Alexander Franks

Assistant Professor
Department of Statistics and Applied Probability
University of California, Santa Barbara
afranks@pstat.ucsb.edu
http://afranks.com

RESEARCH INTERESTS

Multivariate analysis; causal inference; high-throughput biology; covariance estimation; large p, small n; data integration; measurement error; missing data; sports statistics;

PREVIOUS POSITIONS

University of Washington, Seattle, WA 2015-2017
Moore/Sloan Data Science and WRF Innovation in Data Science Postdoctoral Fellow
Advisor: Peter Hoff

EDUCATION

Harvard University, Cambridge, MA 2010-2015
Ph.D., Statistics
Advisor: Edoardo Airoldi

Brown University, Providence, RI 2005-2010
ScM, Applied Math., 2010
BA, Computer Science and Applied Math, 2009
- Graduated with Honors

PAPERS

Submitted / In Revision

Jiajing Zheng, Jiaxi Wu, Alexander D'Amour, and **Alexander Franks**. Sensitivity to unobserved confounding in studies with factor-structured outcomes. 2022.

Jiajing Zheng, Alexander D'Amour, and **Alexander Franks**. Copula-based sensitivity analysis for multi-treatment causal inference with unobserved confounding. *arXiv preprint arXiv:2102.09412*, 2021.

Ke Wang, **Alexander Franks**, and Sang-Yun Oh. Learning gaussian graphical models with latent confounders. *arXiv preprint arXiv:2105.06600*, 2021.

Alexander D'Amour and **Alexander Franks**. Deconfounding scores: Feature representations for causal effect estimation with weak overlap. *arXiv preprint arXiv:2104.05762*, 2021.

Published / In Press

2022 David Arbour, Eli Ben-Michael, Avi Feller, **Alexander Franks**, and Steven Raphael. Using multitask gaussian processes to estimate the effect of a targeted effort to remove firearms. *Annals of Applied Statistics*, (In Press).

2022 Jiajing Zheng, Alexander D'Amour, and **Alexander Franks**. Bayesian inference and partial identification in multi-treatment causal inference with unobserved confounding. In Gustau Camps-Valls, Francisco J. R. Ruiz, and Isabel Valera, editors, *Proceedings of The 25th International Conference on Artificial Intelligence and Statistics*, volume 151 of *Proceedings of Machine Learning Research*, pages 3608–3626. PMLR, 28–30 Mar 2022.

Nathan Hwangbo, Xinyu Zhang, Daniel Raftery, Haiwei Gu, Shu-Ching Hu, Thomas J. Montine, Joseph F. Quinn, Kathryn A. Chung, Amie L. Hiller, Dongfang Wang, Qiang Fei, Lisa Bettcher, Cyrus P. Zabetian, Elaine R. Peskind, Ge Li, Daniel E. L. Promislow, Marie Y. Davis, and **Alexander Franks**. Predictive modeling of alzheimer's and parkinson's disease using metabolomic and lipidomic profiles from cerebrospinal fluid. *Metabolites*, 12(4), 2022.

2021 **Alexander M. Franks**. Reducing subspace models for large-scale covariance regression. *Biometrics*, 2021.

Nathan Hwangbo, Xinyu Zhang, Daniel Raftery, Haiwei Gu, Shu-Ching Hu, Thomas J. Montine, Joseph F. Quinn, Kathryn A. Chung, Amie L. Hiller, Dongfang Wang, Qiang Fei, Lisa Bettcher, Cyrus P. Zabetian, Elaine R. Peskind, Ge Li, Daniel E. L. Promislow, Marie Y. Davis, and **Alexander Franks**. A metabolomic aging clock using human cerebrospinal fluid. *The Journals of Gerontology: Series A*, 2021.

Kelly M Thomasson, **Alexander Franks**, Henrique Teotónio, and Stephen R Proulx. Testing the adaptive value of sporulation in budding yeast using experimental evolution. *Evolution*, 75(7):1889–1897, 2021.

2020 **Alexander M. Franks**, Edoardo M. Airoldi, and Donald B. Rubin. Nonstandard conditionally specified models for nonignorable missing data. *Proceedings of the National Academy of Sciences*, 2020.

Zachary Terner and **Alexander Franks**. Modeling player and team performance in basketball. *Annual Review of Statistics and Its Application*, 8, 2020.

2019 **Alexander M Franks** and Peter Hoff. Shared subspace models for multi-group covariance estimation. *Journal of Machine Learning Research*, 20(171):1–37, 2019.

Alexander M Franks, Alexander DAmour, and Avi Feller. Flexible sensitivity analysis for observational studies without observable implications. *Journal of the American Statistical Association*, pages 1–33, 2019.

