ARMEEN TAEB

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RESEARCH INTERESTS

Model selection in non-traditional settings, graphical models, domain adaptation, causal inference, latent-variable modeling, mathematical optimization, high-dimensional statistics, applications of data science

ACADEMIC POSITIONS

2023- **Affiliate Faculty, eScience Institute**, University of Washington
2023- **Affiliate Faculty, Center for Statistics and the Social Sciences** , University of Washington
2022- **Assistant Professor, Department of Statistics**, University of Washington
2019-2022 **Foundations of Data Science Postdoctoral Associate**, ETH Zürich

PROFESSIONAL POSITIONS

2017 **Data science intern**, Yahoo Inc.
2015 **Data science intern**, Jet Propulsion Laboratory, NASA
2012 **DSP Research intern: Baraniuk lab**, Rice University
2010-2011 **DSP Research intern: Hughes lab**, CU Boulder
2010 **Summer intern**, National Institute of Standards and Technology

EDUCATION

California Institute of Technology *Pasadena, CA*
PhD, Electrical Engineering *2015 - 2019*

California Institute of Technology *Pasadena, CA*
M.S. in Electrical Engineering *2013 - 2015*

University of Colorado at Boulder *Boulder, CO*
B.S. in Electrical Engineering and Applied Mathematics *2009 - 2013*

PUBLICATIONS

Preprint

T. Xu*, **A. Taeb***, S. Küçükyavuz, A. Shojaie, "Integer programming for learning directed acyclic graphs from non-identifiable Gaussian models"
- 2024

S. Engelke, **A. Taeb**, "Extremal graphical modeling with latent variables "
- 2024

X. Shen, P. Bühlmann, **A. Taeb**, "Causality-oriented robustness: exploiting general additive interventions"
- 2023

A. Taeb, J. Gamella, C. Heinze-Deml, P. Bülhmann, "Learning and scoring Gaussian latent causal models with unknown additive interventions"
- 2023

J. Gamella, **A. Taeb**, C. Heinze-Deml, P. Bühlmann, "Characterization and greedy learning of Gaussian structural causal models under unknown interventions"
- 2022

Journal Publications

A. Taeb, P. Bühlmann, V. Chandrasekaran "Model selection over partially ordered sets"
- 2024 – Proceedings of National Academy of Sciences

Y., Chen, **A. Taeb**, and P. Bühlmann, "A look at robustness and stability of ℓ_1 vs. ℓ_0 regularization: discussion of papers by Bertsimas et al. and Hastie et al."

- 2020 – Statistical Science

A. Taeb, P. Shah, and V. Chandrasekaran, "False discovery and its control in low-rank estimation"
- 2020 – Journal of Royal Statistical Society, Series B

A. Taeb, P. Shah, and V. Chandrasekaran, "Interpreting latent variables in factor models via convex optimization"
- 2018 – Mathematical Programming

A. Taeb, J. Reager, M. Turmon, and V. Chandrasekaran, "A statistical graphical model of the California reservoir network"
- 2017 – Water Resources Research

H. Qi, **A. Taeb**, and S. Hughes, "Visual stylometry using background selection and wavelet- HMT-based Fisher Information distances for attribution and dating of impressionist paintings"
- 2012 – EURASIP Signal Processing

Books

D. Sanz-Alonso, A. Stuart, and **A. Taeb**, "Inverse problems and data assimilation"
- 2023 – Cambridge University Press

PhD thesis

"Latent-variable modeling: inference, algorithms, and applications"
- 2019 – W. P. Carey & Co. Prize for outstanding thesis in Applied Mathematics

Conference proceedings and workshops

A. Taeb, N. Ruggeri, C. Schnuck, F. Yang, "Provable concept learning for interpretable predictions via variational inference"
- 2022 – ICML workshop on AI4Science

A. Taeb, A. Maleki, C. Studer, and R. Baraniuk, "Maximin analysis of message passing algorithms for block sparse signals"
- 2013 – Signal Processing with Adaptive Sparse Structured Representations (SPARS)

