

William Curran

CONTACT INFORMATION

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RESEARCH INTERESTS

Machine Learning, Multiagent Reinforcement Learning, Learning-Based Controls, Human-Robot Interaction.

EDUCATION

Oregon State University, Corvallis, OR

PhD, School of Mechanical, Industrial and Manufacturing Engineering, Expected 2016

- Adviser: Professor Bill Smart
- Area of Study: Human-Robot Interaction and Learning from Demonstration

M.S., School of Electrical Engineering and Computer Science, June 2012

- Adviser: Professor Kagan Tumer
- Area of Study: Multi-Agent Systems and Learning Based Controls

B.S., School of Electrical Engineering and Computer Science, June 2010

- Emphasis on Machine Learning and Artificial Intelligence
- *Cum Laude*

CONFERENCE PUBLICATIONS

- [1] Curran, W., Brys, T., Taylor, M, and Smart, B. Using PCA to Efficiently Represent State Spaces. In: *International Conference on Machine Learning 2015. European Workshop on Reinforcement Learning* July 06–11, 2015
- [2] Curran, W., Thornton, T., Arvey, B, and Smart, B. Evaluating Impact in the ROS Ecosystem. In: *IEEE International Conference on Robotics and Automation 2015* May 26–30, 2015
- [3] Colby, M., Curran, W., Rebhuhn, C., and Tumer, K. Approximating Difference Evaluations with Local Knowledge. In: *International Conference on Autonomous Agents and Multiagent Systems 2015* May 4–8, 2015
- [4] Curran, W. Developing Learning from Demonstration Techniques for Individuals with Physical Disabilities. In: *International Conference on Human-Robot Interaction. HRI Pioneers Workshop* March 2–5, 2015
- [5] Curran, W., Agogino, A., Tumer, K. Agent Partitioning with Reward/Utility-Based Impact In: *AAAI Conference on Artificial Intelligence 2015. Multiagent Interaction without Prior Coordination Workshop* Jan 25–30, 2015
- [6] Curran, W., Arvey, B., Thornton, T. and Smart, B. The ROS Ecosystem: Impacts, Insights and Improvements. In: *ROSCon 2014* September 12–13, 2014
- [7] Lazewatsky, D., Bowie C., Curran, W., LaFortune, J., Narin, B., Nguyen, D., Wyman, A., Smart, W. Wearable Computing to Enable Robot Microinteractions. In: *Robot and Human Interactive Communication 2014* August 25–29, 2014
- [8] Curran, W., Agogino, A., Tumer, K. Hierarchical Simulation for Complex Domains: Air Traffic Flow Management. In: *Genetic and Evolutionary Computation Conference 2014* July 12–16, 2014

- [9] Curran, W., Agogino, A., Tumer, K. Using Reward/Utility Based Impact Scores in Partitioning. In: *International Conference on Autonomous Agents and Multiagent Systems 2013* May 5–9, 2014
- [10] Curran, W., Agogino, A., Tumer, K. Partitioning Agents and Shaping Their Evaluation Functions in Air Traffic Problems with Hard Constraints. In: *Genetic and Evolutionary Computation Conference 2013* July 6–10, 2013
- [11] Curran, W., Agogino, A., Tumer, K. Addressing Hard Constraints in the Air Traffic Problem through Partitioning and Difference Rewards. In: *International Conference on Autonomous Agents and Multiagent Systems 2013* May 6–10, 2013
- [12] Curran, W., Moore, T., Kulesza, T., Wong, W-K., Todorovic, S., Stumpf, S., White, R and Burnett, M. Towards recognizing “cool”: can end users help computer vision recognize subjective attributes of objects in images? In: *Proceedings of the 2012 ACM international conference on Intelligent User Interfaces*, February 14–17, 2012.
- [13] Shinsel, S., Kulesza, T., Burnett, M., Curran, W., Groce, A., Stumpf, S. and Wong, W-K. Mini-Crowdsourcing End-User Assessment of Intelligent Assistants: A Cost-Benefit Study. In: *Proceedings of the 2011 Symposium on Visual Languages and Human-Centric Computing*, September 18–22, 2011.

