Arash Ali Amini

UCLA Department of Statistics,
8125 Mathematical Sciences Building,
Los Angeles, CA 90095-1554

Education

- Ph.D., Electrical Engineering and Computer Science, UC Berkeley, 2011.

  Designated Emphasis in Communication, Computation and Statistics.

- M.S. Electrical Engineering (Communication Systems), Sharif University, 2006.

- B.S. Electrical Engineering, Sharif University, 2004.

Positions

- Associate professor, Department of Statistics, UCLA, 2021–.

- Assistant Professor, Department of Statistics, UCLA, 2014–2021.

- Post-doctoral research fellow, Department of Statistics, University of Michigan, 2011–2014.

- Graduate Research Assistant and Graduate Teaching Assistant, EECS, UC Berkeley, 2007–2011.

- Communication Systems Engineer, KiaTel Research Center, 2004–2006.

- Internship, Iran Telecom. Research Center (ITRC), Summer 2003.

Research Interests

High-dimensional Data Analysis, Nonparametric Estimation, Graphical models, Inference on Networks, Optimization, Convex Relaxation, Functional Data Analysis. Quantitative Finance.

Publications

Preprints

1. L. Vinas and A. A. Amini. "Sharp Bounds for Poly-GNNs and the Effect of Graph Noise". *arXiv preprint arXiv:2407.19567* (2024).

2. C. K. Nguen, O. H. M. Padilla, and A. A. Amini. "Network two-sample test for block models" (2024). arXiv: 2406.06014 [math.ST].

3. L. Vinas and A. A. Amini. "Simplifying GNN Performance with Low Rank Kernel Models" (2023). arXiv: 2310.05250 [cs.LG].

4. N. Josephs, A. A. Amini, M. Paez, and L. Lin. "Nested stochastic block model for simultaneously clustering networks and nodes". *arXiv preprint* (2023). arXiv: 2307.09210.

5. L. Vinas and A. A. Amini. "Step and Smooth Decompositions as Topological Clustering". *arXiv preprint* (2023). arXiv: 2311.05756.

6. A. A. Amini, B. Aragam, and Q. Zhou. "Learning non-graphical conditional independence structures via the neighbourhood lattice". *Preprint* (2023).

Published

1. Q. Ye, A. A. Amini, and Q. Zhou. "Federated Learning of Generalized Linear Causal Networks". *IEEE Transactions on Pattern Analysis and Machine Intelligence* (2024), pp. 1–14.
2. S. Wu and A. A. Amini. "Graph Neural Thompson Sampling". *Reinforcement Learning Journal (RLJ)* 1.1 (2024).
3. L. Shen, A. Amini, N. Josephs, and L. Lin. "Bayesian Community Detection for Networks with Covariates". *Bayesian Analysis* (2024), pp. 1 –28.
4. L. Zhang and A. A. Amini. "Adjusted Chi-Square Test for Degree-Corrected Block Models". *The Annals of Statistics* 51.6 (2023), pp. 2366–2385.
5. Z. Zhou, G. Dudeja, and A. A. Amini. "Statistical Guarantees for Consensus Clustering". *The Eleventh International Conference on Learning Representations (ICLR)*. 2023.
6. H. Almohri, R. B. Chinnam, and A. A. Amini. "Performance evaluation of automotive dealerships using grouped mixture of regressions". *Expert Systems with Applications* 213.Part C (2023), p. 119266.
7. A. A. Amini, R. Baumgartner, and D. Feng. "Target alignment in truncated kernel ridge regression". *Advances in Neural Information Processing Systems (NeurIPS)*. ed. by A. H. Oh, A. Agarwal, D. Belgrave, and K. Cho. 2022.
8. A. Amini, M. Paez, and L. Lin. "Hierarchical Stochastic Block Model for Community Detection in Multiplex Networks". *Bayesian Analysis* 19.1 (2024), pp. 319 –345.
9. A. Amini, B. Aragam, and Q. Zhou. "On perfectness in Gaussian graphical models". *International Conference on Artificial Intelligence and Statistics*. PMLR. 2022, pp. 7505–7517.
10. A Akhazhanov et al. "Finding quadruply imaged quasars with machine learning – I. Methods". *Monthly Notices of the Royal Astronomical Society* 513.2 (Apr. 2022), pp. 2407–2421
11. L. Zhang and A. A. Amini. "Label consistency in overfitted generalized k-means". *Neural Information Processing Systems (NeurIPS)* (2021).
12. A. A. Amini. "Spectrally-truncated kernel ridge regression and its free lunch". *Electron. J. Statist.* 15.2 (2021), pp. 3743–3761.
13. A. A. Amini and Z. S. Razaee. "Concentration of kernel matrices with application to kernel spectral clustering". *The Annals of Statistics* 49.1 (2021), pp. 531 –556.
14. Z. S. Razaee, A. A. Amini, M. A. Diniz, M. Tighiouart, G. Yothers, and A. Rogatko. "On the properties of the toxicity index and its statistical efficiency". *Statistics in Medicine* 40.6 (2021), pp. 1535–1552.
15. P. Pandit, M. Sahraee-Ardakan, A. A. Amini, S. Rangan, and A. K. Fletcher. "Generalized Autoregressive Linear Models for Discrete High-Dimensional Data". *IEEE Journal on Selected Areas in Information Theory* 1.3 (2020), pp. 884–896.
16. Z. Razaee and A. Amini. "The Potts-Ising model for discrete multivariate data". *Advances in Neural Information Processing Systems* 33 (2020).

