Kevin Miller

CONTACT INFORMATION

University of California, Los Angeles
Department of Mathematics
520 Portola Plaza
Los Angeles, CA 90095
Tel: 801-691-2714

Homepage: millerk22.github.io
E-mail: ksmill327@gmail.com
Linkedin: linkedin.com/in/ksmiller22
Github: github.com/millerk22

EDUCATION

University of California, Los Angeles, Los Angeles, CA 2017–2022

- Ph.D. in Mathematics, GPA: **3.92/4.00**
  - *Advisor: Prof. Andrea L. Bertozzi*
  - *Dissertation: "Active Learning and Uncertainty in Graph-Based Semi-Supervised Learning"*

Brigham Young University, Provo, Provo, Utah 2010–2017

- B.Sc. in Applied and Computational Mathematics, GPA: **3.96/4.00**
  - *Graduated Magna Cum Laude*

ACADEMIC EXPERIENCE

University of California, Los Angeles 2018–Present
Graduate Research Fellow, Department of Mathematics

- Supported by:
  - DOD National Defense Science and Engineering Graduate (NDSEG) Fellowship, 2019–2022
  - NSF National Research Training (NRT) MENTOR Fellowship, 2018–2019

REU in Computational and Applied Mathematics, UCLA Summer 2016 & Summer 2018
Graduate Student Researcher, Department of Mathematics

- (2018) Conducted research in template matching in large-scale multichannel networks under Dr. Andrea Bertozzi for DARPA applications
- (2016) Developed novel method for semi-supervised classification of pixels in hyperspectral images under Dr.'s Andrea Bertozzi and Stanley Osher

Brigham Young University, Provo 2015–2017
Undergraduate Student Researcher, Department of Mathematics

- Led undergraduate participation in conducting network science and spectral graph theory research in spectral clustering on digraphs and link prediction

PUBLICATIONS

Preprints

- Bohan Chen, **Kevin Miller**, Jon Schwenk, Andrea Bertozzi. "Graph-based Active Learning for Surface Water and Sediment Detection in Multispectral Images". *Submitting to IEEE Transactions on Geoscience and Remote Sensing (TGARS).*
- **Kevin Miller**, Andrea Bertozzi. "Model-change active learning in graph-based semi-supervised learning". URL: https://arxiv.org/abs/2110.07739.

Published

- Yifan Hua∗, **Kevin Miller**∗, Bao Wang, Chen Qian, Andrea Bertozzi. "Efficient and reliable overlay networks for decentralized federated learning". URL: https://arxiv.org/abs/2112.15486. *To appear in SIAM Journal on Applied Mathematics (SIAP), ∗ co-first authors.*
- **Kevin Miller**, John Mauro, Jason Setiadi, Xoaquin Baca, Zhan Shi, Jeffrey Calder, and Andrea Bertozzi. "Graph-based active learning for semi-supervised classification of SAR data". *Accepted to SPIE Conference on Defense + Commercial Sensing, 2022.*
- Andrea Bertozzi, Bamdad Hosseini, Hao Li, **Kevin Miller**, Andrew Stuart. "Posterior consistency of semi-supervised regression on graphs", 2021. *Inverse Problems.* DOI: https://doi.org/10.1088/1361-6420/ac1e80.

- **Kevin Miller**, Hao Li, Andrea Bertozzi. "Efficient graph-based active learning with probit likelihood via Gaussian approximations, 2020. *ICML Workshop on Real World Experiment Design and Active Learning*. URL: https://arxiv.org/abs/2007.11126.
- Victoria Chayes, **Kevin Miller**, Rasika Bhalerao, Jerry Luo, Wei Zhu, Andrea Bertozzi, Wenzhi Liao, and Stanley Osher. "Pre-processing and classification of hyperspectral imagery via selective inpainting", 2017. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pages 6195–6199. URL: https://ieeexplore.ieee.org/document/7953347.

