

Jeffrey Carroll Regier

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Academic positions

- 2019 – UNIVERSITY OF MICHIGAN, ANN ARBOR
DEPARTMENT OF STATISTICS
Assistant Professor
- 2016 – UNIVERSITY OF CALIFORNIA, BERKELEY
DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCES
Postdoctoral Researcher
advisor: Michael I. Jordan

Education

- 2016 **Ph.D. Statistics**
UNIVERSITY OF CALIFORNIA, BERKELEY
Designated Emphasis in Communication, Computation and Statistics
advisor: Jon McAuliffe
- 2013 **M.A. Mathematics**
UNIVERSITY OF CALIFORNIA, BERKELEY
- 2004 **M.S. Computer Science**
COLUMBIA UNIVERSITY
- 2003 **B.A. Computer Science & Economics** (double major)
SWARTHMORE COLLEGE

Publications

JOURNAL ARTICLES

Jeffrey Regier, Andrew Miller, David Schlegel, Ryan P. Adams, Jon McAuliffe, and Prabhat. “Approximate inference for constructing astronomical catalogs from images”. In: *Annals of Applied Statistics* 13.3 (2019), pp. 1884–1926. [\[PDF\]](#)

Jeffrey Regier, Keno Fischer, Kiran Pamnany, Andreas Noack, Jarrett Revels, Maximilian Lam, Steve Howard, Ryan Giordano, David Schlegel, Jon McAuliffe, Rollin Thomas, and Prabhat. “Cataloging the visible universe through Bayesian inference in Julia at petascale”. In: *Journal of Parallel and Distributed Computing* 127 (May 2019), pp. 89–104. [\[PDF\]](#)

Romain Lopez, **Jeffrey Regier**, Michael Cole, Michael I. Jordan, and Nir Yosef. “Deep generative modeling for single-cell transcriptomics”. In: *Nature Methods* 15 (Dec. 2018), pp. 1053–1058. [\[PDF\]](#)

Jeffrey Regier and Philip B. Stark. “Mini-minimax uncertainty quantification for emulators”. In: *SIAM/ASA Journal on Uncertainty Quantification* 3.1 (2015), pp. 686–708. [\[PDF\]](#)

ARTICLES IN HIGHLY SELECTIVE CONFERENCE PROCEEDINGS

Romain Lopez, Pierre Boyeau, Nir Yosef, Michael I. Jordan, and **Jeffrey Regier**. “Decision-Making with Auto-Encoding Variational Bayes”. In: *Neural Information Processing Systems (NeurIPS)*. 2020. [\[PDF\]](#)

Runjing Liu, **Jeffrey Regier**, Nilesh Tripuraneni, Michael I. Jordan, and Jon McAuliffe. “Rao-Blackwellized stochastic gradients for discrete distributions”. In: *International Conference on Machine Learning (ICML)*. 2019. [\[PDF\]](#)

Nilesh Tripuraneni, Mitchell Stern, Chi Jin, **Jeffrey Regier**, and Michael I. Jordan. “Stochastic cubic regularization for fast nonconvex optimization”. In: *Neural Information Processing Systems (NeurIPS)*. 2018. Selected for oral presentation (1% acceptance rate). [\[PDF\]](#)

Romain Lopez, **Jeffrey Regier**, Michael I. Jordan, and Nir Yosef. “Information constraints on auto-encoding variational Bayes”. In: *Neural Information Processing Systems (NeurIPS)*. 2018. [\[PDF\]](#)

Jeffrey Regier, Kiran Pamnany, Keno Fischer, Andreas Noack, Maximilian Lam, Jarrett Revels, Steve Howard, Ryan Giordano, David Schlegel, Jon McAuliffe, Rollin Thomas, and Prabhat. “Cataloging the visible universe through Bayesian inference at petascale”. In: *International Parallel and Distributed Processing Symposium (IPDPS)*. 2018. [\[PDF\]](#)

Jeffrey Regier, Michael I. Jordan, and Jon McAuliffe. “Fast black-box variational inference through stochastic trust-region optimization”. In: *Neural Information Processing Systems (NIPS)*. 2017. Selected for spotlight presentation (4% acceptance rate). [\[PDF\]](#)

Andrew Miller, Albert Wu, **Jeffrey Regier**, Jon McAuliffe, Dustin Lang, Prabhat, David Schlegel, and Ryan Adams. “A Gaussian process model of quasar spectral energy distributions”. In: *Neural Information Processing Systems (NIPS)*. 2015. [\[PDF\]](#)

Jeffrey Regier, Andrew Miller, Jon McAuliffe, Ryan Adams, Matt Hoffman, Dustin Lang, David Schlegel, and Prabhat. “Celeste: Variational inference for a generative model of astronomical images”. In: *International Conference on Machine Learning (ICML)*. 2015. [\[PDF\]](#)