17. Z. Zhou and A. A. Amini. "Optimal bipartite network clustering". *Journal of Machine Learning Research* 21.40 (2020), pp. 1–68.

18. Q. Ye, A. A. Amini, and Q. Zhou. "Optimizing regularized Cholesky score for order-based learning of Bayesian networks". *IEEE Transactions on Pattern Analysis and Machine Intelligence* (2020).

19. S. J. Kazemitabar and A. A. Amini. "Approximate Identification of the Optimal Epidemic Source in Complex Networks". *Proceedings of NetSci-X 2020: Sixth International Winter School and Conference on Network Science*. Ed. by N. Masuda, K.-I. Goh, T. Jia, J. Yamanoi, and H. Sayama. Cham: Springer International Publishing, 2020, pp. 107–125.

20. B. Aragam, A. Amini, and Q. Zhou. "Globally optimal score-based learning of directed acyclic graphs in high-dimensions". *Advances in Neural Information Processing Systems*. 2019, pp. 4452–4464.

21. Z. Zhou and A. A. Amini. "Analysis of spectral clustering algorithms for community detection: the general bipartite setting". *Journal of Machine Learning Research* 20.47 (2019), pp. 1–47.

22. Z. S. Razaee, A. A. Amini, and J. J. Li. "Matched Bipartite Block Model with Covariates." *Journal of Machine Learning Research* 20.34 (2019), pp. 1–44.

23. P. Pandit, M. Sahraee-Ardakan, A. Amini, S. Rangan, and A. K. Fletcher. "Sparse Multivariate Bernoulli Processes in High Dimensions". *Proceedings of Machine Learning Research*. Ed. by K. Chaudhuri and M. Sugiyama. Vol. 89. Proceedings of Machine Learning Research. PMLR, 2019, pp. 457–466.

24. A. A. Amini and E. Levina. "On semidefinite relaxations for the block model". *The Annals of Statistics* 46.1 (2018), pp. 149–179.

25. J. Kazemitabar, A. Amini, A. Bloniarz, and A. S. Talwalkar. "Variable Importance using Decision Trees". *Advances in Neural Information Processing Systems*. 2017, pp. 425–434.

26. A. A. Amini, E. Levina, and K. A. Shedden. "Structured regression models for high-dimensional spatial spectroscopy data". *Electron. J. Statist.* 11.2 (2017), pp. 4151–4178.