Honors and Awards

- *Pacific Journal of Mathematics Dissertation Award* 2022
- *Department of Defense NDSEG Research Fellowship* 2019–2022
- *NSF NRT MENTOR Fellowship* 2018–2019
- *Magna Cum Laude*, Brigham Young University, Provo 2017
- *Best in Session Presentation Award*, BYU Spring Research Conference 2016 & 2017
- *BYU Full-Tuition Academic Scholarship* 2010–2011, 2013–2016

Talks & Presentations

- "Graph-based Active Learning for Semi-supervised Classification of SAR Data", SPIE Conference on Defense and Commercial Sensing, April 5, 2022.
- "Scalable and Sample-Efficient Active Learning for Graph-Based Classification", University of Minnesota, IMA Data Science Seminar, October 5, 2021.
- "Active Learning Methods on Graphs for Image, Video and Multispectral Datasets", 7th Annual Intelligence Community Academic Research Symposium (ICARS), September 29, 2021.
- "Active Learning in Graph-Based Semi-Supervised Learning", BYU Mathematics of Machine Learning Invited Class Lecture, March 26, 2021.
- "Active Learning in Graph-Based Semi-Supervised Learning", SIAM CSE 2021, March 1, 2021.
- "Active Learning in Graph-Based Semi-Supervised Learning", Naval Applications for Machine Learning (NAML), March 23, 2021.
- "Bayesian Posterior Consistency in Graph-Based Semi-Supervised Learning", SIAM PDE 2019, December 15, 2019.
- "A Probabilistic Perspective on Link Prediction via Effective Resistances", BYU Spring Research Conference, 2017.
- "Spectral Clustering in Directed Networks", BYU Spring Research Conference, 2016.
- "Cyclic Community Detection in Directed Networks", Lawrence Livermore National Laboratories Student Poster Symposium, 2015.

Industry Research Experience

Owlet Baby Care, Inc.

Associate Data Scientist (Part-time) September 2021 - June 2022

Data Science Intern, Level III Summer 2021

- Managed team of five data science interns working on machine learning research projects focused on extracting insights around baby safety, sickness, and sleep from Owlet SmartSock pulse oximeters
- Led weekly team meetings, communicating project goals and constraints from CTO, and training team members in data science procedures (e.g. GCP, SQL, Pandas, sklearn, PyTorch)

Lawrence Livermore National Laboratories Summer 2015

Computational Science Intern

- Designed and performed testing in Python of traditional clustering algorithms for identifying directed cyclic community structures
- Wrote technical reports summarizing results and presented in Student Intern Poster Symposium on July 28, 2015

Teaching and Mentoring Experience

- REU Mentor, UCLA REUCAM — Summer 2021
- Private Mathematics Tutor — 2018-2021
- Teaching Assistant — 2016-2018
  - PIC 16, *Python with Applications*, UCLA — Spring 2018
  - MATH 3B, *Calculus for Life Sciences*, UCLA — Winter 2018
  - MATH 3B, *Calculus for Life Sciences*, UCLA — Fall 2017
  - MATH 510, *Numerical Methods for Linear Algebra*, BYU — Fall 2016
  - MATH 290, *Fundamentals of Mathematics*, BYU — Winter 2016

Technical Skills

- *Programming Languages*: Python, MATLAB, LaTeX, C++
- *Python Packages*: SKLearn, Pandas, PyTorch

References

Dr. **Andrea L. Bertozzi**
University of California, Los Angeles, Department of Mathematics
Distinguished Professor of Mathematics and Mechanical and Aerospace Engineering
Betsy Wood Knapp Chair for Innovation and Creativity Director of Applied Mathematics
E-mail: bertozzi@math.ucla.edu

Dr. **Andrew Stuart**
California Institute of Technology, Computing and Mathematical Sciences
Bren Professor of Computing and Mathematical Sciences
Division of Engineering and Applied Science
E-mail: astuart@caltech.edu

Dr. **Jeffrey Calder**
University of Minnesota, Department of Mathematics
Associate Professor of Mathematics
E-mail: jwcalder@umn.edu

Dr. **Jeffrey Humpherys**
University of Utah, Department of Internal Medicine
Research Professor
E-mail: jhumpherys@gmail.com