MANUSCRIPTS IN SUBMISSION

Adam Gayoso, Zoë Steier, Romain Lopez, **Jeffrey Regier**, Kristopher Nazor, Aaron Streets, and Nir Yosef. “Joint probabilistic modeling of paired transcriptome and proteome measurements in single cells”. In: *bioRxiv* (2020). [\[PDF\]](#)

Chenling Xu, Romain Lopez, Edouard Mehlman, **Jeffrey Regier**, Michael I. Jordan, and Nir Yosef. “Probabilistic harmonization and annotation of single-cell transcriptomics data with deep generative models”. In: *bioRxiv* (2019). [\[PDF\]](#)

REFEREED WORKSHOP PAPERS

Adam Gayoso, Romain Lopez, Zoë Steier, **Jeffrey Regier**, Aaron Streets, and Nir Yosef. “A joint model of RNA expression and surface protein abundance in single cells”. In: *Machine Learning in Computational Biology (MLCB) Meeting*. 2019. [\[PDF\]](#)

Pierre Boyeau, Romain Lopez, **Jeffrey Regier**, Adam Gayoso, Michael I. Jordan, and Nir Yosef. “Deep generative models for detecting differential expression in single cells”. In: *Machine Learning in Computational Biology (MLCB) Meeting*. 2019. [\[PDF\]](#)

Oscar Clivio, Romain Lopez, **Jeffrey Regier**, Adam Gayoso, Michael I. Jordan, and Nir Yosef. “Detecting zero-inflated genes in single-cell transcriptomics data”. In: *Machine Learning in Computational Biology (MLCB) Meeting*. 2019. Selected for spotlight presentation. [\[PDF\]](#)

Romain Lopez, Achille Nazaret, Maxime Langevin, Jules Samaran, **Jeffrey Regier**, Michael Jordan, and Nir Yosef. “A joint model of unpaired data from scRNA-seq and spatial transcriptomics for imputing missing gene expression measurements”. In: *ICML Workshop on Computational Biology*. 2019. Best student poster award. [\[PDF\]](#)

Maxime Langevin, Edouard Mehlman, **Jeffrey Regier**, Romain Lopez, Michael I. Jordan, and Nir Yosef. “A deep generative model for semi-supervised classification with noisy labels”. In: *Bay Area Machine Learning Symposium*. 2018. Selected for oral presentation. [\[PDF\]](#)

Romain Lopez, **Jeffrey Regier**, Michael Cole, Michael I. Jordan, and Nir Yosef. “A deep generative model for single-cell RNA sequencing with application to detecting differentially expressed genes”. In: *NIPS Workshop on Machine Learning in Computational Biology*. 2017. Selected for spotlight presentation. [\[PDF\]](#)

Romain Lopez, **Jeffrey Regier**, Michael I. Jordan, and Nir Yosef. “A deep generative model for single-cell RNA sequencing”. In: *Bay Area Machine Learning Symposium*. 2017. Selected for oral presentation. [\[PDF\]](#)

Jeffrey Regier and Jon McAuliffe. “Second-order stochastic variational inference”. In: *Bay Area Machine Learning Symposium*. 2016. [\[PDF\]](#)

Jeffrey Regier, Jon McAuliffe, and Prabhat. “A deep generative model for astronomical images of galaxies”. In: *NIPS Workshop on Advances in Approximate Bayesian Inference*. 2015. [\[PDF\]](#)

Jeffrey Regier, Brenton Partridge, Jon McAuliffe, Ryan Adams, Matt Hoffman, Dustin Lang, David Schlegel, and Prabhat. “Celeste: Scalable variational inference for a generative model of astronomical images”. In: *NIPS Workshop on Advances in Variational Inference*. 2014. Selected for spotlight presentation. [\[PDF\]](#)

PATENTS

Jeffrey Regier and Uri Avissar. *System and method for retrieving and intelligently grouping definitions found in a repository of documents*. US Patent 7,747,555. 2010. [\[PDF\]](#)

Awards & fellowships

- 2017 Best Reviewer Award, Neural Information Processing Systems (NIPS)
- 2017 Hyperion HPC Innovation Excellence Award, for the Celeste project
- 2013 Google Ph.D. Fellowship in Machine Learning, awarded annually to 3 students worldwide, including 1 student from North America
- 2013 Citadel Ph.D. Fellowship (declined), awarded annually to 1 statistics Ph.D. student at UC Berkeley
- 2013 Elizabeth Scott Memorial Award, awarded at most annually to the statistics M.A. recipient at UC Berkeley showing the greatest promise in statistical research