27. A. A. Amini, A. Chen, P. J. Bickel, and E. Levina. "Pseudo-likelihood methods for community detection in large sparse networks". *The Annals of Statistics* 41.4 (2013), pp. 2097–2122.

28. A. A. Amini and X. Nguyen. "Bayesian inference as iterated random functions with applications to sequential inference in graphical models". *Neural Information Processing Systems (NIPS)*. 2013.

29. A. A. Amini and X. Nguyen. "Sequential Detection of Multiple Change Points in Networks: A Graphical Model Approach". *IEEE Transactions on Information Theory* 59.9 (2013), pp. 5824–5841.

30. X. Nguyen, A. A. Amini, and R. Rajagopal. "Message-passing sequential detection of multiple change points in networks". *IEEE International Symposium on Information Theory (ISIT)*. 2012, pp. 2007–2011.

31. A. A. Amini and M. J. Wainwright. "Sampled forms of functional PCA in reproducing kernel Hilbert spaces". *The Annals of Statistics* 40.5 (2012), pp. 2483–2510.

32. A. A. Amini and M. J. Wainwright. "Approximation properties of certain operator-induced norms on Hilbert spaces". *Journal of Approximation Theory* 164.2 (2012), pp. 320–345.

33. A. A. Amini and M. J. Wainwright. "High-dimensional analysis of semidefinite relaxations for sparse principal components". *The Annals of Statistics* 37.5B (2009), pp. 2877–2921.

34. A. A. Amini and M. J. Wainwright. "High-dimensional analysis of semidefinite relaxations for sparse principal components". *IEEE International Symposium on Information Theory (ISIT)*. 2008, pp. 2454–2458.

35. A. A. Amini, M. Babaie-Zadeh, and C. Jutten. "A new approach for sparse decomposition and sparse source separation". *European Signal Processing Conference (EUSIPCO)*. 2006, pp. 2–6.

36. A. A. Amini, M. Babai-Zadeh, and C. Jutten. "A fast method for sparse component analysis based on iterative detection-projection". *Bayesian Inference and Maximum Entropy Methods in Science and Engineering (MaxEnt)*. 2006.

In preparation

37. S. J. Kazemitabar and A. A. Amini. "Efficient Network Epidemic Inference with Application to Source Identification". *Working paper* (2019-).

Technical reports

- A. A. Amini, B. Aragam, and Q. Zhou. "A non-graphical representation of conditional independence via the neighbourhood lattice". *Preprint* (2022). eprint: 2206.05829.

- A. A. Amini, B. Aragam, and Q. Zhou. "The neighborhood lattice for encoding partial correlations in a Hilbert space" (Nov. 3, 2017). arXiv: 1711.00991v2 [math.ST].

- B. Aragam, A. A. Amini, and Q. Zhou. "Learning Directed Acyclic Graphs with Penalized Neighbourhood Regression" (2017). arXiv: 1511.08963v3 [math.ST].

- A. A. Amini, M. Paez, L. Lin, and Z. S. Razaee. "Exact slice sampler for Hierarchical Dirichlet Processes" (Mar. 21, 2019). arXiv: 1903.08829v1 [stat.ML].

- S. J. Kazemitabar, A. A. Amini, and A. Talwalkar. "On the support recovery of marginal regression" (Mar. 22, 2019). arXiv: 1903.09488v1 [math.ST].

- A. A. Amini. "Identifiability of Gaussian DAGs in the equal-variance case: A linear-algebraic proof". 2015.

Teaching

Main Instructor

- Statistical Learning Theory, STATS 208, UCLA, Winter 2018.

- High-dimensional Statistics (STAT 200C), UCLA, Spring 2017, 2018, 2019, 2020.

- Linear models (STAT 100C), UCLA, Spring 2015, 2017, 2018, 2019, 2020.

