jack Ontiveros (summer scholar) Topic: “Modeling events as meta-objects”	Summer 2021
Jacob Boerma (summer scholar) Topics: “Propagating uncertainty in decision trees” “Convergence of Q-learning with update error”	Summer 2021
Wayne Ying (summer scholar) Topic: “Experimental infrastructure for L.A.C.E. Lab”	Summer 2021
Henry Eigen (REU summer scholar) Topic: “Expectation-maximization for set output problems”	Summer 2021
Ben Langton (independent study) Topic: “Research in machine learning methods for set input and output”	Spring 2021
Xintong Wang (summer scholar, research assistant) Topic: “Propagating Uncertainty Using Decision Trees”	Summer 2020, January 2021
Rory Zhao (summer scholar, independent study) Topic: “Decision Tree Representations for Value Functions”	Summer 2020 – Fall 2020

STUDENTS AT FRANKLIN & MARSHALL COLLEGE († resulted in honors thesis)

Anton Arapin (research assistant) Topic: “Object-based models in Atari 2600 games”	Summer 2017-Spring 2019
Alexandra Crawley (summer scholar) Topic: “Decision tree models in Atari 2600 games”	Summer 2017
† Daniel J. Foley (summer scholar, independent study, honors) Topic: “Logistic regression models in Atari 2600 games”	Summer 2016-Spring 2017
Young Zhu (summer scholar, independent study) Topic: “Linear Dyna in Atari 2600 games”	Summer 2016-Spring 2017
Yuan Gan (independent study) Topic: “Decision tree models in Atari 2600 games”	Fall 2016
*† Yitao Liang (summer scholar, independent study, honors) Topic: “Pairwise offset features in Atari 2600 games”	Summer 2015-Spring 2016
William Tran (summer scholar, independent study) Topic: “Combining learning and search in Atari 2600 games.”	Summer 2012-Spring 2013
George G. Gallo III (summer scholar, independent study) Topic: “Combining learning and search in Atari 2600 games.”	Summer 2012-Fall 2012
Sarah Dubicki (honors committee member) Thesis: “Hyperbolic 3-Manifolds Dehn Surgery Approach to The Figure-Eight Knot Complement”	Spring 2011
Nabin Tiwari (honors committee member) Thesis: “A New Backward Compatible Web Transport”	Spring 2011

STUDENTS AT THE UNIVERSITY OF ALBERTA

* M. Zaheer Abbas (M.Sc. Thesis, co-supervised with Martha White) Thesis: “Selective Planning Using Neural Network Models with Limited Capacity.”	Summer 2018-Fall 2019
Zachary Holland (M.Sc. Thesis, co-supervised with Michael Bowling) Thesis: “The Effect of Planning Shape on Dyna-Style Planning in High-Dimensional State Spaces.”	Summer 2017-Fall 2018
* Sriram Srinivasan (M.Sc. Thesis, co-supervised with Michael Bowling) Thesis: “State Generalization in UCT.”	Summer 2013-Fall 2014
* Ujjwal Das Gupta (M.Sc. Thesis, co-supervised with Michael Bowling) Thesis: “Adaptive Representation for Policy Gradient.”	Summer 2013-Fall 2014

PROFESSIONAL MEMBERSHIPS AND SERVICE

MEMBERSHIPS

Association for the Advancement of Artificial Intelligence (AAAI)	2009-present
Association for Computing Machinery	2020 – present

REVIEWING FOR JOURNALS

Journal of Intelligent and Fuzzy Systems (JIFS)	2021
Journal on Autonomous Agents and Multiagent Systems (JAAMAS)	2020

Science	2019
Journal of Machine Learning Research (JMLR)	2014 – 2015, 2018
Journal of Artificial Intelligence Research (JAIR)	2010, 2013, 2017
Artificial Intelligence	2014, 2021
Neurocomputing	2011
Transactions on Autonomous Mental Development	2009
Neural Computation	2009
PROGRAM COMMITTEES	
Educational Advances in Artificial Intelligence (EAAI)	2018, 2020 – 2022
Neural Information Processing Systems (NeurIPS)	2008 – 2009, 2012 – 2018, 2022
International Conference on Machine Learning (ICML)	2009, 2012, 2015, 2018 – 2022
International Conference on Learning Representations (ICLR)	2021
International Conference on Reinforcement Learning and Decision Making (RLDM)	2017, 2019
AAAI Conference on Artificial Intelligence (AAAI)	2012, 2014 – 2015, 2018
Conference on Autonomous Agents and Multi-Agent Systems (AAMAS)	2011, 2014
International Joint Conference on Artificial Intelligence (IJCAI)	2013
IJCAI Workshop on Agents Learning Interactively from Human Teachers	2011
AAAI Workshop on Lifelong Learning from Sensorimotor Experience	2011
SENIOR PROGRAM COMMITTEES	
International Joint Conference on Artificial Intelligence (IJCAI)	2015
ORGANIZING COMMITTEES	
AAAI Workshop on Learning for General Competency in Video Games	2015
GRANT REVIEWING	
NSF Ad Hoc Review	2021
NSF CAREER Panel	2019
Grant proposal review for IWT (Flemish government agency for Innovation in Science and Technology)	2011
DEPARTMENTAL SERVICE AT HARVEY MUDD COLLEGE	
Associate Chair of Computer Science	2022-present
Preplacement	
Course scheduling	

Departmental mentoring	
Other duties as assigned	
Exit interviews	2020-2022
Clarity in Expectations Subcommittee (member)	2021-2022
COLLEGE SERVICE AT HARVEY MUDD COLLEGE	
Honor Code Faculty Advisor/Advisory Committee 2.0	
Member	2022-present
Chair	2021-2022
Faculty advisor to the Claremont Colleges Anime Club	2021-2022
DEPARTMENTAL SERVICE AT FRANKLIN & MARSHALL COLLEGE	
Associate Chair of Computer Science	2016-2017 2018-2019
Search committee: visitor in Computer Science	2019
Search committee: tenure track position in Computer Science	2016-2017
Search committee: visitor in Computer Science	2017
Faculty advisor to the Computer Science Club	2014-2017
Search committee: two tenure track positions in Computer Science	2015-2016
Search committee: visitor in Computer Science	2015
Designed/implemented assessment of writing skills development in CPS 337	2013-2015
Participated in the summer working group on writing in the major	2013
Developed report on general education possibilities for Computer Science	2013
Search committee: visitor in Computer Science	2013
Organized series of program meetings to revise CPS 111	2011
Participated in designing Computer Science curriculum, major/minor requirements	2010-2011
COLLEGE SERVICE AT FRANKLIN & MARSHALL COLLEGE	
Chair, Committee on the Faculty Handbook	2018-2019
Member, Judicial Committee	2018-2019
Co-chair, Committee on the Faculty Handbook	2016-2017
Member, Technology Committee	2016-2017
Member, Ad Hoc Working Group on Academic Integrity	2015-2016
Member, Ad Hoc Committee on the Faculty Handbook	2014-2016
Member, Enrollment Committee	2012-2013
Member, Faculty Admission Committee	2011-2013
Member, Curriculum Review Working Group on Distribution Requirements	2011
OTHER	
External tenure case reviewer: [liberal arts college in the US]	2021
External dissertation examiner: Yuri Grinberg, McGill University	2014