EXPERIENCE

Oregon State University, Corvallis, OR

Personal Robotics Lab

September 2013 to Current

- Developing learning from demonstration algorithms for severely disabled individuals with amyotrophic lateral sclerosis and quadriplegia. This involves looking into effective interfaces for those with severe disabilities, developing shared autonomy learning algorithms, employing multi-robot coordination for efficient task execution, and how to learn from highly suboptimal human demonstrations.
- Dr. Bill Smart, Oregon State, MIME Department

Autonomous Agents and Distributed Intelligence

Winter 2011 to June 2013

- Currently working on Air Traffic Control with a focus on multi agent reinforcement learning. This involves learning and using the air traffic simulator FEATS with the goal to apply reinforcement learning techniques in an effort to alleviate the air traffic congestion problem. Current work involves removing congestion and optimizing delay in the national airspace by controlling ground delay imposed upon aircraft.
- Dr. Kagan Tumer, Oregon State, MIME Department

Roost Tracking Project

Summer 2010 to Summer 2012

- Applied Machine Learning techniques on the image processing of multiple radar images. The goal was to design software to autonomously find rare bird roosts using radar images.
- Dr. Dan Sheldon, Oregon State, EECS Department
- Dr. Tom Dietterich, Oregon State, EECS Department

Vision Feedback

Spring 2011 to Fall 2011

- Lead a study exploring how users give feedback to machine learning vision algorithms. Lack of trust is a large issue in the Vision domain of Machine Learning. This study is designed to help develop techniques to alleviate this problem.
- Dr. Weng-Keen Wong, Oregon State, EECS Department
- Dr. Sinisa Todorovic, Oregon State, EECS Department

EUSES End User Development

Fall 2010 to Fall 2011

- Explored the juncture between machine learning, human-computer interaction, and testing.
 - Dr. Margaret Burnett, Oregon State, EECS Department
 - Dr. Alex Groce, Oregon State, EECS Department

Navy Research Lab, Washington, DC

NRL Student Contractor

June 2015 to September 2015

- Developed the Dimensionality Reduced Reinforcement Learning (DRRL) algorithm for learning in high-dimensional spaces. It uses dimensionality reduction on demonstrations to compute a low-dimensional manifold in which to learn in.
 - Dr. David Aha, Navy Research Lab, Navy Center for Applied Research in Artificial Intelligence

NASA AMES Moffet Field, Mountainview, CA

NASA AMES Intern

June 2013 to September 2013

- Developed a new simulation approach leveraging the concept of a multi-fidelity simulation. Computationally complex simulation is used only when agents are in a potential separation violation, while a low fidelity simulation is used for navigation. The key research focus is when to change from one fidelity to another, as small nuanced issues can easily occur that impedes agent learning.
 - Dr. Adrian Agogino, NASA AMES, Moffett Field

NASA AMES Intern

June 2012 to September 2012

- Extended my work on Air Traffic Control with adviser Adrian Agogino. Here I extended previous Air Traffic Control work by simulating the entire NAS (35,000 planes) rather than a small subset of the NAS, and developed an automated partitioning system for aircraft to learn quickly and efficiently.
 - Dr. Adrian Agogino, NASA AMES, Moffett Field

INVITED TALKS

- [1] Curran, W. Overview of HRI at Oregon State University *Washington State University* Mar 26, 2015
- [2] Curran, W., Thornton, T., Arvey, B, and Smart, B. Evaluating Impact in the ROS Ecosystem. *ROSCon* Sep 12–13, 2014

EXPERTISE

Computer Science:

- Multi-agent Reinforcement Learning
- Machine Learning
- Software Engineering
- Human-Computer Interaction
- Human-Robot Interaction