Alexander J. Gutierrez

Contact Information

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Education

Ph.D. Program in Mathematics 2013-
University of Minnesota, Minneapolis, MN.
Advisers: **Gilad Lerman** in the School of Mathematics
Jarvis Haupt in the Department of Electrical and Computer Engineering
Awards and honors: National Science Foundation Graduate Research Fellow (2015-2018), University of Minnesota College of Science and Engineering Graduate Research Fellow (2013,2014)

Honors B.S. in Mathematics, Summa Cum Laude, 2013
Arizona State University, Tempe, AZ.
Awards and honors: Goldwater Scholar (2012), Phi Beta Kappa Honor Society (2011), Joint Mathematics Meetings Outstanding Poster Presentation Winner (2013)

Professional Experience

Data Science Intern May 2017-August 2017
AI Lab, 3M Company Saint Paul, MN

- Designed and implemented fast, data-driven algorithms for use in computational orthodontia
- Algorithm Potpourri: Worked on a series of collaborative hackathon-type projects to answer data science questions from other parts of the company.

ATRCenter Intern May 2013-August 2013
Air Force Research Lab and MIT Fairborn, OH and Cambridge, MA
Developed the interferometic inveresion reconstruction algorithm and demonstrated a proof-of-concept for synthetic aperture radar imaging with Laurent Demanet and Vincent Jugnon of the Massachusetts Institute of Technology and Jason Parker of the Air Force Research Lab.

Papers

- *Fourier reconstruction of univariate piecewise-smooth functions from non-uniform spectral data with exponential convergence rates*, with Rodrigo Platte and Anne Gelb. *Applied and Computational Harmonic Analysis* in October, 2014.
  http://www.sciencedirect.com/science/article/pii/S1063520314001262#
- *Co-Circular Relative Equilibria of Four Vortices*, with Jonathon Gomez, John Little, Roberto Pelayo, and Jesse Robert, *Immerse* June, 2016.
- *Edge Detection from Non-Uniform Fourier Data Using the Convolutional Gridding Algorithm*, with Anne Gelb and Adam Martinez. *Journal of Scientific Computing* in December, 2014. http://dl.acm.org/citation.cfm?id=2683024.

Current Research Interests

Broad Interests: Statistical signal processing, image processing, computer vision, machine learning

Collaboration with the Center for Magnetic Resonance Research
University of Minnesota 2015-Present
Image reconstruction from spatiotemporal magnetic resonance (MR) measurements, with potential applications to cheap and portable MRI. Joint with Jarvis Haupt, Di Xiao, Michael Garwood, and Michael Mullen.

Spatiotemporal Inpainting
University of Minnesota 2016-Present
Inpainting from satellite measurements using neural nets. Joint with Gilad Lerman and Ardeshir Ebtehaj.

Other current research directions

- Statistical performance of (CPD) noisy tensor completion under a sparse factor model
- Investigation into the optimization landscape of tensor decomposition

Technical Skills

Advanced: Python (pandas, PyTorch), MATLAB, LaTeX, Unix

Intermediate: R, Sage Mathematical Software