Joseph Bowkett

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EDUCATION

California Institute of Technology - Burdick Group — Pasadena CA, USA
Doctor of Philosophy in Mechanical Engineering — expected June 2020
Master of Science in Mechanical Engineering — June 2016
Sir William Pickering Fellowship — Current GPA: 3.5/4.0

University of Auckland — Auckland, New Zealand
Bachelor of Engineering (Honours) in Mechatronics — November 2013
GPA: NZ Scale 8/9 (A), 4.0/4.0 equivalent

EXPERIENCE

NASA Jet Propulsion Laboratory — Pasadena, CA, USA
Research Affiliate — April 2016 – Present

- Developed simulations and experimental apparatus for testing several control strategies designed to mitigate residual end effector vibration in articulated arms with multiple sources of compliance, including MPC and input/command shaping
- Scripted a new module for the JPL Surrogate system from scratch to coordinate limb motions as well as capture and stitch head cam images in order to form a panoramic representation of the robot's surroundings
- Developed testing procedures and scripts to aid in the diagnosis of EtherCAT comms issues in the limb control of the RoboSimian platform
- Currently primary roboticist on Unified Processing for Icy Body Exploration (UPRITE) research project developing autonomy for mobility & manipulation
- Primary maintainer of JPL Surrogate robotic platform, requiring extensive understanding of EtherCAT controlled motors under a proprietary software stack, frequent electrical diagnosis and redesign, and rapid design & prototyping of mechanical components as project needs arise
- Applying extension of RL multi-armed bandit theory to manipulation mode selection within UPRITE project
- Currently developing road debris removal behavior on RCTA Roman platform for the Army Research Labs, alongside researching application of deep learning to assessment of complex manipulation task post-conditions
- Applying ResNet based Tensorflow model to synthetic depth images to classify manipulation task post-conditions for recovery actions

California Institute of Technology — Pasadena, CA, USA
Teaching Assistant — Sept 2015 – June 2017

- Advanced robotics: (2 quarters)
- Spec'd, sourced, and maintained a range of robotics platforms for the purpose of teaching students inertial & visual navigation, sampling & filtering, planning etc, including ground vehicles, "turtlebots", quadcopters, OptiTrack motion capture system
- Prepared software packages including prepackaged virtual machines and template programs to teach students the use of ROS and a range of its most commonly employed packages
- Intro to Systems Engineering: (3 quarters)
- Oversaw a team of 80 undergraduates designing and constructing of an electric race car for the Formula SAE Electric competition
- Took on the role of machine shop manager to allow students to work outside hours of regular staff
- Provided guidance on mechanical and electrical design, along with reconciling requirements and interfaces between component teams

PowerbyProxi Ltd — *Reference available on request* — Auckland, New Zealand
Product Development Engineer — November 2013 – July 2014
Engineering Intern — November 2011 – March 2013

- Development and validation of embedded C software on Microchip PIC32MX platform
- Design of mechanical and electrical hardware including PCBs and mounting enclosures
- Interacted with corporate customers such as John Deere to scope new products and create development timelines
- Investigated issue of interaction between field of inductive power transfer circuitry and RF transceivers within packages sealed for industrial environments
- Led a team of engineering interns to develop a novel method of pairing RF transceivers using frequency modulation of power circuitry used for inductive power transfer
- Developed Windows Forms based software for configuring Inductive Power Transfer devices in the field, as well as electrical hardware for testing of RS232, CAN, Ethernet protocols

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University of Auckland, Yacht Research Unit Auckland, New Zealand
Undergraduate Research Assistant April 2013 – October 2013

- Constructed racing bicycle aerodynamic drag testing apparatus in twisted flow wind tunnel for commercial client
- Used computer vision to measure frontal area of device under test and an array of force sensors

PROJECTS & LEADERSHIP

Senior Engineering Research Project February 2013 – November 2013

- Designed and operated automated testing apparatus to investigate how spatial positioning of two coils separated by an air gap influenced efficiency of inductive power transfer, for use by PowerbyProxi Ltd

Senior Multidisciplinary Group Project September 2013

- Led a team of 24 engineering students on a fulltime week-long project to plan improvements to the city of Auckland's resilience against catastrophic natural disasters, culminating in my presenting our solution to the entire graduating class, engineering faculty and city council members

SKILLS & INTERESTS

Proficiencies: C, C++, Embedded C, Python, Git, ROS, Keras, TensorFlow, PCL, MATLAB, MS Project, Atlassian Suite, Mathematica, Visual Studio, Solidworks, Eclipse, Arduino, Altium, LabView, Machine Shop & Rapid Prototyping
Interests: Squash, skiing, SCUBA diving, hiking, piano, RC aircraft (quadrotor)