Invited talks

- Apr 2020 Institute for Computational and Experimental Research in Mathematics
- Sep 2018 ML4Sci Workshop at Lawrence Berkeley National Laboratory
- Jul 2018 Big Data Summit at Lawrence Berkeley National Laboratory
- Mar 2018 Voleon Capital Management, seminar series on machine learning
- Mar 2018 University of Utah, From Stars to Bytes seminar series
- Jul 2017 UCSF, Department of Radiology & Biomedical Imaging, seminar series
- Jun 2017 JuliaCon 2017, keynote address
- Jun 2017 Dark Energy Spectroscopic Instrument collaboration meeting, plenary talk
- Dec 2016 NIPS Workshop on Advances in Approximate Bayesian Inference
- Nov 2016 Lawrence Berkeley National Laboratory, Cosmology Group, seminar series
- Mar 2016 Ohio State University, Statistics Department, seminar series
- Aug 2015 MANTISSA Day at Lawrence Berkeley National Laboratory

Contributed talks

- May 2018 International Parallel and Distributed Processing Symposium (IPDPS)
- Dec 2017 Neural Information Processing Systems (NIPS)
- Aug 2016 SAMSI ASTRO Opening Workshop

Jul 2015 International Conference on Machine Learning (ICML)
Dec 2014 NIPS Workshop on Advances in Variational Inference

Teaching experience

STATISTICS 507, UNIVERSITY OF MICHIGAN, ANN ARBOR
Graduate course on data analysis in Python.
Primary Instructor. Winter 2020, Fall 2020, Winter 2021

STATISTICS 415, UNIVERSITY OF MICHIGAN, ANN ARBOR
Advanced undergraduate course in modern statistical prediction and machine learning.
Primary Instructor. Fall 2019.

STATISTICS 154, UNIVERSITY OF CALIFORNIA, BERKELEY
Advanced undergraduate course in modern statistical prediction and machine learning.
Primary Instructor. Summer 2015.

STATISTICS 215B, UNIVERSITY OF CALIFORNIA, BERKELEY
Second core graduate course in applied statistics.
Graduate Student Instructor. Spring 2013, Spring 2014.

STATISTICS 154, UNIVERSITY OF CALIFORNIA, BERKELEY
Advanced undergraduate course in modern statistical prediction and machine learning.
Graduate Student Instructor. Spring 2012.

Industry experience

May 2014 GOOGLE. *Research Intern.*
–Aug 2014 Hosted by Yoram Singer and Amar Subramanya. Developed a mathematical model for entity linking, derived an optimization procedure for it, and implemented the procedure first in Lua and then in C++ within a map-reduce framework.

May 2004 METAGLOSSARY.COM. *Co-Founder, Lead Developer.*
–Jun 2007 Invented and implemented a machine-learning-based system for extracting terms and definitions from web pages containing glossaries (US Patent 7,747,555). Raised seed funding. Developed and administered a website that served hundreds of thousands of unique visitors.

Aug 2006 GOOGLE. *Software Engineer, Contractor.*
–Mar 2007 Developed C++ code to parse web server logs on a computing farm and output models of latency distributions. Created a JavaScript-intensive web application in Python and C++ that allows users to explore these web server latency distributions.

May 2006 RUBICONSOFT. *Software Engineer, Contractor.*
–Aug 2006 Developed an extensible, multithreaded web-crawler in Java for extracting product data from e-commerce websites.

- May 2005 GOLDMAN, SACHS & Co. *Analyst, Software Engineer.*
 –May 2006 Developed a distributed system in Perl, C++, and a proprietary programming language for computing the firm’s exposure to various types of financial risk.
- Dec 2004 SKY SOLUTIONS. *Business Intelligence Consultant.*
 –May 2005 Built business analytics web applications for clients using Java, SQL, and Cognos reporting software.

Journal & conference reviewing

- Neural Information Processing Systems (NeurIPS), Area Chair, 2020
 Machine Learning for Computational Biology (MLCB), 2020
 PLOS Computational Biology, 2020
 Journal of Machine Learning Research (JMLR), 2018, 2020
 The Astronomical Journal (ApJ), 2019
 International Conference on Machine Learning (ICML), 2013–2016, 2018
 Neural Information Processing Systems (NIPS), 2017
 IEEE Transactions on Knowledge and Data Engineering (TKDE), 2014
 International Joint Conferences on Artificial Intelligence (IJCAI), 2013
 Artificial Intelligence and Statistics (AISTATS), 2013

Statistical advising

- National Security Agency, Science Advisory Group (NSA-SAG), 2013–2019

Press

- “Count based autoencoders and the future for scRNA-seq analysis”. In: *What Do You Mean “Heterogeneity”?* (Apr. 2018).
- “Julia language delivers petascale HPC performance”. In: *The Next Platform* (Nov. 2017).
- “Julia joins petaflop club”. In: *HPCwire* (Sept. 2017).
- “Parallel supercomputing for astronomy”. In: *Julia Computing* (July 2017).
- “Celeste enhancements create new opportunities in sky surveys”. In: *National Energy Research Scientific Computing Center* (Nov. 2016).
- “Celeste: A new model for cataloging the universe”. In: *EurekAlert* (Apr. 2015).