John Winder

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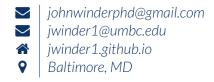✉ *jwinder1@umbc.edu*
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⚲ *Baltimore, MD*

Artificial Intelligence | Machine Learning | Reinforcement Learning

Education

Ph.D. in Computer Science, *University of Maryland, Baltimore County (UMBC)*　　*2019*
Advised by Dr. Marie desJardins, Dr. Cynthia Matuszek
Thesis: *Abstract Decision Making and Concept Formation for Adaptability and Generalization*
Research in hierarchical reinforcement learning, state abstraction, probabilistic planning

M.S. in Computer Science, *UMBC*　　*2015*
Advised by Dr. Marie desJardins, Dr. Tim Oates
Research in machine learning, computer vision, feature extraction

B.S. in Computer Science, magna cum laude, *UMBC*　　*2013*

Publications

Proposals (Awarded)

⬦　**John Winder**. *Ender's Dilemma: Defeating the Hive Mind.* Johns Hopkins University Applied Physics Laboratory, AD FACT (Internal R&D). 2021-2022. Award total: $100,000. Topics: *Multi-agent, hierarchical, and model-based reinforcement learning (MARL, HRL, MBRL).*

⬦　**John Winder**. *Adversarial Attacks on RL & Explainable RL Agents.* Johns Hopkins University Applied Physics Laboratory, "I Have Hammer" Projects (Internal R&D). 2021-2022. Award total: $100,000. Topics: *Adversarial attacks on reinforcement learning, explainable machine learning (XAI/XRL).*

⬦　**John Winder**, Thomas Urban. *Beyond Human Reasoning - Bridging the Information Gap.* Johns Hopkins University Applied Physics Laboratory, Propulsion Grant (Internal R&D). 2021-2022. Award total: $250,000. Topics: *Novel neural network architectures (memory and self-attention), probabilistic graphical models, multi-agent reinforcement learning, human-machine interaction.*

⬦　Cynthia Matuszek, Francis Ferraro, **John Winder**. *NRI: FND: Semi-Supervised Deep Learning for Domain Adaptation in Robotic Language Acquisition.* National Science Foundation (NSF), Information & Intelligent Systems (IIS). 2020-2023. Award total: $748,724. Topics: *Grounded language learning for robots, manifold alignment, imitation learning, inverse reinforcement learning.*

⬦　Dan Lee, **John Winder**. *STTR Phase I: A Machine Learning Framework for Comprehensive Dental Caries Detection.* National Science Foundation (NSF), Industrial Innovation & Partnerships (IIP). 2020-2021. Award total: $224,999. Topics: *Medical imaging, computer vision for radiology, semantic segmentation, semi- and self-supervised learning.*

◊ Marie desJardins [and **John Winder** (student co-author)]. *Concept Formation in Partially Observable Domains.* National Science Foundation (NSF), Information & Intelligent Systems (IIS). 2018-2021. Award total: $399,993. Topics: *Concept-based knowledge transfer, state abstraction, online function approximation for contextual bandits.*

Journal Articles

◊ Karan K Budhraja, **John Winder**, Tim Oates. *Feature Construction for Controlling Swarms by Visual Demonstrations.* ACM Transactions on Autonomous and Adaptive Systems (TAAS), 12(2), 10. 2017.

Conference Papers

◊ Gaoussou Youssouf Kebe, Padraig Higgins, Patrick Jenkins, Kasra Darvish, Rishabh Sachdeva, Ryan Barron, **John Winder**, Don Engel, Edward Raff, Francis Ferraro, Cynthia Matuszek. *A Spoken Language Dataset of Descriptions for Speech-Based Grounded Language Learning.* Proceedings of The Thirty-fifth Conference on Neural Information Processing Systems (NeurIPS 2021). 2021.

◊ **John Winder**, Stephanie Milani, Matthew Landen, Erebus Oh, Shane Parr, Shawn Squire, Marie desJardins, Cynthia Matuszek. *Planning with Abstract Learned Models While Learning Transferable Subtasks.* Proceedings of The Thirty-Fourth AAAI Conference on Artificial Intelligence (AAAI-20). 2020.

◊ David Abel*, **John Winder***, Marie desJardins, Michael L Littman. *The Expected-Length Model of Options.* Proceedings of the Twenty-Eighth International Joint Conference on Artificial Intelligence (IJCAI-19) [*equal contribution]. 2019.

◊ Nakul Gopalan, Marie desJardins, Michael L Littman, James MacGlashan, Shawn Squire, Stefanie Tellex, **John Winder**, Lawson LS Wong. *Planning with Abstract Markov Decision Processes.* Proceedings of the Twenty-Seventh International Conference on Automated Planning and Scheduling (ICAPS-17). 2017.

◊ Nicholay Topin, Nicholas Haltmeyer, Shawn Squire, **John Winder**, Marie desJardins, James MacGlashan. Proceedings of the Twenty-Fourth International Joint Conference on Artificial Intelligence (IJCAI-15). 2015.

Workshop Papers & Extended Abstracts

◊ Patrick Jenkins, Rishabh Sachdeva, Gaoussou Youssouf Kebe, Padraig Higgins, Kasra Darvish, Edward Raff, Don Engel, **John Winder**, Francis Ferraro, Cynthia Matuszek. *Presentation and Analysis of a Multimodal Dataset for Grounded Language Learning.* arXiv preprint arXiv:2007.14987. 2020.

◇ Patrick Jenkins, Padraig Higgins, Rishabh Sachdeva, **John Winder**, Cynthia Matuszek. *GLD: A Grounded Language Dataset of Object Images and Descriptions in Natural Language Text and Speech.* The 8th Mid-Atlantic Student Colloquium on Speech, Language and Learning (MASC-SLL 2020) [Extended Abstract]. 2020.

