

Michael Ouimet, Ph.D.

SUMMARY

Mechanical engineer with interdisciplinary research experience in control and estimation theory, dynamical systems, and machine learning focusing on robotic applications. Broad range of mathematical modeling, analysis skills, and programming experience (Python and MATLAB) with supervisory roles. Strong written and oral communication skills.

EXPERIENCE

Engineer at SPAWAR Systems Center Pacific

July 2015 - present

- Principal Investigator (PI) on a proposal funded by the Office of Naval Research (ONR) to co-advise a Ph.D. student at UC San Diego in topics of cooperative estimation and control of unmanned vehicles, especially focused on human-swarm teaming (FY17-FY19)
- Co-PI and Algorithm Lead on an internally funded research project on Human-Autonomy Teaming. Implemented a number of Artificial Intelligence motion planning algorithms (A*, MDPs, model-predictive control, supervised learning, reinforcement learning) in Python and evaluated their applicability on solving successively more challenging (and therefore realistic) Navy scenarios.
- Aided in the design of a PID control law for an unmanned military vehicle. Developed a training document for applying multisensor data fusion techniques (SLAM, Kalman Filter and extensions, Particle Filter, data association) to unmanned military vehicles.

Postdoctoral researcher at UC San Diego

Apr 2014 - Jun 2015

- Developed mathematical model for information throughput of team of aerial, mobile, internet-providing vehicles and designed novel motion control algorithm to deploy over Earth's atmosphere, providing optimal service subject to motion constraints.
- Created event-triggering strategy for cooperative localization algorithm to provide robots' ability to estimate own location cooperatively while minimizing communication costs. Compared novel algorithm to standard baseline algorithms to investigate the tradeoff between communication cost and system performance.
- Supervised undergraduate and graduate researchers in individual projects towards developing capabilities of lab's new multi-robot testbed, helped determine and direct the long-term focus of the testbed. Team successfully demonstrated several algorithms including localization, SLAM, multi-agent deployment, and cyclic pursuit.

Graduate student at UC San Diego

Sep 2009 - Apr 2014

- Worked on interdisciplinary team with Scripps Institute of Oceanography research engineers and oceanographers to develop algorithms for underwater buoyancy-controlled drifters. Designed, simulated, and validated cooperative algorithms to estimate parameters of ocean internal waves off coast of San Diego. Algorithm estimated the desired parameters from real data and results are being transferred to the oceanographic community.
- Developed and simulated novel motion control algorithm where ocean drifters utilize their knowledge of the ocean wave flowfield to maneuver in desired direction by moving vertically in the water column, harnessing varying water speeds. Received honorable mention for presentation of this work at the UCSD Engineering Research Expo 2014.
- Developed and simulated cooperative algorithm to optimally deploy team of unreliable mobile robotic sensors across an environment. Algorithm has applications in area surveillance and monitoring of environments where communication is challenging, such as underwater.

Engineering internship at Otis Elevator Company

Summer 2006, 2007

- Measured elevator noise and developed a script to analyze its frequency spectrum for the purpose of fault detection.

- Documented, re-implemented, and added functionality to a script of an elevator belt wear model. This piece of software was easier for anyone to edit, well documented, and had one tenth the runtime.

ADDITIONAL INFORMATION

- Audited Micro-MBA course for academics through the UCSD Rady School of Management
- Led lab outreach tours for High School and University groups to inspire students to join STEM fields and consider careers in robotics/research

EDUCATION

University of California, San Diego, California, USA

Ph.D., Mechanical and Aerospace Engineering (Advisor: Jorge Cortés), Apr. 2014

-Thesis title: Distributed Cooperation for Robust Estimation

M.S., Mechanical and Aerospace Engineering, Nov. 2010

University of Notre Dame, Indiana, USA

B.S., Mechanical Engineering, Jun. 2009

JOURNAL PUBLICATIONS

M. Ouimet and J. Cortés. Robust coordinated rendezvous of depth-actuated drifter in ocean internal waves. *Automatica*, vol. 69, pp. 265-274, 2016

M. Ouimet and J. Cortés. Robust, distributed estimation of internal wave parameters via inter-drogue measurements. *IEEE Transactions on Control Systems Technology*, vol. 22, no. 3, pp. 980-994, 2014

M. Ouimet and J. Cortés. Collective estimation of ocean nonlinear internal waves using robotic underwater drifters. *IEEE Access*, vol. 1, pp. 418-427, 2013.

M. Ouimet and J. Cortés. Hedonic coalition formation for optimal deployment. *Automatica*, vol. 49, no. 11, 3234-3245, 2013

CONFERENCE PROCEEDINGS

M. Ouimet, N. Ahmed, and Sonia Martínez. Event-based cooperative localization using implicit and explicit measurements. *Conference on Multisensor Fusion and Integration for Intelligent Systems*, San Diego, CA, 2015

M. Ouimet, J. Cortés, and Sonia Martínez. Global network integrity using altitude-actuating balloons in the stratosphere. *Conference on Decision and Control*, Osaka, Japan, 2015

M. Ouimet and J. Cortés. Coordinated rendezvous of underwater drogues in ocean internal waves. *Conference on Decision and Control*, Los Angeles, CA, 2014

M. Ouimet and J. Cortés. Robust estimation and aggregation of ocean internal wave parameters using Lagrangian drifters. *American Control Conference*, Portland, OR, 2014

M. Ouimet and J. Cortés. Distributed estimation of internal wave parameters via inter-drogue distances. *Conference on Decision and Control*, Maui, HI, 2012

M. Ouimet and J. Cortés. Coalition formation and motion coordination for optimal deployment. *Conference on Decision and Control*, Orlando, FL, 2011

AWARDS AND HONORS

Invited speaker to UC Irvine Mechanical Engineering department, April 2016

Nominated for Outstanding Contribution award for *Transactions on Control Systems Technology*

Honorable mention at the UCSD Engineering Research Expo, 2014
