

# Lauren Milliken

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## Research Interests

Human-robot interaction, shared autonomy, adaptable robotics, human-robot teaming, marine robotics, task allocation, and planning under uncertainty.

## Education

- 2015–2017 **MS in Robotics**, *Oregon State University*, Corvallis, OR, *GPA: 3.75/4.00*.  
**Thesis Topic:** "Modeling Human Expertise for Providing Adaptive Levels of Robot Shared Autonomy"  
**Advisor:** Geoffrey Hollinger  
**Defended:** August 18, 2017
- 2011–2015 **BS in Electrical Engineering**, *University of Dayton*, Dayton, OH, *GPA: 3.84/4.00*.  
**Minor:** Computer Science  
**Concentration:** Robotics

## Work Experience

- 2015–2017 **Graduate Research Assistant**, *Robotics Decision Making Lab*, Oregon State University, Corvallis, OR.  
Focus in human-robot interaction and shared autonomy in marine robotics.  
Hands on work in marine robotics including a Platapus Lutra boat and Seabotix vLBV300
- 2014 **Engineering Co-op**, *Yaskawa Motoman Robotics*, Miamisburg, OH.  
Built modules displaying the features of different robots for technology shows as part of design team. Tasks included designing schematics, wiring controllers, assembling the modules, programming robots, contributing to brainstorming meetings, and giving demonstrations to tour groups.
- 2012–2013 **Engineering Intern**, *SAIC*, Dayton, OH.  
Worked on camera mounted airplanes used for detection and tracking in Afghanistan as member of project Blue Devil. Drew wiring schematics and technical diagrams, drafted technical reports and standard operating procedures. Bridged the gap between the engineering and the logistical parts of the team. Experienced both the office setting and hands-on with the aircraft at the airfield at Wright Patterson Air Force Base.

## Publications

- [1] **L. Milliken** and G. A. Hollinger. "Modeling user expertise for choosing levels of shared autonomy". In *International Conference on Robotics and Automation (ICRA)*, Singapore, May 2017.
- [2] J. J. Chung, **L. Milliken**, G. A. Hollinger, and K. Tumer. "When to ask for help:

introspection in multi-robot teams". In *International Conference on Robotics and Automation Workshop on Human Multi-Robot System Interaction (ICRA)*, Singapore, May 2017.

- [3] **L. Milliken** and G. A. Hollinger. "Modeling user expertise for choosing levels of shared autonomy". In *Robotics: Science and Systems Conference Workshop on Planning for Human-Robot Interaction (RSS)*, Ann Arbor, MI, June 2016.
- [4] **L. Milliken**, E. Krieger, Y. Diskin, and V. K. Asari. "High resolution 3d reconstruction using a hexacopter drone". In *Brother Joseph W Stander Symposium*, University of Dayton, Dayton, OH, April 2014.

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## Research and Projects

2017 **Dynamic Task Allocation for Human-Robot Teams in Medical Environments**, Oregon State University.

Examine how robots and humans can work together in the treatment of highly infectious diseases such as Ebola. A variant of Monte Carlo Tree Search is used to optimize task order and assignment between and human and a robot and dynamically adjust for contingencies in the patient treatment environment.

2015–2017 **Learning User Expertise for Choosing Levels of Shared Autonomy**, Oregon State University.

Model human expertise as a Partially Observable Markov Decision Process (POMDP) in order to choose the amount of control to share between a human user and semi-autonomous robot. The algorithms are tested in simulation with human user studies, and the adaptive shared autonomy is also applied to the underwater vehicle, the Seabotix vLBV300.

2015–2017 **PCC Structural Process Optimization Project**, Oregon State University.

We work with the parts casting company PCC in developing work flow optimization for their assembly line process. We use Reinforcement Learning and Evolutionary Algorithms to optimize work orders and are developing a GUI to visualize the process.

2014–2015 **Go-Kart Control System**, *Senior Design Project*, University of Dayton.

Designed a system that wireless controls the speed of each go-kart from a handheld tablet. Design included speed control, WiFi communication from tablet to kart, creating a user interface for the tablet and mounting on the go-kart using an Arduino based system.

2014 **Undergraduate Researcher**, *Vision Lab*, University of Dayton, City.

Use Hexacopter Drone to collect aerial data for on-going research projects in Vision Lab. Gained experience and knowledge of image processing problems such as rain removal, face recognition, object tracking, and 3-D reconstruction.

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## Awards

- o Mary C. Millette Endowment Award for the Outstanding Senior Electrical Engineering Student, May 2015
- o John C. Eck Scholarship, 2012-2015
- o Trustees' Merit Scholarship, 2011-2015

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## Skills

Programming Languages C++, JavaScript, Python, Matlab, OpenCV, ROS

Programs NI Labview, Matlab Simulink, GIMP  
Miscellaneous Experience with micro-controllers, running user studies, GUI design, PID controller design/tuning, circuit design, technical writing, schematic drawing

## Teaching Experience

Fall 2016 **Teaching Assistant, System Dynamics and Controls**, *Oregon State University, School of Mechanical, Industrial and Manufacturing Engineering.*  
An undergraduate controls course for mechanical and electrical engineering students. Met with students and did the grading.

## Relevant Coursework

**Learning Based Control**, *Fall 2015*, Oregon State University.

**Artificial Intelligence**, *Winter 2016*, Oregon State University.

**Computer Vision**, *Winter 2016*, Oregon State University.

**Human-Robot Interaction**, *Spring 2016*, Oregon State University.

**Sequential Decision Making**, *Winter 2017*, Oregon State University.

**Linear Multivariable Control Systems**, *Fall 2016*, Oregon State University.