Technical Reports

M. Azadkia, **A. Taeb**, P. Bülhmann, "A fast non-parametric approach for local causal structure learning"
- 2022 – arXiv 2111.14969

A. Taeb, P. Shah, and V. Chandrasekaran, "Learning exponential family graphical models with latent variables using regularized conditional likelihood"
- 2020 – arXiv 2010.09386

GRANTS

"False discovery control in non-standard settings"
- 2023-2026; National Science Foundation, Division of Mathematical Sciences; Statistics; $225k

"False discovery control for causal structure learning"
- 2023-2024; Royalty Research Fund, University of Washington; $40k

"Interpretable predictions for medical imaging diagnostics"
- CO-PI: with F. Yang, J. Vogt, and E. Ozkan
- 2021-2023; Hasler Foundations, Switzerland; CHF 510k

AWARDS & HONORS

2019-2021 **Foundations of Data Science Postdoctoral Fellowship**, ETH
2020 **W. P. Carey & Co. Prize for outstanding thesis in Applied Mathematics**, Caltech
2016-2018 **Resnick Institute Fellowship for Sustainability Research**, Caltech
2013-2014 **Electrical Engineering Graduate Fellowship**, Caltech
2013 **GRFP Honorable Mention**, NSF
2013 **Distinguished Senior in Electrical Engineering**, University of Colorado at Boulder

TEACHING & MENTORING

Teaching

Wi. 2024	**STAT 538, Statistical Learning**, Graduate Course, 18 Students	*UW*
Wi. 2024	**STAT 528, Applied Statistics Capstone**, Graduate Course, 38 Students	*UW*
Fa. 2023	**STAT 591, Multiple Testing and Modern Inference**, Graduate Course, 12 Students	*UW*
Sp. 2023	**BIOST 558, Statistical Machine Learning for Data Scientists**, Graduate Course, 57 Students	*UW*
Wi. 2023	**STAT 538, Statistical Learning**, Graduate Course, 4 Students	*UW*
Wi. 2023	**STAT 528, Applied Statistics Capstone**, Graduate Course, 36 Students	*UW*
Fa. 2020	**Seminar on Multiple Testing for Modern Data Science**, Co-Instructor (with Matthias Löffler)	*ETH*
Fa 2018	**Inverse Problems** & **Data Assimilation**, Co-instructor (with Andrew Stuart)	*UDSI*

Mentoring

2023-	**Xiaozhu Zhang**, "False discovery control in highly correlated variable selection" – PhD	*UW Statistics*
2023-	**Bojun Chen**, "Testing for model selection over partially ordered sets" – MS	*UW Statistics*
2022	**Felix Hafenmair** , "High-dimensional causal discovery" – MS	*ETH*
2022	**Zipei Geng** , "Nonparametric Variable Selection under Latent Confounding" – MS	*ETH*
2021	**Carina Schnuck**, "Provably learning interpretable and predictive latent features" – MS	*ETH*
2020-2021	**Juan Gamella**, "Active learning for causal inference" – MS	*ETH*
2020-	**Dennis Frauen** , "Inference with highly correlated variables" – MS	*Göttingen*
2020	**Judy Beestermoeller**, "Learning Gaussian graphical models" – MS	*ETH*
2020	**Mattias Hemming**, "Causal inference and low-rank estimation" – MS	*ETH*

ACADEMIC SERVICE & LEADERSHIP

PhD Committees

2024	**Ph.D. Committee Member and reader**, for Sara Laplante, advisors: Ema Perkovic, Department of Statistics, Univeristy of Washington.
2024	**Ph.D. Committee Member and reader**, for Renak Mehta, advisors: Zaid Harchaoui, Department of Statistics, Univeristy of Washington.
2024	**Ph.D. Graduate Student Representative**, for Vince Cooper, advisors: Kyle Armour, Cecilia Bitz, and Greg Hakim, Department of Atmospheric Sciences, Univeristy of Washington.

