Jessica Austin

https://github.com/jessicaaustin
http://linkedin.com/in/jessica-aus10
jessica@aus10.org

Education

Carnegie Mellon University, **Robotics Institute**
M.S., Robotics, August 2013 - December 2014
Coursework included: Kinematics, Dynamics, Control, Manipulators, CV, ML
California Institute of Technology
B.S., Mechanical Engineering, with minor in Control and Dynamical Systems, June 2008

Work Experience

Senior Robotics Software Engineer, Bedrock Ocean Exploration
February 2021–Present
The robotics software engineering team is responsible for all software aspects of Bedrock's AUV-based mapping system. During my time here, our small team has worked closely with EE, ME, integration engineers, and ops to bring the AUV from a tethered tele-operation prototype to a system capable of running fully autonomously underwater. Major projects include:

- ➔ Wrote software drivers and ROS nodes to control loads (GPIO, DAC), read telemetry (ADC), and manage various sensors (serial, IP, I2C), as well as embedded code for the AUV propulsion system
- ➔ Collaborated with GNC engineer to integrate controllers into ROS system; included software integration, system identification, and tuning
- ➔ Developed fault detection and recovery framework, with configurable fault definitions based on diagnostics published by ROS nodes
- ➔ Designed architecture and wrote software to allow communication between the AUV and base station over various low-bitrate and lossy communications methods, allowing operators to view AUV status and send commands in the field
- ➔ Built and maintain configuration management system to provision all robotics software computers
- ➔ Built continuous integration pipeline that runs automated tests and static code checks, built up internal test helper library to make it easy to write python unit tests, introduced first C++ unit tests, and built jobs to deploy code to robotics systems
- ➔ Developed several iterations of post-mission analysis tools, which take data from robotics systems and generate static reports and populate exploratory tools, allowing engineers across the org to check system performance and debug issues

Senior Software Developer, Axiom Data Science
June 2016–February 2021
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.
- ➔ 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.

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).

GrubHub.com
During my time here , 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 trunk
- ➔ 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.

ChiBots SRS Robomagellan Competition 2012, collaboration with Bill Mania
Goal: Navigate a field autonomously as quickly as possible, using a wheeled robot

- ➔ CoroWare CoroBot with camera, rangefinders, IMU, wheel encoders, running 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

Skills

Languages: Python, C++, Javascript, Typescript, SQL, Java, bash
Frameworks and tools: ROS1, Docker, Ansible, AWS (S3, EC2, IAM), Prometheus, Grafana, Jupyter Notebooks, PostgreSQL, TimescaleDB, Apache Kafka, Apache Spark
Hardware: Serial, I2C, Linux networking stack, servo, motor controller, INS, IMU

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.

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: The Folk School Fairbanks, Anchorage Makerspace
Hobbies: gardening, cooking, hiking, packrafting, skiing, skijoring