

JEFF IRION, Ph.D.

✉ <see my webpage> 🌐 <https://jefflirion.github.io> 📄 <https://github.com/jefflirion>
☎ <provided via email> 🔗 www.linkedin.com/in/jefflirion

PROFESSIONAL EXPERIENCE

- **SENIOR ROBOTICS SOFTWARE ENGINEER**, Neato Robotics *November 2018 – Present*
 - Contributed to robot vacuum code base with a focus on grid mapping, navigation, and map-related algorithms (e.g. BFS, DFS, ray tracing, etc.).
 - Drove a push towards test-driven development (TDD) and continuous integration (CI). Implemented checks for coding style, static analysis, unit test coverage, and memory leak detection.
 - Co-authored a SQLite database library used for storing data on the robot.
 - Worked on a feature to address the #1 customer satisfaction issue and led an alpha testing group.
- **RESEARCH SCIENTIST**, Bosch *May 2016 – November 2018*
 - Devised and implemented novel algorithms for distributed Graph SLAM optimization on Apache Spark.
 - Programmed a complete Graph SLAM framework in Python, including data I/O, vertices, edges, $SE(2)$ and $SE(3)$ pose operations, and fully analytic Jacobians.
 - Processed 3-D point clouds from an HDL-64E Velodyne LiDAR scanner and developed a method for incorporating ground plane images into the Graph SLAM optimization.
 - Contributed to the Bosch open-source library for ADMM optimization on Apache Spark.

EDUCATION

- **Ph.D., Applied Mathematics**, University of California, Davis. December 2015.
3.83 GPA. Adviser: Dr. Naoki Saito
- **B.S., Chemical Engineering**, University of California, San Diego. June 2009.
3.75 GPA. Minors in Mathematics and Economics

HONORS & AWARDS

- JSIAM Best Paper Award (2014)
- NDSEG Fellowship
- UC Davis VIGRE Award
- National Merit Scholar
- UCSD Regents Scholar
- UCSD Provost's Honors

SKILLS

Python, C++, CMake, ROS, R, MATLAB, Apache Spark, SQL, Git, Mercurial, SVN, Bash, Linux, \LaTeX , Test-Driven Development, Agile

RESEARCH EXPERIENCE

- **GRADUATE RESEARCH IN APPLIED MATH**, UC Davis June 2012 – January 2016
 - Developed algorithms for analyzing data on graphs; implemented these methods in MATLAB.
 - Developed methods for using graph-based techniques to analyze matrix data and demonstrated an 83.7% improvement over previous results in approximation experiments.

SELECTED COURSEWORK

- Numerical Methods
- Large-Scale Scientific Computation
- Applied Statistics
- Information Theory and Coding
- Graphs & Networks
- Numerical Optimization

SELECTED PUBLICATIONS

- J. Irion and N. Saito, "Efficient Approximation and Denoising of Graph Signals Using the Multiscale Basis Dictionaries," *IEEE Transactions on Signal and Information Processing over Networks*, vol. 3, 2017.
- J. Irion and N. Saito, "Hierarchical Graph Laplacian Eigen Transforms," *Japan SIAM Letters*, vol. 6, 2014. (*Best paper award*)

ONLINE COURSES

- Udacity Robotics Nanodegree
- Udacity Self-Driving Car Nanodegree, Term 1

<https://graduation.udacity.com/confirm/T6R5PPE>

PERSONAL PROJECTS

- **Graph SLAM solver** github.com/jefflirion/python-graphslam
 - Self-contained, extensible Graph SLAM solver with support for \mathbb{R}^2 , \mathbb{R}^3 , $SE(2)$, and $SE(3)$ datasets.
- **ADB library in Python** github.com/jefflirion/adb_shell
 - Implemented the ADB protocol in Python to enable control of Android devices from Python apps.
- **Android TV smart home integration** github.com/jefflirion/python-androidtv
 - Wrote a package for controlling Android TV devices and integrating them into Home Assistant.
- **Powerlifting calculator** jefflirion.github.io/powerlifting/
 - Wrote a powerlifting calculator in JavaScript to calculate total, Wilks score, and Malone score.

HOBBIES & INTERESTS

- Home Assistant contributor – codeowner for the Android TV integration March 2018 – Present
- Associate Editor and contributing author – *POWER* magazine May 2012 – April 2016
- Competitive powerlifter – elite status in the 220 and 242 lbs. classes June 2006 – November 2014