JEFF IRION

<see my webpage> https://jefflirion.github.io https://github.com/jefflirion
<provided via email> www.linkedin.com/in/jefflirion

Professional Experience

- **RESEARCH SCIENTIST**, Bosch *May 2016 – Present*
  - Devised and implemented novel algorithms for distributed Graph SLAM optimization on Apache Spark.
  - Single-handedly programmed a complete Graph SLAM framework in Python from scratch, 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.
    $\Rightarrow$ Removed ghosting from high-noise datasets where manual efforts failed.
  - Contributed to the Bosch open-source library for ADMM optimization on Apache Spark.
  - Collaborated with business units, presented research results, and discussed SLAM and AI projects.
  - Completed term 1 of the Udacity Self-Driving Car Nanodegree.

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, Apache Spark, ROS, MATLAB, R, SQL, Git, Mercurial, SVN (Subversion), Bash, Linux, LaTeX

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.
  - Pre-processed real-world traffic data and achieved 13.2% and 8.0% improvements over existing methods in approximation and denoising experiments, respectively.
  - 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)***

Hobbies & Interests

- Home automation with Home Assistant (open source Python 3 software) March 2018 – present
- Competitive powerlifter – elite status in the 220 and 242 lbs. classes June 2006 – present
- Associate Editor and contributing author – *POWER* magazine May 2012 – April 2016