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## QUALIFICATIONS

- Industry-hardened mathematician/statistician well-versed in broad categories of physical and statistical domains
- Several-year experience with product development schedules and workflows including: core research, codebase management and collaboration, CI/CD, time-bound deliverables
- Rapidly adapt to new domains owing to a generalist background with graduate degrees in mathematics and statistics
- Recent projects include signal processing designs and PDE analysis for  $\text{Li}^+$  ion batteries, ML-based classifier design and algorithm development for audio signals in handsets, analysis of ML-feature information content

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## WORK EXPERIENCE

### Senior Machine Learning Engineer

*Cirrus Logic, Inc.*

August 2017 - Present

*Salt Lake City, UT*

Design and development of mixed signal processing and machine learning algorithms. In-depth mathematical and statistical analyses of algorithms, models, and datasets. Present expertise includes various models of  $\text{Li}^+$  ion battery dynamics, classical audio signal processing techniques, information theoretic analysis. Responsibilities include software development (python, TensorFlow, MATLAB), exploratory data analysis, internal publication/communication of discovery.

### Postdoctoral Fellow

*University of Texas at Austin*

September 2016 - June 2017

*Austin, TX*

Developed mathematical theory and simulation for improvements to the biomedical imaging modalities thermo- and photo-acoustic tomography. Generalized graduate work to electromagnetic waves and Maxwell's equations.

### Graduate Research/Teaching Assistant

*University of Utah*

September 2011 - August 2016

*Salt Lake City, UT*

Developed mathematical theory and simulation for imaging with phase-less measurements of acoustic waves. Extended mathematical theory of statistical dynamics of polycrystalline materials. Implemented novel change-point hypothesis test for U.S. yield curves. Instructed multiple calculus-based courses (Calculus I through PDEs).

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## EDUCATION

### PhD, Mathematics

August 2016

Thesis title: *Intensity-only imaging with waves, restarted inverse Born series, and analysis of coarsening in polycrystalline materials*

### MS, Statistics

May 2016

Project title: *Generating CVM-CUSUM statistics from eigenvalue summations*

### MS, Applied Mathematics

December 2012

### BS, Mathematics

May 2010

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## SELECT PUBLICATIONS AND AWARDS

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- P. Bardsley, M. Cassier, F. Guevara Vasquez, "Imaging small polarizable scatterers with polarization data," *Inverse Problems*, 34(10), 2018. DOI:10.1088/1361-6420/aad342
- P. Bardsley, K. Ren, R. Zhang, "Quantitative photoacoustic imaging of two-photon absorption," *Journal of Biomedical Optics* 23(1), 2018. DOI:10.1117/1.JBO.23.1.016002
- P. Bardsley, L. Horváth, P. Kokoszka, G. Young, "Change point detection in functional factor models with application to yield curves," *The Econometrics Journal*, 20(1), 2017. DOI:10.1111/ectj.12075
- P. Bardsley, K. Barmak, E. Eggeling, Y. Epshteyn, D. Kinderlehrer, S. Ta'asan, "Towards a gradient flow for microstructure," *Rendiconti dei Lincei*, 28(4), 2017. DOI:10.4171/RLM/785
- P. Bardsley, F. Guevara Vasquez, "Restarted inverse Born series for the Schrödinger problem with discrete internal measurements," *Inverse Problems*, 30 045014 (2013) doi:10.1088/0266-5611/30/4/045014
- Cirrus Logic Rockstar Award (trade secret innovation) *Cirrus Logic, Inc.*, 2022
- Master of Statistics Student of the Year *University of Utah*, 2016
- Rushing Graduate Fellowship *University of Utah*, 2015
- Research Experience for Undergraduate Scholarship *University of Utah*, 2009

## OTHER INFO

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**GITHUB:** <https://github.com/bardsleypt/bardsleypt>

**LINKEDIN:** <https://www.linkedin.com/in/patricktbardsley>

**LANGUAGES:** python (pandas, numpy, sklearn, TensorFlow, matplotlib), C, C++, L<sup>A</sup>T<sub>E</sub>X, MATLAB, sql

**OS:** MacOS, \*nix, Windows

**AFFILIATIONS:** SIAM, referee for various IOP journals

## REFERENCES (CONTACT INFO AVAILABLE ON REQUEST)

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Cédric Andrieu, *Advanced Tech Systems Engineer, Cirrus Logic, Inc.*

Khaled Lakhdhar, *Machine Learning Engineer, Amazon*

Ghassan Maalouli, *Principal Radar Systems Engineer, Honeywell Aerospace*

Fernando Guevara Vasquez (PhD Supervisor), *Professor of Mathematics, University of Utah*

Yekaterina Epshteyn (PhD supervisor), *Professor of Mathematics, University of Utah*

Lajos Horváth (MStat supervisor), *Professor of Statistics, University of Utah*