Scientific Events and Organization

2024	**Co-organizer of the 24th IMS New Researcher Conference**, Co-organized with Yuan Jiang and Pragya Sur.
2024	**Co-organizer of a contributed session in IMS-Bernoulli Conference in Probability and Statistics**, Co-organized with Mateo Diaz, topic: "False discovery control in non-standard settings".
2024	**Co-organizer of invited session in American Causal Inference Conference**, Co-organized with Ali Shojaie, topic: "Optimization methods for causal discovery".
2023-	**Organizer: IMS New Researcher Group Seminar Series**, Organize talks from young researchers in data science.
2023	**Co-organizer of minisymposium in SIAM Conference on Optimization**, Co-organized with Xinwei Shen, topic: "Application of optimization for causal discovery".
2020-2022	**Co-organizer: Young Data Science Seminar Zürich**, Organize talks from young researchers.
2017	**Co-organizer: Co-organizer of minisymposium in SIAM Conference on Optimization**, Co-organized with Yong Sheng Soh, topic: "Lift-and-project methods for data science".

Reviewing

Journals: Annals of Statistics, Bernoulli, Biometrika, Electronic Journal of Statistics, Journal of American Statistical Association, Journal of Machine Learning Research, Journal of Royal Statistical Society, SIAM Journal of Mathematics of Data Science, Statistical Science

Conferences: Neurips, UAI

CITIZENSHIP at the UW

2024	**Member of the faculty hiring committee for TTAP, TAP, and AAP**, Department of Statistics
2022-	**Member of PhD admissions committee**, Department of Statistics
2023-	**Member of the M.S. admission committee**, Department of Statistics
2023-	**Member of the Prelim examination committee**, Department of Statistics
2023	**Member of the Diversity Inclusion Community and Equity (DICE) committee**, Department of Statistics

TALKS

"Quantifying rare events with extremal graphical models"

- Department of Atmospheric Sciences, University of Washington, May 2024

"Integer Programming for Learning Directed Acyclic Graphs"
- American Causal Inference Conference, May 2024

"On False Positive Error"
- Bernoulli-IMS World Congress in Probability and Statistics, August 2024
- Marshall Statistics Seminar, University of Southern California, April 2024
- eScience Institute, University of Washington, April 2024
- International Conference on Selective Inference, March 2024
- Department of Statistical Science, Duke University, December 2023
- Department of Biostatistics, University of Washington, November 2023

"Causality and robustness from heterogeneous data"
- Interactive Causal Learning Conference, Boca Raton, December 2023
- Department of Industrial and Systems Engineering, University of Washington, May 2023
- Department of Economics, University of Washington, May 2023

" Provable concept learning for interpretable predictions"
- Department of Medicine, University of California at San Francisco, November 2022

"Causal structure learning with unknown noise interventions"
- SIAM Conference on Optimization, June 2023
- American Causal Inference Conference, May 2023
- Department of Statistics, University of Washington, October 2022
- COMPSTAT, August 2022

"Perturbations and Causality in Gaussian Latent Variable Models"
- CMStatistics, December 2021
- Online Causal Inference Seminar, June 2021
- SIAM Conference on Algebraic Geometry, August 2021
- SIAM Conference on Optimization, July 2021
- Seminar for Statistics and Data Science, TU Münich, March 2021

"False discovery and its control in low-rank estimation"
- SIAM Conference on Optimization, May 2021
- Statistics@UPF Seminars, March 2020
- SIAM Conference of Algebraic Geometry, June 2019
- Department of Computer Science, Northeastern, December 2018
- Laboratory for Information and Decision Systems, MIT, November 2018
- Workshop on New Signal Models and their Information Content, Banff, November 2018
- Statistics Seminar, University of Chicago, October 2018
- Seminar For Statistics: ETH Zürich, September 2018

"From Data Science to Hydrology, California Reservoirs During Drought"
- Wonderful Company HQ, July 2018
- RAND Corporation, June 2018
- International Congress on Environmental Modelling and Software, May 2018
- San Francisco Water Public Utilities Commission, March 2018

"Interpreting latent variables via convex optimization"
- Allerton Conference on Communication, Control, and Computing, October 2017
- SIAM Optimization, May 2017