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## 1 Education

*March 2023* · Ph.D., Artificial Intelligence and Computer Science, Oregon State University

*March 2020* · M.S., Computer Science, Oregon State University (magna cum laude)

*June 2015* · B.S., Computer Science, Oregon State University (summa cum laude)

## 2 Publications

### 2.1 Journal Publications

**Matthew L. Olson**, Roli Khanna, Lawrence Neal, Fuxin Li, Weng-Keen Wong. Counterfactual State Explanations for Reinforcement Learning Agents via Generative Deep Learning. *Artificial Intelligence*, 2021

Andrew Anderson, Jonathan Dodge, Amrita Sadarangani, Zoe Juozapaitis, Evan Newman, Jed Irvine, Souti Chattopadhyay, **Matthew L. Olson**, Alan Fern, and Margaret Burnett. Mental models of mere mortals with explanations of reinforcement learning. *Transactions on Interactive Intelligent Systems*, 2020.

### 2.2 Conference Publications

(UNDER REVIEW) **Matthew L. Olson**, Shusen Liu, Rushil Anirudh, Jay J. Thiagarajan, Timo Bremer, Weng-Keen Wong. Cross-GAN Auditing: Unsupervised Identification of Attribute Level Similarities and Differences between Pretrained Generative Models. *The Conference on Computer Vision and Pattern Recognition (CVPR)* 2023.

Tobias Huber, Maximilian Demmler, Silvan Mertes, **Matthew Olson** and Elisabeth André. GANterfactual-RL: Understanding Reinforcement Learning Agents' Strategies through Visual Counterfactual Explanations. *The Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2023.

Jonathan Dodge, Andrew Anderson, **Matthew L. Olson**, Rupika Dikkala, and Margaret Burnett. How Do People Rank Multiple Mutant Agents? *ACM Conference on Intelligent User Interfaces (IUI)*, 2022.

**Matthew L. Olson**, Thuy-Vy Nguyen, Gaurav Dixit, Neale Ratzlaff, Weng-Keen Wong, Minsuk Kahng. Contrastive Identification of Covariate Shift in Image Data. *IEEE Visualization Conference (VIS)*, 2021.

Lawrence Neal, **Matthew Olson**, Weng-Keen Wong, Xiaoli Fern, Fuxin Li. Open Set Learning with Counterfactual Images. *Proceedings of the European Conference on Computer Vision (ECCV)*, 2018.

## 2.3 Workshop Publications

**Matthew L. Olson**. Deep Generative Multimedia Children’s Literature. *AAAI, Workshop on Creative AI Across Modalities*. 2023.

**Matthew L. Olson**, Shusen Liu, Rushil Anirudh, Jayaraman J. Thiagarajan, Weng-Keen Wong, Peer-timo Bremer. Unsupervised Attribute Alignment for Characterizing Distribution Shift. *NeurIPS Workshop on Distribution Shifts*, 2021.

Prachi Rahurkar, **Matthew L. Olson**, Prasad Tadepalli. Human Adversarial QA: Did the Model Understand the Paragraph? *NeurIPS Workshop on Human And Model in the Loop Evaluation and Training Strategies*. 2020

**Matthew L. Olson**, Lawrence Neal, Fuxin Li, Weng-Keen Wong. Counterfactual States for Atari Agents via Generative Deep Learning. *International Joint Conference on Artificial Intelligence workshop on Explainable AI*. Macao, China, August 2019.

Arpit Christi, **Matthew Olson**, Mohammad Amin Alipour, and Alex Groce. Reduce Before You Localize: Delta-Debugging and Spectrum-Based Fault Localization. *IEEE International Workshop on Debugging and Repair*. Memphis, Tennessee, October 2018

## 2.4 Other Publications

**Matthew L. Olson**, Neale Ratzlaff, Weng-Keen Wong. Generalizing Cross Entropy Loss with a Beta Proper Composite Loss: An Improved Loss Function for Open Set Recognition. *OpenReview*, 2021.

**Matthew L. Olson**, Lisa Zhang, Chun-Nam Yu. Adapting pretrained language models for long document classification. *OpenReview*, 2019.

# 3 Experience

## 3.1 Professional

Sept. 2017 - present · **Graduate Research Assistant for Dr. Weng-Keen Wong, Oregon State University**: Develop interfaces and techniques with density ratio estimation to explain dataset shift to non-experts. Create state of the art algorithms for improving open set detection in neural networks. Mentored multiple senior capstone projects over

a variety of machine learning topics. Collaborate closely with colleagues in the DARPA Explainable Artificial Intelligence project. Founded and lead the Artificial Intelligence Graduate Student Associations with over 200 members Developed techniques to explain results of Deep Learning algorithms applied to Computer Vision and Reinforcement Learning. Create Generative Adversarial Networks for the interpretation of AI systems.

