# ARMEEN TAEB

ataeb@uw.edu | armeentaeb.github.io/index/

## RESEARCH INTERESTS

Model selection in non-standard settings, causal inference, graphical models, domain adaptation, 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, Advisor: Peter Bühlmann

## 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*
Advisor: Venkat Chandrasekaran

**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 (* indicates equal contributions)

M. Valdez, A. Willis, **A. Taeb**, "Consensus tree estimation with false discovery rate control via partially ordered sets"
- ◇ 2025

X. Zhang, N. Keret, A. Shojaie, **A. Taeb**, "Convex mixed-integer programming for causal additive models with optimization and statistical guarantees"
- ◇ 2025

**A. Taeb***, R. Guo*, L. Henckel*, "Model-oriented graph distances via partially ordered sets"
- ◇ 2025

X. Zhang, J. Bien, **A. Taeb**, "Quantifying uncertainty and stability among highly correlated predictors: a subspace perspective"
- ◇ 2025 – Under review at the Journal of the Royal Statistical Society, Series B

J. Gamella, **A. Taeb**, C. Heinze-Deml, P. Bühlmann, "Characterization and greedy learning of Gaussian structural causal models under unknown interventions"
- ◇ 2024 – Minor revision at the Journal of Machine Learning Research

## Journal Publications (* indicates equal contributions)

R. Sergazinov, **A. Taeb**, I. Gaynanova , "A spectral method for multi-view subspace learning using the product of projections"
- ◇ 2025 – Biometrika

T. Xu, S. Küçükyavuz, A. Shojaie, **A. Taeb**, "An asymptotically optimal coordinate descent algorithm for learning Bayesian networks from Gaussian models"
- ◇ 2025 – Journal of Machine Learning Research

X. Shen, P. Bühlmann, **A. Taeb**, "Causality-oriented robustness: exploiting general noise interventions"
- ◇ 2025 – Journal of the American Statistical Association

T. Xu*, **A. Taeb***, S. Küçükyavuz, A. Shojaie, "Integer programming for learning directed acyclic graphs from non-identifiable linear models "
- ◇ 2025 – Biometrika

S. Engelke, **A. Taeb**, "Extremal graphical modeling with latent variables via convex optimization "
- ◇ 2025 – Journal of Machine Learning Research

**A. Taeb**, J. Gamella, C. Heinze-Deml, P. Bülhmann, "Learning and scoring Gaussian latent causal models with unknown additive interventions"
- ◇ 2024 – Journal of Machine Learning Research

**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 $\ell_1$ vs. $\ell_0$ 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 the 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

Pending: "Towards reliable causal discovery via posets: assessment, robustness, and uncertainty quantification"
- ◇ National Science Foundation CAREER, DMS, Statistics

"2025 conferences for new researchers in statistics, probability, and data science"
- ◇ CO-PI: with E. Lila
- ◇ National Science Foundation, DMS, Statistics; 40k

"False discovery control in non-standard settings"
- ◇ National Science Foundation, DMS, 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

| | | |
|---|---|---|
| Spr 2025 | **STAT 435, Introduction to Statistical Machine Learning**, Undergraduate Course, 83 Students | *UW* |
| Wi. 2025 | **STAT 538, Statistical Learning**, Graduate Course, 28 Students | *UW* |
| Wi. 2025 | **STAT 528, Applied Statistics Capstone**, Graduate Course, 32 Students | *UW* |
| 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

**PhD students and postdocs**

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|---|---|---|
| 2023- | **Xiaozhu Zhang**, PhD advisee | *UW* |
| 2023- | **Tong Xu**, Advisor: Simge Küçükyavuz | *Northwestern* |
| 2025- | **Maria Valdez**, Advisor: Amy Willis | *UW* |

**Masters students**

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|---|---|---|
| 2023-2025 | **Bojun Chen**, advisee, first position: PhD at UW Biostatistics | *UW* |
| 2022 | **Felix Hafenmair** , thesis advisee | *ETH* |
| 2022 | **Zipei Geng** , thesis advisee, first position: PhD at Kaust | *ETH* |
| 2021 | **Carina Schnuck**, thesis advisee, first position: Citi bank | *ETH* |
| 2020-2021 | **Juan Gamella**, thesis advisee, first position: PhD at ETH | *ETH* |

**Undergraduate students**

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|---|---|---|
| 2025- | **Jian Kang**, research advisee | *UW* |
| 2025- | **Arnav Mazumder**, research advisee | *UW* |
| 2025- | **Carter Lembo**, research advisee | *UW* |

## ACADEMIC SERVICE & LEADERSHIP

## Scientific Events and Organization

### IMS New Researchers

2024-2026 **President of IMS New Researchers Group**, IMS

2025 **Co-organizer of the first IMS International New Researchers Conference**, Spain

2024-2026 **Co-organizer of the 24-26th IMS New Researchers Conference**, USA

### Conference Session organizer

2026 **IMS Annual Meeting**, topic: "Modern optimization for statistical learning".

2025 **Joint Statistical Meeting**, topic: "The interplay of statistics, optimization, and geometry for modern data science".

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 Series B, SIAM Journal of Mathematics of Data Science, Statistical Science.

**Conferences**: Neurips, UAI.

# SELECTED TALKS

## "Complex Model Selection via Posets: Correlated Features, Causal Graphs, and Phylogenetic Trees"

- Department of Statistics, University of Chicago, October 2025
- IMS Annual Meeting, July 2026

## "Integer Programming for Learning Directed Acyclic Graphs"

- International Conference on Frontiers of Data Science (Hangzhou, China), July 2024
- Pacific Causal Inference Conference (Shanghai, China), July 2024
- American Causal Inference Conference, May 2024

## "Model selection over partially ordered sets"

- Department of Statistics, University of Melbourne, December 2024
- Department of Statistics, Rutgers University, November 2024
- 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

## "Quantifying rare events with extremal graphical models"

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

## "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