- Theoretical Statistics (STAT 200B), UCLA, Winter 2015, 2016, 2017, 2018, 2019, 2020.

- Introduction to Theoretical Statistics (STAT 426), University of Michigan, Fall 2012.

Teaching Assistant

- Random Processes in Systems (EE 226A), UC Berkeley, Fall 2010.
- Probability and Random Processes (EE 126), UC Berkeley, Spring 2011.
- Digital Signal Processing, Sharif University, 2005.
- Adaptive Filters, Sharif University, 2005.

Grants

Awarded

- PI on the NSF grant DMS-1945667 "CAREER: High-Dimensional Statistical Models for Unsupervised Learning". $400,000. Duration: 2020–2025.
- Co-PI with Qing Zhou on the NSF grant IIS-1546098 "BIGDATA: F: Learning Big Bayesian Networks", $919,305. Duration: 2015–2020.
- Co-PI with Chad Hazlett on UCLA Center for Social Sciences Seed Grant, "Improving Kernel Methods for Social Science Research", 2018.

Service

- Ad-hoc committees, UCLA, 2022 (twice).
- NSF review panels, 2017, 2018.
- Search committee, Dept. of Statistics, UCLA, 2018–2019 and 2019–2020.
- Admission committee, Dept. of Statistics, UCLA, 2014–2015 and 2019–2020.
- Organizing statistics seminars, Dept. of Statistics, UCLA, Academic year 2015–2017.
- Served on the following Ph.D. thesis committees:

Name	**Type**	**Department**	**Chair**	**Duration**
Linfan Zhang	PhD	STAT	Arash Amini	2018–2022
S. Jalil Kazemitabar	PhD	STAT	Arash Amini	
Zhixin Zhou	PhD	STAT	Arash Amini	
Qiaoling Ye	PhD	STAT	Arash Amini & Q. Zhou	2017–2022
Hassan Sadeghi	PhD	Finance (UZH)	Arash Amini & W. Farkas	2020–
Bryon Aragam	PhD	STAT	Qing Zhou	
Mojtaba Sahraee-Ardakan	PhD	EE	Allie Fletcher	2021–2022
Parthe Pandit	PhD	EE	Allie Fletcher	2019–2022
Gabriel Ruiz	PhD	STAT	Qing Zhou	2018–2022
Hao Wang	PhD	STAT	Qing Zhou	2018–2022
Ruochen Jiang	PhD	STAT	Jingyi Li	2018–2022
Zhanhao Peng	PhD	STAT	Qing Zhou	2018–2021
Hangjian Li	PhD	STAT	Qing Zhou	2018–2022
Neng Chieh Chang	PhD	Ecnonomics	D. N. Chetverikov	2018–2020