◇ Monali Saraf, Padraig Higgins, **John Winder**, Cynthia Matuszek. *A Human-Robot Interaction Data Set: Towards Active Learning.* The 8th Mid-Atlantic Student Colloquium on Speech, Language and Learning (MASC-SLL 2020) [Extended Abstract]. 2020.

◇ **John Winder**, Stephanie Milani, Matthew Landen, Erebus Oh, Shane Parr, Shawn Squire, Marie desJardins, Cynthia Matuszek. *Planning with Abstract, Learned Models.* Do Good Robotics Symposium (DGRS-19) [Extended Abstract]. 2019.

◇ **John Winder**, Marie desJardins. *Concept-Aware Feature Extraction for Knowledge Transfer in Reinforcement Learning.* Knowledge Extraction from Games (KEG-18) Workshop at the Thirty-Second AAAI Conference on Artificial Intelligence (AAAI-18). 2018.

◇ **John Winder**, Shawn Squire, Matthew Landen, Stephanie Milani, Marie desJardins. *Towards Planning With Hierarchies of Learned Markov Decision Processes.* Integrated Execution of Planning and Acting Workshop (IntEx-17) at the Twenty-Seventh International Conference on Automated Planning and Scheduling (ICAPS-17). 2017.

◇ **John Winder**. *Anomaly Reasoning through Concept Formation for Planning and Reinforcement Learning.* Proceedings of the Twenty-Seventh International Conference on Automated Planning and Scheduling (ICAPS-17) [Doctoral Consortium]. 2017.

◇ Shawn Squire, **John Winder**, Matthew Landen, Stephanie Milani, Marie desJardins. *R-AMDP: Model-Based Learning for Abstract Markov Decision Process Hierarchies.* The Third Conference on Reinforcement Learning and Decision Making (RLDM-17) [Extended Abstract]. 2017.

◇ Nakul Gopalan, Marie desJardins, Michael L Littman, James MacGlashan, Shawn Squire, Stefanie Tellex, **John Winder**, Lawson LS Wong. *Planning with Abstract Markov Decision Processes.* The Third Conference on Reinforcement Learning and Decision Making (RLDM-17) [Extended Abstract]. 2017.

◇ **John Winder**. *A Framework for Anomaly Reasoning: Interpretation through Concept Formation for Knowledge Transfer and Lifelong Learning.* Proceedings of the Twenty-Fifth International Joint Conference on Artificial Intelligence (IJCAI-16) [Doctoral Consortium]. 2016.

◇ Nakul Gopalan, Marie desJardins, Michael L Littman, James MacGlashan, Shawn Squire, Stefanie Tellex, **John Winder**, Lawson LS Wong. *Planning with Abstract Markov Decision Processes.* Abstraction in Reinforcement Learning Workshop at the Thirty-Third International Conference on Machine Learning (ICML-16). 2016.

Work Experience

Johns Hopkins University Applied Physics Laboratory
Advanced AI Algorithms Section, Intelligent Platforms Group
Laurel, MD

Section Supervisor
(Senior Professional Staff Scientist)
Feb. 2021 - Present

Johns Hopkins University Applied Physics Laboratory
Laurel, MD

Senior Professional Staff Scientist
July 2020 - Feb. 2021

Department of Computer Science and Electrical Engineering
UMBC

Adjunct Assistant Professor
October 2020 - Present

Department of Computer Science and Electrical Engineering
UMBC

Faculty Research Assistant
Fall 2019 - July 2020

Interactive Robotics and Language (IRAL) Lab
UMBC

Graduate Research Assistant
Fall 2018 - Summer 2019

Multi-Agent Planning and Learning (MAPLE) Lab
UMBC

Graduate Research Assistant
Fall 2013 - Summer 2018

International Computer Science Institute (ICSI)
Berkeley, CA

Consultant
May - August 2016

CS Matters in Maryland (CSforALL)
Baltimore, MD

Graduate Assistant
May - August 2014, 2015

SAIC (Leidos)
Columbia, MD

Computer Science Intern
May - August 2012

Teaching Experience

Reinforcement Learning and Probabilistic Planning

MAPLE Lab Instructor
Summer, Winter 2018
Summer, Winter 2017

Principles of Operating Systems

Teaching Assistant
Spring 2014

Object Oriented Programming

Teaching Assistant
Fall 2013

Service

Robotics: Science and Systems (RSS 2020) Reviewer
Spring 2020

Conference on Human-Robot Interaction (HRI 2020) Program Committee (Reviewer)
Fall 2019

AAAI Conference on Artificial Intelligence (AAAI-20) Program Committee (Reviewer)
Fall 2019

Conference on Robot Learning (CoRL-19) Reviewer
Summer 2019

Knowledge Extraction from Games (KEG-19) Program Committee (Reviewer)
Workshop at AAAI-18 *Fall 2018*

Integrated Execution of Planning and Acting (IntEx-18) Program Committee (Reviewer)
Workshop at ICAPS-18 *Spring 2018*

Maryland Computing Education Summit (CE21-Maryland) Student Organizer, Volunteer
April 2016

Awards

IJCAI-16 Travel Award *June 2016*

T. Rowe Price Associates Scholarship *May 2013*

UMBC Class of 2013 Featured Student *May 2013*

Marshall Scholar Nominee at UMBC *May 2013*

Phi Beta Kappa *Fall 2012*

Undergraduate Research Award *Spring 2011*

UMBC Honors College *2009 - 2013*