

DENNIS WAI

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<http://www.denniswai.com>

EDUCATION

University of California, Berkeley

2013-Present

PhD. in Mechanical Engineering

Advisor: Professor Masayoshi Tomizuka

Overall GPA: 3.914

University of California, Berkeley

Completed May 2013

B.S. in Mechanical Engineering

Overall GPA: 3.817

RESEARCH EXPERIENCE

Mechanical Systems Laboratory

Aug 2013 - Present

Graduate Student Researcher

Berkeley, CA

- Developing control algorithms for robust precision tracking in intersatellite laser communications and implementing on an ASCTEC quadcopter testbed
- Stochastic estimation techniques for attitude estimation
- Model-based control coupled with stochastic estimation on a quadcopter testbed.

CiBER Lab

May 2011 - May 2013

Undergraduate Researcher

Berkeley, CA

- Designed and manufactured a novel tail backpack for a remote controlled car to demonstrate pitch-correcting abilities in midair.
- Created and designed various PCBs for controller purposes in Tailbot, a robot with inertial assisted control by an active tail inspired by lizards; Tailbot was also a featured robot on the front page of Nature magazine

Mechanical Systems Laboratory

May 2010-May 2011

Undergraduate Researcher

Berkeley, CA

- Created a small, wireless Arduino inertial measurement unit as part of a wireless body sensor network that will relay kinematic information to a local networked computer for analysis in a clinical setting.
- Developed in LabVIEW packet loss compensation methods to account for incomplete sensor readings as well as graphical methods to translate the kinematic data into easily understood animations of a virtual human.

WORK EXPERIENCE

Jet Propulsion Laboratory

Robotics Engineer

May 2015 - Aug 2015

Pasadena, CA

- Kinematic analysis of a 3/4 degree of freedom robotic arm to determine workspace accessibility in the Mars Sample Transfer Chain, which involves transferring a cache from one rover to another so that the cache can be returned from Mars to Earth
- The analytical work convinced the Mars Program Office that the mission was feasible and informed them of the arm configuration that should be used

Jet Propulsion Laboratory

Robotics Engineer

Jun 2014 - Aug 2014

Pasadena, CA

- Analyzed a 3/4 DOF robotic arms kinematics to determine workspace accessibility in MSTT, which involves transferring a cache from one rover to another so that the cache can be returned from Mars to Earth.
- My analytical work changed the Mars Program Offices original mission concept into a cache-less alternative.

Jet Propulsion Laboratory

Electrical Engineer

Jun 2013 - Aug 2013

Pasadena, CA

- Assisted in the prototyping of a novel comet sampling tool for a future comet surface sample return mission, which can help provide answers to the origin of water in our solar system
- Architected and manufactured the electrical and pneumatic control system for the autonomous sampling system. The system successfully retrieved samples with high reliability and will represent JPL's candidate solution for the mission.

Space Science Laboratory

Mechanical Engineer

May 2012 - Aug 2012

Berkeley, CA

- Drafted and designed the optical layout for an externally dispersed interferometer attachment for the Lick Observatories in order to improve its spectral resolution by four folds
- Prepared weekly presentations to update fellow astronomers in hardware developments

Pioneers in Engineering

Mentorship Coordinator

May 2011 - May 2012

Berkeley, CA

- Spearheaded efforts to recruit Berkeley undergraduates to become robotics mentors for underprivileged high school students in our annual 300+ robotics competition.
- Managed a 10-person committee in robotics curriculum development for 90+ UC Berkeley undergraduates
- Hosted the inaugural and well-received Robots vs Dinosaur Science Festival, a 100+ event, complete with 8 novel science activities in cooperation with the Lawrence Hall of Science

TEACHING EXPERIENCE

UC Berkeley EECS Department

Teaching Assistant

May 2012 - Aug 2012

Berkeley, CA

- Taught *Electronic Techniques for Engineering* to 100+ UC Berkeley undergraduates over the summer
- Prepared discussion, exam reviews, and other curriculum material for students
- Led weekly discussions, instructional labs, and office hours and was rated as the best Teaching Assistant

Academic Service Center at UC Berkeley

May 2011 - May 2012

Physics Tutor

Berkeley, CA

- Assisted undergraduates in mastery of basic and advanced physics concepts through 1-on-1 tutoring

PUBLICATIONS

Conference Proceedings

1. Joonbum Bae; Haninger, K.; **Wai, D.**; Garcia, X.; Tomizuka, M., "A network-based monitoring system for rehabilitation," *Advanced Intelligent Mechatronics (AIM), 2012 IEEE/ASME International Conference on*, vol., no., pp.232,237, 11-14 July 2012 [IEEE Link](#)
2. Paul Backes; **Wai, D** et al. "Sampling System Concepts for a Touch-and-Go Architecture Comet Surface Sample Return Mission." *American Institute of Aeronautics and Astronautics (AIAA), AIAA SPACE 2014 Conference and Exposition* June 2014 [AIAA Link](#)
3. Yizhou Wang; **Wai, D.**; Tomizuka, M., "Steady-state Marginalized Particle Filter for Attitude Estimation" *Dynamic Systems and Control Conference (DSCC)* July 2014 [ASME Link](#)
4. Kyle Edelberg; **Wai, D.**; Reid, J; Kulczycki, E; Backes, P., "Workspace and Reachability Analysis of a Robotic Arm for Sample Cache Retrieval from a Mars Rover" *AIAA SPACE 2015 Conference and Exposition (AIAA)* Sept 2015

RELEVANT SKILLS

Computer Languages	Python, MATLAB, C, LabVIEW, OSX, Ubuntu, git, jemdoc
Tools	Solidworks, EAGLE, AutoCAD, Inkscape, Illustrator, ROS, Docker
Cantonese	Fluent

HONORS AND EXTRACURRICULARS

Pioneers in Engineering Foundation CEO	Apr 2015 - Present
Pioneers in Engineering Web Developer	Aug 2014 - Present
Pioneers in Engineering Scholarship Founder	Aug 2013 - Present
Pioneers in Engineering Advisor	May 2012 - Present
Pioneers in Engineering Mentorship Coordinator	May 2011 - May 2012
Tau Beta Pi Service Chair - Officer of the Semester	Aug 2012 - Dec 2012
Pi Tau Sigma Student Relations Officer	Jan 2011 - Dec 2011
Charles and Daisee Seffens Scholarship Recipient	Aug 2009 - Aug 2012
Cal Band Trombonist	Aug 2010 - Aug 2012