Albert Tian Chen, Alexander Franks, and Nikolai Slavov. Dart-id increases single-cell proteome coverage. *PLoS computational biology*, 15(7):e1007082, 2019.

2018 **Alexander M Franks**, Florian Markowetz, Edoardo M Airoldi, et al. Refining cellular pathway models using an ensemble of heterogeneous data sources. *The Annals of Applied Statistics*, 12(3):1361–1384, 2018

Jessica M Hoffman, Kate E Creevy, **Alexander Franks**, Dan G O'Neill, and Daniel EL Promislow. The companion dog as a model for human aging and mortality. *Aging cell*, 17(3):e12737, 2018

2017 **Alexander Franks**, Edoardo Airoldi, and Nikolai Slavov. Post-transcriptional regulation across human tissues. *PLoS computational biology*, 13(5):e1005535, 2017.

2016 **Alexander Franks**, Alexander DAmour, Daniel Cervone, and Luke Bornn. Meta-analytics: tools for understanding the statistical properties of sports metrics. *Journal of Quantitative Analysis in Sports*, 12(4):151–165, 2016.

2015 **Alexander Franks**, Andrew Miller, Luke Bornn, and Kirk Goldsberry. Characterizing the spatial structure of defensive skill in professional basketball. *Annals of Applied Statistics*, 2015. `http://arxiv.org/abs/1405.0231`

Gábor Csárdi, **Alexander Franks**, David S Choi, Edoardo M Airoldi, and D. Allan Drummond. Accounting for experimental noise reveals that transcription dominates control of steady-state protein levels in yeast. *PLoS Genetics*, 2015. `http://www.plosgenetics.org/article/Metrics/info:doi/10.1371/journal.pgen.1005206`.

Edward WJ Wallace, Jamie L Kear-Scott, Evgeny V Pilipenko, Michael H Schwartz, Pawel R Laskowski, Alexandra E Rojek, Christopher D Katanski, Joshua A Riback, Michael F Dion, **Alexander M Franks**, et al. Reversible, specific, active aggregates of endogenous proteins assemble upon heat stress. *Cell*, 162(6):1286–1298, 2015.

Lo-Hua Yuan, Anthony Liu, Alec Yeh, Aaron Kaufman, Andrew Reece, Peter Bull, **Alexander Franks**, Sherrie Wang, Dmitri Illushin, and Luke Bornn. A mixture-of-modelers approach to forecasting ncaa tournament outcomes. *Journal of Quantitative Analysis in Sports*, 11(1):13–27, 2015.

2014 **Alexander M. Franks**, Gábor Csárdi, D. Allan Drummond, and Edoardo M. Airoldi. Estimating a structured covariance matrix from multilab measurements in high-throughput biology. *Journal of the American Statistical Association*, 110(509):27–44, 2015.

2013 Hygor Piaget M. Melo, **Alexander Franks**, André A. Moreira, Daniel Diermeier, José S. Andrade Jr, and Luís A. Nunes Amaral. A solution to the challenge of optimization on "golf-course"-like fitness landscapes. *PloS one*, 8(11):e78401, 2013.

FUNDING

2016 National Institutes of Health. *Multi-group covariance models for metabolomic analyses of neurodegenerative disease.* (R03 CA211160, Co-Investigator). 2016-2018

2019 Chan/Zuckerberg Initiative. *Mapping the single-cell proteome and transcriptome of human testis in 3D.* (Co-PI). 2019-2022.

2019 National Science Foundation. *HDR DSC: Collaborative Research: Central Coast Data Science Partnership: Training a New Generation of Data Scientists* (Award #1924205, Co-PI). 2019-2022.

2021 National Institutes of Health. *Methods for Systematic Analysis of Post-transcriptional Regulation in Single Cells* (1R01GM144967-01, PI). 2021-2025.

Other Publications

Luke Bornn, Daniel Cervone, **Alexander Franks**, and Andrew Miller. Studying basketball through the lens of player tracking data. In *Handbook of Statistical Methods for Design and Analysis in Sports*. Chapman and Hall/CRC, 2016.

Media

Dana Mackenzie and Barry Cipra. *What's happening in the mathematical sciences. Volume 10.* American Mathematical Society, 2015.

