## Matthew Hausknecht


CONTACT matthew.hausknecht@gmail.com (512) 703-0857
https://mhauskn.github.io/


RESEARCH FOCUS I work at the intersection of Deep Learning and Reinforcement Learning to develop autonomy capable of adapting and learning in complex environments.

CITIZENSHIP USA

EMPLOYMENT

**Argo AI** 2022 - Present
*Staff Scientist*

**Microsoft Research** 2017 - 2022
Redmond, WA
*Senior Researcher* and founder of the reinforcement learning group.

**Google** 2014
*Research Intern*
Developed recurrent deep neural network architectures for large scale video classification. Advised by George Toderici.

EDUCATION

**The University of Texas at Austin**, Austin, TX 2009 - 2016
*Ph.D., Department of Computer Sciences*
Advised by Peter Stone
Thesis: *Cooperation and communication in multiagent deep reinforcement learning*

**Emory University**, Atlanta, GA 2005 - 2009
*B.S. Computer Science, Summa Cum Laude*
Advised by Li Xiong, Eugene Agichtein, and Phillip Wolff

PUBLICATIONS

Reading and Acting while Blindfolded: The Need for Semantics in Text Game Agents
S Yao, K Narasimhan, M Hausknecht
*Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL)* 2021

ALFWorld: Aligning Text and Embodied Environments for Interactive Learning
M Shridhar, X Yuan, M Côté, Y Bisk, A Trischler, M Hausknecht
*International Conference on Learning Representations (ICLR)* 2021

Keep CALM and Explore: Language Models for Action Generation in Text-based Games
S Yao, R Rao, M Hausknecht, K Narasimhan
*Empirical Methods in Natural Language Processing (EMNLP)* 2020

Working Memory Graphs 2020
R Loynd, R Fernandez, A Celikyilmaz, A Swaminathan, M Hausknecht
*International Conference on Machine Learning (ICML)*

Learning Calibratable Policies using Programmatic Style-Consistency 2020
E Zhan, A Tseng, Y Yue, A Swaminathan, M Hausknecht

*International Conference on Machine Learning (ICML)*

Graph constrained reinforcement learning for natural language action spaces 2020
P Ammanabrolu, M Hausknecht
*International Conference on Learning Representations (ICLR)*

Interactive Fiction Games: A Colossal Adventure 2020
MJ Hausknecht, P Ammanabrolu, MA Côté, X Yuan
*Association for the Advancement of Artificial Intelligence (AAAI)*

Scriptnet: Neural static analysis for malicious javascript detection 2019
JW Stokes, R Agrawal, G McDonald, M Hausknecht
*IEEE Military Communications Conference (MILCOM)*

Nail: A general interactive fiction agent 2018
M Hausknecht, R Loynd, G Yang, A Swaminathan, JD Williams
*Technical Report*

Counting to Explore and Generalize in Text-based Games 2018
Xingdi Yuan, Marc-Alexandre Côté, Alessandro Sordoni, Romain Laroche, Remi Tachet des Combes, Matthew Hausknecht, Adam Trischler
*European Workshop on Reinforcement Learning (EWRL)*

TextWorld: A Learning Environment for Text-based Games 2018
Marc-Alexandre Côté, Ákos Kádár, Xingdi Yuan, Ben Kybartas, Tavian Barnes, Emery Fine, James Moore, Matthew Hausknecht, Layla El Asri, Mahmoud Adada, Wendy Tay, Adam Trischler
*IJCAI/ICML Computer Games Workshop*

Leveraging grammar and reinforcement learning for neural program synthesis 2018
Rudy Bunel, Matthew Hausknecht, Jacob Devlin, Rishabh Singh, Pushmeet Kohli
*International Conference on Learning Representations (ICLR)*

Revisiting the arcade learning environment: Evaluation protocols and open problems for general agents 2017
MC Machado, MG Bellemare, E Talvitie, J Veness, M Hausknecht, Michael Bowling
*International Joint Conferences on Artificial Intelligence (IJCAI)*

Neural Program Meta-Induction 2017
J Devlin, RR Bunel, R Singh, M Hausknecht, P Kohli
*Advances in Neural Information Processing Systems (NIPS)*

Cooperation and communication in multiagent deep reinforcement learning 2017
Matthew Hausknecht
*Ph.D. Thesis*

