Eric M. Wolff

Contact Information	Eric M. Wolff 1200 E. California Blvd. MC 305-16 Pasadena, CA 91125	269-861-5305 ewolff@caltech.edu www.cds.caltech.edu/∼ewolff

Interests

Cyberphysical systems, autonomous vehicles, robot motion planning, temporal logic, machine learning, optimization, verification of hybrid systems, optimal control

Education

California Institute of Technology, Pasadena, CA — 2010-2014 (expected)
Ph.D., Control and Dynamical Systems
  - Thesis: *Control of Dynamical Systems with Temporal Logic Specifications*
  - Advisor: Prof. Richard M. Murray

Cornell University, Ithaca, NY — 2006-2010
B.S., Mechanical Engineering, *summa cum laude*

Professional Experience

Research Assistant. California Institute of Technology — 2010–Present
Prof. R. M. Murray, Dept. of Control and Dynamical Systems
- Developed algorithms to design controllers that guarantee correct and efficient execution of complex tasks by robots, autonomous vehicles, and other cyberphysical systems.
- Published six papers describing new algorithms for optimal control of nonlinear systems and robust control of stochastic systems with complex tasks.

Research Intern. Air Force Research Laboratory, Dayton, OH — Fall 2013
Dr. L. Humphrey, Aerospace Systems Directorate
- Created software to assist human operators by performing automated verification and synthesis of UAV mission plans using temporal logic specifications.

Research Intern. Army Research Laboratory, Adelphi, MD — Summer 2010
Dr. A. Wickenden and *Dr. W. Nothwang*
- Developed algorithms (based off D^* Lite and LPA*) and software for incremental path planning and control of small autonomous ground vehicles.
- Implemented algorithms on hardware and built prototype camera localization system.

Student Member. Violet Nanosatellite Team, Cornell University — 2009–2010
Prof. M. Peck, Dept. of Mechanical and Aerospace Engineering
- Led development of an attitude determination and control simulation in Simulink.
- Designed the spacecraft's attitude control system architecture with teammates.

Student Researcher. Cornell University — 2008–2010
Prof. E. Garcia, Dept. of Mechanical and Aerospace Engineering
- Optimized design of piezoelectric energy harvesting devices for wireless sensor networks.
- Built prototypes and test fixtures using 3D printer, mill, lathe, and diamond saw.

Summer Intern. Goodrich-Ithaco Space Systems, Ithaca, NY — Summer 2009
- Designed test fixtures for reaction wheels and CMGs using SolidWorks.

Awards

National Defense Science and Engineering Graduate Fellowship (1 of about 200)	2011
National Science Foundation Graduate Research Fellowship	2010
Cornell University, Merrill Presidential Scholar (1 of 32)	2010
Cornell University, Mechanical and Aerospace Engineering	
- McManus Design Award (for best solution to an original design problem)	2010
- Frank O. Ellenwood Prize (for highest GPA in heat and power courses)	2010
Cornell Engineering Learning Initiatives Research Grant (x2)	2008, 2009

Technical Skills	**Expertise**: Optimization, Control Theory, Dynamics, Hybrid Systems, AI Autonomous Robotics, Mechatronics, Machine Learning, Formal Verification

Expertise: Optimization, Control Theory, Dynamics, Hybrid Systems, AI
Autonomous Robotics, Mechatronics, Machine Learning, Formal Verification

Simulation/Analysis: MATLAB, Simulink, SolidWorks, R, CVX, CPLEX

Programming: C++, Python, Java, ROS

OS/Office: Linux, Mac, Windows, Word, Excel, PowerPoint, Git, LaTeX

Analytical: Stochastic Processes, Linear Operator Theory, Differential Geometry

Teaching

Teaching Assistant. California Institute of Technology　　　　　　Fall 2013
CDS 110a: Introduction to Control Theory. Instructor: D. MacMartin

Mentor. SURF Program, California Institute of Technology　　　Summer 2013
Mentored undergraduate on summer research project

Tutor. RISE Program, Caltech Y, Pasadena, CA　　　　　　Jan. 2011–Present
Volunteer tutor for high school students in math and science

Tutor. Tau Beta Pi, Cornell University　　　　　　Fall 2008–Fall 2009
Volunteer tutor for undergraduates in linear algebra and differential equations

Mentor. FIRST Robotics, Coloma High School, Coloma, MI　　　Winter 2009
Volunteer mentor for high school students in FIRST robotics competition

Peer-reviewed Publications

1. M. Horowitz, E. M. Wolff, and R. M. Murray. A compositional approach to stochastic optimal control with temporal logic specifications. *Int. Conf. on Intelligent Robots and Systems*, 2014, submitted.

2. F. Sun, N. Ozay, E. M. Wolff, J. Liu, and R. M. Murray. Efficient control synthesis for augmented finite transition systems with an application to switching protocols. *American Control Conf.*, 2014, accepted.

3. E. M. Wolff, U. Topcu, and R. M. Murray. Optimization-based trajectory generation with linear temporal logic specifications. *Int. Conf. on Robotics and Automation*, 2014, accepted.

4. E. M. Wolff and R. M. Murray. Optimal control of nonlinear systems with temporal logic specifications. In *Int. Symp. on Robotics Research*, 2013.

5. E. M. Wolff, U. Topcu, and R. M. Murray. Automaton-guided controller synthesis for nonlinear systems with temporal logic. In *Int. Conf. on Intelligent Robots and Systems*, 2013.

6. E. M. Wolff, U. Topcu, and R. M. Murray. Optimal control of non-deterministic systems for a computationally efficient fragment of temporal logic. In *IEEE Conf. on Decision and Control*, 2013.

7. E. M. Wolff, U. Topcu, and R. M. Murray. Efficient reactive controller synthesis for a fragment of linear temporal logic. In *Int. Conf. on Robotics and Automation*, pp. 5033–5040, 2013.

8. E. M. Wolff, U. Topcu, and R. M. Murray. Robust control of uncertain Markov decision processes with temporal logic specifications. In *IEEE Conf. on Decision and Control*, pp. 3372–3379, 2012.

9. E. M. Wolff, U. Topcu, and R. M. Murray. Optimal control with weighted average costs and temporal logic specifications. In *Robotics: Science and Systems*, 2012.

PRESENTATIONS	International Symposium on Robotics Research (ISRR)	Dec. 16, 2013
	IEEE Conference on Decision and Control (CDC)	Dec. 11, 2013
	International Conference on Intelligent Robots and Systems (IROS)	Nov. 6, 2013
	University of Michigan	Oct. 1, 2013
	The 2nd Workshop on Synthesis (SYNT)	July 13, 2013
	Saarland University	May 13, 2013
	International Conference on Robotics and Automation (ICRA)	May 9, 2013
	University of Pennsylvania	Apr. 2, 2013
	IEEE Conference on Decision and Control (CDC)	Dec. 11, 2012
	Robotics: Science and Systems (RSS)	July 12, 2012
	REEL Science K-12 community outreach program	Dec. 7, 2012

HOBBIES	Skiing, hiking, softball, swimming