June 2021 - present · **Machine Learning Research Intern, Lawrence Livermore National Labs** Improve predictions in the extreme few shot learning setting on sim-to-real fusion experiment data. Design new algorithms for identifying unique and shared attributes between two datasets. Investigate state of the art generative models for approximating data distributions (i.e. StyleGAN2).

March 2021, March 2022 · **ML Olson Consulting for Lexum and Medema:** Improved semi-supervised multi-label accuracy of Saskatchewan court cases by 18% using LongFormer. Reduced error of part manufacturing time predictions by 37% using tabular data with Pycaret.

June 2019 - August 2019 · **Machine Learning Research Intern, Bell-Labs:** Won the robotics competition at the Unix 50th anniversary international event. Utilized state of the art language models to perform 4G/5G patent classification. Developed new deep learning models to process arbitrary length sequential data.

July 2015 - September 2017 · **Software Engineer for Printer Testbeds, HP Inc:** Developed and maintained .Net desktop application for a multi-million dollar fleet of printer test tools. Became team lead for the motion control software on the R&D and production tools. Created Software for real-time, rotary encoder, error correction . Collaborated with different teams in India, Singapore, Barcelona, and Ireland to develop new Thermal Inkjet technologies. Travelled to Singapore to perform tool installation and training.

March 2014 - June 2015 · **Undergraduate Researcher for Dr. Alex Groce, Oregon State University:** Investigated Delta Debugging for the Siemens suite using Python and bash. Calculated Software Fault Localization's coefficients for the suite using Java.

### 3.2 Undergraduate

9/2014 - June 2015 · **AX-12A Robotic Arm User Interface for Oregon State University Senior Project:** Collaborated with ICS Inc. and team members to produce an original design document. Developed the client-side interface for the Robot Arm using Qt and JavaScript.

6/2014 - September 2014 · **Software Engineering Intern, Hewlett Packard Enterprise:** Created a Java GUI for the networking utility Scapy. Explored patent opportunities in the field of Digital Image Correlation. Used and tested Intel's Data Plane Development Kit to increase networking performance.

April 2013 - September 2014 · **2013 FSGP Champion Solar Car CS Team Captain, Oregon State University:** Programmed the C# app, vb app, and MySQL database that ran the driver interface. Lead team in developing a new Telemetry system and updated computer system. Collaborated with other teams through email, phone, and meetings.

January 2013 - June 2015 · **Computer Science Teaching Assistant, Oregon State University:** Lead students through organized lab time and extended study sessions. Graded student's assigned demonstrations. Helped students by explaining programming concepts and debugging homework.

September 2012 - February 2014 · **IT student worker, OSU College of Science:** Helped support University based computers, networks, and printers within the College of Science. Provided customer service for over 2000 employees and students

### 3.3 Mentorship 2022

- *Detecting Cheating In Video Games With Machine Learning.* Srikar Valluri, Bradley Gore and Ethan Ng. Applied Pretrained Deep Convolution neural networks to identify video clips of cheaters and non-cheaters.
- *Serial Image Analysis.* Alec Sautter, Austin McCalley, Benjamin Lee, Hugh MacWilliams, Kyle Huang and Samuel Somatis. Detected the change of coastal plant species photographs over time using machine learning.
- *Machine Learning Applied to Magnetic Flux Datasets.* Zinn Morton, Allen Chan, Benjamin Condeira, Matthew Sterrett and Justin Flesch. Used state-of-the-art unsupervised anomaly detection and visualization for identifying change-points in magnetic melts.
- *Natural Language Processing for AI Incident Resolution.* Nicholas Broce, Jason Scott-Hakanson, Nicholas Olson and Yesha Jhala. Used a LongFormer deep pretrained network for enabling search in a database of AI-related articles.
- *White Shark Video Processing: Using Machine Learning to Understand White Shark Behaviors.* Harper Swenson, Zhangyao Zhou and Kaavya Subramanian. Built a tree-based machine learning model using Pycaret to identify the activities of sharks.

### 3.4 Languages & Tools

Python, C#, JavaScript, bash, C++, C, vb.net, Java  
Pytorch, NumPy/SciPy, Tensorflow, Latex, Git, Perforce

### 3.5 Honors

- 2019 UnixWorld Challenge, Outstanding Achievement in Robotic Orchestration, Bell Labs, New Jersey.
- 2013 and 2014 Computer Science Scholarship, Oregon State University College of Engineering.
- 2011 Honor Scholarship, Clackamas Community College.

### 3.6 Training

- Deep Learning Specialization
- Project Management Fundamentals
- Dynamic Leadership
- Influence in the Workforce
- Visual Studio Live Industry Training