Spencer Frei	PhD	STAT	Ying Nian Wu	2019–2021
Denali Molitor	PhD	Math	Deanna Needell	2018–2021
Timothy Blackburn	PhD	STAT	Mark S. Handcock	2018–2021
Arash Vahabpour	PhD	EE	V. Roychowdhury	2019–2022
Xin Jiang	PhD	EE	L. Vandenberghe	2019–2022
QuiJing Lu	PhD	EE	V. Roychowdhury	2019–2022
Benjamin Bowman (ATC)	PhD	Math	Guido Montufar	2022–2023
Thomas Merkh	PhD	Math	Guido Montufar	
Wenyu Zhou	PhD	STAT	Ying Nian Wu	
Qian Xiao	PhD	STAT	Hongquan Xu	
Lin Wang	PhD	STAT	Hongquan Xu	
Yuhao Yin	PhD	STAT	Hongquan Xu	2019–2022
Aaron Danielson	PhD	STAT	Mark S. Handcock	
Siavash Jalal	PhD	STAT	Peter Bentler	
Ryan Rosario	PhD	STAT	Ying Nian Wu	
Seunghyun Min	PhD	STAT	Qing Zhou	
Clayton Schoeny	PhD	EE	Lara Dolecek	
Yu Zhang	PhD	CE	Henry Burton	
Pratik Chaudhari	PhD	CS	Stefano Soatto	
Mehrdad Showkatbakhsh	PhD	EE	Suhas Diggavi	
Huwenbo Shi	PhD	Bioinformatics	Janet Sinsheimer	
Ehsan Ebrahimzadeh	PhD	EE	Vwani Roychowdhury	
Onur Atan	PhD	EE	Mihaela van der Schaar	
Mihir Laghate	PhD	EE	Danijela Cabric	
Han Sun	MS	STAT	Arash Amini	
Jiaming Guo	MS	STAT	Arash Amini	2019–2021
Peichen Wu	MS	STAT	Arash Amini	2018–2020
Hassan Sadeghi	MS	Finance (ETH)	Arash Amini & W. Farkas	2018–2020
Saeed Ghodsi	MS	STAT		2020–2022
Pandit Parthe	MS	STAT		2019–2021
Andrew Sang	MS	STAT		2018–2020
Ablaikhan Akhazhanov	MS	STAT	Arash Amini & C. Hazlett	
Fan Zhang	MS	STAT		
Xiaolu Yu	MS	STAT		
Fiona Chehong Yeung	MS	STAT		
Jinchao Li	MS	STAT		
Dacheng Zhang	MS	STAT		
Xin Jiang	MS	STAT		
Xiaolu Yu	MS	STAT		
Ruiqi Zhong	MS	STAT		
Yuantong Li	PhD	STAT	Guang Cheng	2022–
Theodore Yushin Faust	PhD	Math	Mason Porter	2022

Advising

- Luciano Vinas, Statistics, PhD, UCLA, 2021-.
- Chung Kyong Nguen, Statistics, PhD, UCLA, 2021-.
- Hassan Sadeghi, Finance, PhD, University of Zurich, 2020-.

- Navin Souda, Statistics, PhD, 2022-.
- Shuang Wu, Statistics, PhD, 2022-.
- Zhi Zhang, Statistics, PhD, 2023-.

Alumni

- Linfan Zhang, Statistics, PhD, UCLA, 2018-2022.
- Parthe Pandit, EE, PhD (co-advised with A. Fletcher), 2018-2022.
- Mojtaba Sahraee-Ardakan, EE, PhD, (co-advised with A. Fletcher), 2018-2022.
- Qiaoling Ye, Statistics, PhD, UCLA. 2016-2021. (co-advised with Q. Zhou)
- Jiaming Guo, Statistics, MS, 2020-2021.
- Peichen Wu, Statistics, MS, 2019-2020.
- Seyed Jalil Kazemitar, Statistics PhD, UCLA, 2016-2020.
- Zhixin Zhou, Statistics PhD, UCLA, 2015-2018.
- Han Sun, Statistics MS, UCLA, 2016-2018.
- Hassan Sadeghi, MS, Finance, ETH, 2018-2019, (visiting).
- Haidar Almohri, IEOR PhD, Wayne State University, (co-advised), 2014-2017.
- Ehsan Ebrahimzadeh, EE PhD, UCLA. (co-mentored), 2014-2018.
- Priyanka Nanayakkara, undergraduate internship (Stats 195), 2017-2018.
- Minshuo Chen, EE MS (informal co-advising), 2015-2016.
- Fan Chen, CSST undergraduate internship, UCLA. Summer 2015.
- Bryon Aragam, Statistics PhD, 2014-2015. (co-advised with Q. Zhou)

