Lucas Chavez, MS

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BACKGROUND Robotics; hardware and software development; computer vision; environmental mapping; 3D simulation

SKILLS Python, C++, Matlab, Git, CMake, Unix, Robotic Operating System (ROS), Arduino, Circuits, OpenGL, Simulink, Labview, Solidworks, Machining, & LaTeX

EDUCATION **University of New Mexico** *MS Mechanical Engineering in Robotics, GPA – 3.54*
Thesis: *Mesh Addition Based on the Depth Image* paper

New Mexico Institute of Mining and Technology *BS Mechanical Engineering, GPA – 3.48*

RELEVANT COURSES
ME 582 – Robotic Engineering II
ECE 516 – Computer Vision
CS 529 & CS 591 – Introduction to and Advanced Machine Learning
ECE 595 – Autonomous Mobile Robots
ECE 595 – Adaptive Filtering
ME 581 – Digital Control

GRANTS **National Science Foundation Grant # 1131305** Research Assistant
Belo Horizonte, Brazil July 2012 - January 2013

- Traveled to Brazil and researched at the robotics lab of Universidade Federal de Minas Gerais, VeRLab.
- Developed a procedure and determined an error model for a RGBD sensor. Work included creating an experimental setup and code for data analysis. paper
- Used the error model in my thesis work to create a realistic simulation of output from a RGBD sensor.

PUBLICATIONS L. Chavez and R. Lumia "Mesh Addition Based on the Depth Image," presented at the Robotics and Automation for Humanitarian Applications Conf., Kerala, India, 2016. video, paper, code

L. Chavez et al. "Fiber Optic Strain Gage Verification and Polyethylene Hip Liner Testing," presented at the International Modal Analysis Conference, Jacksonville, FL, 2010. paper

EXPERIENCE **Fiore Industries** Intern
Albuquerque, NM January 2015 - July 2015

- Using a Fanuc robotic arm (image), designed and developed a capable platform for intelligent prosthetic research by utilizing ROS, Python, Arduino, and sound development practices.
- Performed path planning with the arm, which gave the ability to move the arm to desired positions using inverse kinematics.
- Added 8 force sensors and force control to an industrial gripper that came with the robot. Used Arduino, XBee, and custom circuits to wirelessly communicate between the gripper and ROS.
- Contributed Python code to ROS by fixing an open source issue (179) via a Github pull request. My code fixed a runtime error that was occurring during wireless communication.

Stellar Science Intern
Albuquerque, NM August 2013 - June 2014

- Contributed to Stellar's code base in C++, Python, CMake, Qt, Bash script, and Java.
- Wrote code to add user functionality to 3D simulation software.
- Read, analyzed, and visualized a large data set of irradiance on the earth's surface.
- Maintained reliability of the code base and wrote unit tests for new code.

Intelligent Systems and Robotics Center — Research Assistant
Sandia National Labs, Albuquerque, NM — November 2011 - July 2012

- Worked on the hardware design and software development of a Pioneer robotic platform.
- Used ROS, C++, and Python to control the robot and position a RGBD sensor.

Kirtland Air Force Research Laboratory — Intern
Kirtland Air Force Base, Albuquerque, NM — May 2011 - September 2011

- Applied techniques from the field of robotics to design a calibration procedure specific to a unique 6 DOF laser scatterometer test bed which is in use by AFRL.
- Modeled kinematics of the system and simulated the calibration procedure with Matlab. poster

Robotics Laboratory — Research Assistant
University of New Mexico, Albuquerque, NM — January 2010 - August 2010

- Utilized a Segway RMP and Simulink to create a mobile robotic research platform to be used by future students.
- Ordered and installed compatible hardware for communication to the Segway. Wrote Simulink code and demos to control the movement of the Segway.
- Used machine learning to create an auto calibration procedure for the Segway's stereo cameras.
- Implemented haptic control of the Segway which gave physical feedback to the operator when the robot encountered obstacles. video

Los Alamos Dynamic Summer School — Intern
Los Alamos National Lab, Los Alamos, NM — Summer 2009

- Developed LabVIEW code to receive and log data from fiber optic strain gauges.
- Coauthored "Fiber Optic Strain Gage Verification and Polyethylene Hip Liner Testing."
- Received training, talks, and experience with modal analysis and structural monitoring.

Facilities Engineering — Intern
Sandia National Labs, Albuquerque, NM — Summer 2007 & 2009

- Collected and analyzed data from buildings and infrastructures.
- Obtained an L-Clearance in order to work with classified material.

Mechanical Engineering Department Machine Shop — Machine Shop Supervisor
New Mexico Tech, Socorro, NM — January 2007 - May 2008

- Assisted students with shop equipment and building parts for class projects.
- Maintained equipment by ordering and installing parts.

Notable Projects

Environmental Mapping with a Mobile Robot video — 2011

- Used ROS and a Kinect sensor to implement SLAM on a Pioneer mobile robot.
- Created a user interface that allowed a user to set goal points on the map that was being generated in real-time by the SLAM process.

Controlling a Segway with a Wii Remote video — 2010

- Wirelessly controlled a Segway mobile robot by using a Wii remote and Simulink.
- The Wii remote input was fed through a PID controller and the final movement commands were sent via CAN bus communications to the Segway.

Affiliations

President of American Society of Mechanical Engineers — 2009
New Mexico Tech, Socorro, NM

- Worked with teams of students on projects such as welding workshops, Rube Goldberg machines, and an air cannon.
- Scheduled guest speakers to present on a variety of engineering subjects.