Half field offense: An environment for multiagent learning and ad hoc teamwork 2016
Matthew Hausknecht, P Mupparaju, S Subramanian, S Kalyanakrishnan, P Stone
*AAMAS Adaptive Learning Agents (ALA) Workshop*

On-policy vs. off-policy updates for deep reinforcement learning 2016
Matthew Hausknecht, Peter Stone
*Deep Reinforcement Learning: Frontiers and Challenges, IJCAI 2016 Workshop*

Deep Reinforcement Learning in Parameterized Action Space 2016
Matthew Hausknecht, Peter Stone
*Proceedings of the International Conference on Learning Representations (ICLR)*

Machine Learning Capabilities of a Simulated Cerebellum 2016
Matthew Hausknecht, Wen-Ke Li, Michael Mauk, and Peter Stone
*IEEE Transactions on Neural Networks and Learning Systems*

Deep Recurrent Q-Learning for Partially Observable MDPs 2015
Matthew Hausknecht, Peter Stone
*AAAI Fall Symposium on Sequential Decision Making for Intelligent Agents*

Beyond Short Snippets: Deep Networks for Video Classification 2015
Joe Yue-Hei Ng, Matthew Hausknecht, Sudheendra Vijayanarasimhan, Oriol Vinyals, Rajat Monga, George Toderici
*CVPR 2015*

A Neuroevolution Approach to General Atari Game Playing 2013
Matthew Hausknecht, Joel Lehman, Risto Miikkulainen, and Peter Stone
*IEEE Transactions on Computational Intelligence and AI in Games*

Using a million cell simulation of the cerebellum: Network scaling and task generality 2012
Wen-Ke Li, Matthew J. Hausknecht, Peter Stone, and Michael D. Mauk
*Neural Networks*

HyperNEAT-GGP: A HyperNEAT-based Atari General Game Player 2012
Matthew Hausknecht, Piyush Khandelwal, Risto Miikkulainen, and Peter Stone
*Proceedings of Genetic and Evolutionary Computation Conference*

Dynamic Lane Reversal in Traffic Management 2011
Matthew Hausknecht, Tsz-Chiu Au, Peter Stone, David Fajardo, and Travis Waller
*Proceedings of IEEE Intelligent Transportation Systems Conference*

Autonomous Intersection Management: Multi-Intersection Optimization 2011
Matthew Hausknecht, Tsz-Chiu Au, and Peter Stone
*Proceedings of IROS 2011-IEEE/RSJ International Conference on Intelligent Robots and Systems*

Vision Calibration and Processing on a Humanoid Soccer Robot 2010
Piyush Khandelwal, Matthew Hausknecht, Juhyun Lee, Aibo Tian and Peter Stone
*Fifth Workshop on Humanoid Soccer Robots*

Learning Powerful Kicks on the Aibo ERS-7: The Quest for a Striker. 2010
Hausknecht, M. and Stone, P.
*Proceedings of the RoboCup International Symposium*

For want of a nail: How absences cause events. 2009
Wolff, P., Barbey, A., Hausknecht, M.
*Journal of Experimental Psychology: General*

Heuristic Based Extraction of Causal Relations from Annotated Causal Cue Phrases 2009
Hausknecht, M.

*Undergraduate Dissertation*

## Additional Experience

**University of Texas at Austin**
*Teaching Assistant* Discrete Math for Computer Science: Honors — Fall 2013

**Emory University**
*Teaching Assistant* Introduction to Computer Science — Fall 2007

## Open Source Software

Jericho (Python, C) - A lightweight python-based interface connecting learning agents with interactive fiction games. Additional text-based reinforcement agent implementations using Pytorch.

Half-field Offense (Python, C++) - Simulator to interface learning agents with the RoboCup 2D soccer simulator. Continuous action agent implementation using Caffe.

Arcade Learning Environment (Python, C++) - Created the first interfaces which allowed external agents to use ALE as a library. Additionally investigated the first uses of recurrent networks for deep reinforcement learning.

## Languages

Python, C/C++, Pytorch

## Honors & Awards

Phi Kappa Phi, 2010
NSF Graduate Research Fellowship, 2009
MCD Fellowship, The University of Texas at Austin, 2009
Trevor Evans Award, Emory University, 2009
Dean's List, Emory University, 2005-2008
Phi Beta Kappa, 2007