TEACHING

- PSTAT 197: Data Science Capstone (2021, 2022)
- PSTAT 195: Data Science Applications and Analysis (2020)
- INT15: Data Science Principles and Techniques (2019)
- PSTAT115: Introduction to Bayesian Data Analysis (2018, 2019, 2020)
- PSTAT131: Introduction to Statistical Machine Learning (2017 twice, 2018)
- PSTAT262: High-dimensional Covariance Estimation (2018)

ADVISING

Thesis Committee Chair

- Fanqi Meng, PhD student, UCSB PSTAT (2017-2021)
- Jiajing Zheng, PhD student, UCSB PSTAT (2018-2021)
- Yi Zheng, PhD student, UCSB PSTAT (2018-cur)
- Ke Wang, PhD student, UCSB PSTAT (2018-cur, co-advising)
- Megan Elcheikhali, PhD student, UCSB PSTAT (2018-cur)

Thesis Committee Member

- Arya Pourzanjiani, PhD, UCSB Computer Science (graduated 2019)
- Richard Jiang, PhD Student, UCSB Computer Science (graduated 2021)
- Alice Lepissier, PhD Student UCSB Bren School (graduated 2021)
- Javier Zapata, PhD Student, UCSB PSTAT (graduated 2021)
- Rachel Redberg, PhD Student, UCSB Computer Science (advanced to candidacy)
- Alexander Bernstein, PhD Student, PSTAT (advanced to candidacy)

SERVICE

- 2019-2022 Chair of the Data Science Committee
- 2019-2022 DataLab Director
- 2018-2020 Department Seminar Organizer
- 2017-2018 Member Department Computing Committee

- 2017-2018 Liaison Department Library Liaison

INVITED TALKS

- February 2017, Bayesian Covariance Estimation with Applications in High-throughput Biology, Invited Talk, UT Austin, Department of Statistics and Data Science
- February 2017, Bayesian Covariance Estimation with Applications in High-throughput Biology, Invited Talk, Duke University, Statistical Science
- February 2017, Bayesian Covariance Estimation with Applications in High-throughput Biology, Invited Talk, UC Berkeley, Department of Statistics
- February 2017, Bayesian Covariance Estimation with Applications in High-throughput Biology, Invited talk, Fred Hutchinson Cancer Research Institute
- February 2017, Bayesian Covariance Estimation with Applications in High-throughput Biology, Invited talk, Cornell University, Department of Statistical Science
- February 2017, Bayesian Covariance Estimation with Applications in High-throughput Biology, Invited talk, Brown University, Department of Biostatistics
- February 2017, Information-sharing schemes for complex data analysis: Examples from high-throughput biology and professional basketball
- February 2017, Invited talk, Northwestern University, Department of Computer Science / Department of Statistics
- February 2017, Information-sharing schemes for complex data analysis: Examples from high-throughput biology and professional basketball, UCSB
- February 2017, Invited talk, Temple University, Department of Statistical Science
- February 2017, Information-sharing schemes for complex data analysis: Examples from high-throughput biology and professional basketball Invited talk, University of Toronto, Statistical Sciences
- October 2017, What Basketball Taught Me About Big Data: Analyzing Player Tracking Data in The NBA, UCSB Big Data Research Symposium
- November 2017, From Pixels to Points: Using Tracking Data to Measure Performance in Professional Basketball, Invited talk, UCSB Spatial Center
- February 2018, Bayesian Covariance Estimation with Applications in High-throughput Biology, Invited seminar, UC Santa Cruz, Statistics Department
- February 2018, Invited Talk, Bayesian Covariance Estimation with Applications in High-throughput Biology
- March 2018, Identifiability in Causal Inference, Invited talk, Evidation LLC, Santa Barbara CA
- June 2018, Bayesian Covariance Estimation with Applications in High-throughput Biology, Invited talk, Annual Meeting of the Statistical Society of Canada (SSC)
- July 2018, From Pixels to Points: Using Tracking Data to Measure Performance in Professional Basketball, Invited talk, GRAPHIQ LLC / Amazon.com Inc., Santa Barbara CA
- January 2019, Statistical Models for the Metabolomics of Neurodegenerative disease, Invited talk, Kavli BRAIN Showcase, UC Santa Barbara
- May 2019, Invited talk, University of Washington Biostatistics
- May 2019, Shared Subspace Models for Multi-group Covariance Estimation, Invited Talk, University of Washington, eScience Institute
- May 2019, Shared Subspace Models for Multi-group Covariance Estimation, Invited Talk, UCLA Statistics Department

- August 2020, Bayesian Multi-Task Gaussian Process Models for NBA Production Curves, Invited Talk, Joint Statistical Meetings —
- March 2021, Shared Subspace Models for Multi-group Covariance Estimation, Invited Talk, ENAR
- June 2021, Copula models for sensitivity analysis in observational causal inference, Invited Talk, EcoSta
- July 2021, Copula models for sensitivity analysis in observational causal inference, Invited Talk, Neglected Assumptions of Causal Inference (ICML Workshop)
- October 2021, Copula models for sensitivity analysis in observational causal inference Invited Talk, University of Southern California Statistics
- March 2022, Bayesian Inference and Partial Identification in Multi-Treatment Causal Inference with Unobserved Confounding, Accepted work, poster and short presentation, AISTATS conference.