Invited talks and presentations

Session	**Type**	**University**	**Department**	**Date**
EcoStata	Invited			2024
IRSA Conference: New Perspectives on the Analysis of Complex Multivariate Data	Invited	U. of Minnesota		2024
Tutorial on Reconsidering Overfitting in the Age of Overparameterized Models	Panelist	NeurIPS		Dec 2023
Workshop on Statistical Network Analysis and Beyond (SNAB)	Invited	NYU		Aug 2022
Math Machine Learning seminar	Invited	MPI MiS + UCLA	Math	Jul 2022
International Society for Bayesian Analysis	Invited			Jun 2022
Probability and Combinatorics Seminar	Invited	UC Irvine	Math	May 2022
International Indian Statistical Association	Invited			May 2021
Workshop on Statistical Network Analysis and Beyond (SNAB)	Invited			Jan 2021
BioStat Seminar	Invited	U Penn	BioStat	Mar 2021
JSM 2020	Invited			Aug 2020
Seminar	Invited	U of Notre Dame	Stat	Oct 2019

Seminar	Invited	UC Riverside	Stat	Oct 2018
2017 IMS-China International Conference on Stat and Probability	Invited			Jun 2017
Probability and Stat seminar	Invited	USC	Math	Mar 2016
Ann Arbor Non-parametric Workshop	Invited	U of Michigan		Oct 2016
Graph Limits & Stat Workshop	Invited	Isaac Newton Institute (INI)		Jul 2016
Statistical Network and High-Dimensional Data Analysis Theory and Applications Workshop	Invited	Fudan University		Mar 2016
Santa Fe Network Workshop	Invited	Santa Fe Institute		Dec 2015
WNAR 2015: Session on networks	Invited			2015
Seminar	Invited	UT Austin	Stat	2015
Seminar	Invited	UCLA	BioStat	2015
Seminar	Invited	UCLA	Stat	2014
NIPS 2014 workshop on networks	Poster			2014
Seminar	Invited	Yale	Stat	2014
Seminar	Invited	Harvard	Stat	2014
Seminar	Invited	OSU	Stat	2014
Seminar	Invited	Purdue	Stat	2014
Seminar	Invited	U of Toronto	Stat	2014
Seminar	Invited	UC Davis	Stat	2014
Seminar	Invited	UCLA	Stat	2014
Seminar	Invited	UIUC	Stat	2014
Seminar	Invited	U of Wisconsin	Stat	2014
NIPS 2013	Spotlight			2013
Seminar	Invited	U of Michigan	Stat	2013
Seminar	Invited	Yale	Stat	2013
JSM 2013	Invited			2013
Seminar	Invited	CMU	Stat	2011
ISIT 2008	Presentation			2008

Refereeing

Annals of Statistics
Biometrika
Journal of American Statistical Association (JASA)
Proceedings of the National Academy of Sciences
Statistical Science
Electronic Journal of Statistics
Statistical Papers
Bernoulli
Journal of Multivariate Analysis
Probability Theory and Related Fields
Applied and Computational Harmonic Analysis
Mathematical Reviews
Mathematics of Operations Research
Proceedings of National Academy of Sciences
IEEE Transactions on Information Theory
Bayesian Analysis
COLT
AISTATS
ICLR

Honors

UC Berkeley-Vodafone fellowship, 2006-2007.

Ranked 2nd among EE graduates, Sharif Univ., 2004.

Among top 50 in nationwide university entrance exam, Iran, 2000.

Computing Skills

Proficient in R, Python, MATLAB, LaTeX, and Linux.

Familiar with C, Julia, and HTML.

Miscellaneous

U.S. citizen

References (available upon request)

Peter J. Bickel	Professor of Statistics, UC Berkeley	bickel@stat.berkeley.edu
Elizaveta Levina	Associate Professor of Statistics, University of Michigan	elevina@umich.edu
XuanLong Nguyen	Assistant Professor of Statistics, University of Michigan	xuanlong@umich.edu
Martin J. Wainwright	Professor of Statistics, and Associate Professor of EECS, UC Berkeley	wainwrig@stat.berkeley.edu
Mark Handcock	Professor of Statistics UCLA	handcock@stat.ucla.edu
Qing Zhou	Professor of Statistics UCLA	zhou@stat.ucla.edu

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