

# Jessica Austin

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## Education

### **Carnegie Mellon University, Robotics Institute**

M.S., Robotics, August 2013 - December 2014

*Coursework included:* Kinematics, Dynamics, Control, Robotic Manipulators, Computer Vision, Machine Learning, Mathematics for Robotics, Educational Technology

### **California Institute of Technology**

B.S., Mechanical Engineering, with minor in Control and Dynamical Systems, June 2008

## Work Experience

### **Senior Software Developer, Axiom Data Science**

June 2016–Present

Axiom provides data management and analysis services for organizations conducting research and management in the ecological, geological and ocean sciences. My major projects include:

- Lead backend developer for Ocean Observatories Initiative (OOI) [Data Explorer](#), a data discovery, visualization, and access tool for ocean science data. Worked with OOI scientists to develop a data pipeline that enables rapid exploration of dense, long-running time-series and profiler data.
- Lead developer for an environmental sensors system that powers the [IOOS Environmental Sensor Map](#) and other data portals. This system regularly pulls data for over 25,000 stations across over 100 data sources, standardizes and stores it, and makes it available via community-standard data access methods. During my time on the project, I've redesigned this system for increased scalability and reliability, introduced metrics and monitoring throughout the stack, added quality control tests for data, and developed a web-based management system that moved data source administration from one developer to a team of environmental data scientists. Technologies include: Python, Kafka, TimescaleDB, netCDF, Docker, Prometheus, Grafana. Presentation: [slides](#) and [video](#).
- Co-maintainer of [ioos\\_qc](#), an open-source python library implementing automated quality control algorithms for oceanographic datasets and observing systems.
- Worked with the Integrated Ocean Observing System (IOOS) program office to develop [v1.2 of the IOOS Metadata Profile](#) and a standard data access approach across the IOOS Regional Associations. Work included updates to the [Climate and Forecast \(CF\) Conventions](#) to describe QC variables.
- Developed cluster computing system to analyze years of AIS vessel traffic data for use in NOAA Office of Coast Survey Hydrographic Health Model and other projects. Previous NOAA workflow took days to process a small spatio-temporal subset; this approach processed one year of data for all US waters in less than 48 hours. [Presentation](#), [website](#), [data portal](#).

### **Senior Software Developer, Resource Data, Inc.**

January 2015–June 2016

Resource Data, Inc. is a custom software and GIS consulting company based in Anchorage, Alaska.

My projects involved working with various local organizations, including the North Pacific Research Board.

### **Student Researcher, Geyer Lab, Carnegie Mellon University**

September 2013–December 2014

The Geyer Lab focuses on principles of human motor control, with application to prosthetics and rehabilitation. I collaborated with other students in the lab to evaluate neuromuscular control models on a robotic leg, and investigated the use of compact nonlinear springs for increased bandwidth and torque resolution in Series Elastic Actuators (see publications below).

### **ChiBots SRS Robomagellan 2012, collaboration with Bill Mania**

Competition: Navigate a field autonomously as quickly as possible, using a wheeled robot

- CoroWare CoroBot with camera, rangefinders, IMU, wheel encoders, running on ROS
- Kalman filter for sensor fusion of IMU and wheel encoder data
- Odometry based on dead reckoning, localization using a very sparse map
- OpenCV-based algorithm to find waypoints marked by orange traffic cones
- Overcame challenges using ROS navigation packages with low-grade hobby hardware

## GrubHub.com

GrubHub is the nation's leading online and mobile food ordering platform. During my time there, the company grew from 40 employees to over 300, and from 13 cities to nationwide.

### Manager, Quality and Release Engineering Team

May 2012–June 2013

- Maintenance and expansion of a full-scale pre-production environment, which allowed 5 different teams to work independently before merging to master
- Designed and constructed continuous deployment build pipeline in Jenkins and led the associated process changes, increasing deployment frequency from monthly to weekly

### Senior Software Developer

April 2010–June 2012

- Worked within a cross-functional team to develop new products, including: full implementation of new credit card payment processor, development of sweepstakes game that increased diner order frequency, and creation of data entry API to allow third-party data entry for menus
- Led the development group on testing best practices, leading to increased code quality and sustainability even in a time of rapid company growth

### Consultant/Software Developer, ThoughtWorks, Inc.

August 2008–April 2010

ThoughtWorks is a global IT consultancy specializing in custom software and is a pioneer in AGILE software development. My work included: working for a large educational company to improve their deployment process; development for a major US airline to redesign their booking website and create a marketing website that featured user-generated content.

## Skills

**Tools and Platforms:** Docker, Apache Kafka, PostgreSQL, TimescaleDB, ElasticSearch, Apache Spark, Amazon AWS, Prometheus, Grafana, Ansible, AngularJS, MATLAB, Simulink, Robot Operating System (ROS)

**Languages and Frameworks:** Python, Javascript, Java, Scala, SQL, shell scripting, C++

## Publications

Austin, Jessica, John-Marc Dunaway, Rob Bochenek, and Tiffany Vance. "**Developing Big-Data Infrastructure for Analyzing AIS Vessel Tracking Data on a Global Scale**". *Big Earth Data Analytics in Earth, Atmospheric and Ocean Sciences*. American Geophysical Union, 2020. *In Review*.

Austin, Jessica, Alexander Schepelmann, and Hartmut Geyer. "**Control and evaluation of series elastic actuators with nonlinear rubber springs**." *Intelligent Robots and Systems (IROS), 2015 IEEE/RSJ International Conference on*. IEEE, 2015.

Schepelmann, Alexander, Jessica Austin, and Hartmut Geyer. "**Evaluation of decentralized reactive swing-leg control on a powered robotic leg**." *Intelligent Robots and Systems (IROS), 2015 IEEE/RSJ International Conference on*. IEEE, 2015.

## Other Interests

### Owner, Frosty Beaver Designs, LLC

Custom laser-cut maps and designs

### Volunteer Work

Board Member and volunteer, The Folk School Fairbanks

Board Member, Anchorage Makerspace

**Hobbies:** woodworking, gardening, hiking, packrafting, skiing, skijoring