

# Jie Ding

dingj@umn.edu www.jding.org

## **POSITION**

---

**University of Minnesota** Minneapolis, MN  
Tenure-Track Assistant Professor in Statistics From Sept. 2018  
Graduate Faculty in Electrical and Computer Engineering  
Graduate Faculty in Data Science

**Duke University** Durham, NC  
Postdoctoral Fellow in Data Science 2018

## **EDUCATION**

---

**Harvard University** Cambridge, MA  
Ph.D., Engineering Sciences, A.M., Statistics 2017  
Ph.D. Thesis: Nonlinear Modeling and Prediction for Time Series

**Tsinghua University** Beijing, China  
B.S., Mathematics and Electrical Engineering 2012

## **GRANTS**

---

Title: **Collaborative Research: SCALE MoDL: Advancing Theoretical Minimax Deep Learning: Optimization, Resilience, and Interpretability**

09/01/2021 to 08/31/2024

Role: PI

Funding agency: National Science Foundation

Total award amount: \$273,887

Title: **An AI-enabled Cyber-Physical-Biological System for Cardiac Organoid Maturation**

09/15/2020 to 08/31/2023

Role: co-PI (PI: Jia Liu, other co-PIs: Na Li, and Richard T Lee)

Funding agency: National Science Foundation

Total award amount: \$898,225

Title: **Privacy-Preserving Machine Learning and Decision Making**

04/20/2021 to 05/31/2022

Role: PI

Funding agency: Cisco Research

Total award amount: \$150,388

Title: **Deep Adaptive Neural Structures**

05/20/2021 to 05/19/2024

Role: PI

Funding agency: Office of Naval Research

Total award amount: \$705,010

Title: **Robust Methods for Trustworthy Machine Learning**

06/01/2020 to 05/31/2023

Role: PI

Funding agency: Army Research Office

Total award amount: \$355,202

Title: **Dynamical Modeling of Complex Data**

07/01/2020 to 1/31/2022

Role: PI

Funding agency: Office of the Vice President for Research, University of Minnesota (internal grant)

Total award amount: \$47,814

Title: **Physics for Artificial Intelligence**

09/26/2018 to 03/23/2020

Role: co-PI (PI: Vahid Tarokh)

Funding agency: Defense Advanced Research Projects Agency

Total award amount: \$488,065

### **Miscellaneous**

AWS Cloud Credits for Research

09/26/2021 to 09/26/2022

Role: PI

Funding agency: Amazon Science

Total award amount: \$20,000

Meta Faculty Research Award

12/7/2021 to 12/7/2022

Role: co-PI (PI: Mingyi Hong)

Funding agency: Meta

Total award amount: \$49,988

## **PATENTS**

---

J. Ding, "Interval Privacy," 12/01/2020, US patent, #63119811.

J. Ding, X. Xian, X. Wang, "Assisted Learning and Module Privacy," 02/12/2020, US patent, #62975348.

J. Ding, W. Hua, "Rapid Determination of An Unknown Position," 03/08/2018, US patent #151915,974.

## **SELECTED RESEARCH**

---

### ***Statistical Theory and Methods***

1. J. Zhang, J. Ding, Y. Yang, "Is a Classification Procedure Good Enough? -- A Goodness-of-Fit Assessment Tool for Classification Learning," *Journal of the American Statistical Association*, DOI: <https://doi.org/10.1080/01621459.2021.1979010>, to appear, 2021.
2. J. Zhang, J. Ding, Y. Yang, "Targeted Cross-Validation," *Bernoulli*, to appear, 2021.
3. J. Ding, E. Diao, J. Zhou, V. Tarokh, "On Statistical Efficiency in Learning," *IEEE Transactions on Information Theory*, vol. 67, no. 4, pp. 2488-2506, 2021.
4. S. Shao, P. Jacob, J. Ding, V. Tarokh, "Bayesian Model Comparison with the Hyvarinen Score: Computation and Consistency," *Journal of the American Statistical Association*, vol. 114, no. 528, pp. 1826-1837, 2019.
5. J. Ding, V. Tarokh and Y. Yang, "Bridging AIC and BIC: A New Criterion for Autoregression," *IEEE Transactions on Information Theory*, vol. 64, no. 6, pp. 4024-4043, 2018.

### ***Collaborative and Privacy-Sensitive Machine Learning***

6. G. Wang, J. Ding, Y. Yang, "Regression with Set-Valued Categorical Predictors," *Statistica Sinica*, to appear, 2022.
7. X. Wang, Y. Xiang, J. Gao, J. Ding, "Information Laundering for Model Privacy," *International Conference on Learning Representations (ICLR)*, **Spotlight Presentation** (5.6%), 2021.
8. J. Zhou, J. Ding, K. M. Tan, and V. Tarokh, "Model Linkage Selection for Cooperative Learning," *Journal of Machine Learning Research*, vol. 22, no. 256, pp. 1-44, 2021.
9. X. Xian, X. Wang, J. Ding, R. Ghanadan, "Assisted Learning: A Framework for Multi-Organization Learning," *Conference on Neural Information Processing Systems (NeurIPS)*, **Spotlight Presentation** (3%), 2020.
10. E. Diao, J. Ding, V. Tarokh, "Gradient Assisted Learning," arXiv preprint arXiv:2106.01425, 2021.
11. J. Ding, B. Ding, "'To Tell You the Truth' by Interval-Private Data," *IEEE International Conference on*

***Big Data (IEEE BigData)***, 2020.

12. J. Ding, B. Ding, “Interval Privacy: A New Data Privacy Framework,” arXiv preprint arXiv:2106.09565, 2020.
13. C. Ye, J. Ding, R. Ghanadan, “Meta Clustering for Collaborative Learning,” arXiv preprint arXiv:2006.00082, 2020.

### ***Deep Learning Theory and Applications***

14. G. Li, Y. Gu, J. Ding, “The Rate of Convergence of Variation-Constrained Deep Neural Networks,” arXiv preprint arXiv:2106.12068, 2021.
15. G. Li, Y. Gu, J. Ding, “L1 Regularization in Two-Layer Neural Networks,” ***IEEE Signal Processing Letters***, vol. 29, pp. 135-139, 2021.
16. E. Diao, J. Ding, V. Tarokh, “SemiFL: Communication Efficient Semi-Supervised Federated Learning with Unlabeled Clients,” arXiv preprint arXiv:2106.01432, 2021.
17. E. Diao, J. Ding, V. Tarokh, “HeteroFL: Computation and Communication Efficient Federated Learning for Heterogeneous Clients,” ***International Conference on Learning Representations (ICLR)***, 2021.
18. M. Soltani, S. Wu, Y. Li, R. Ravier, J. Ding, and V. Tarokh, “Compressing Deep Networks Using Fisher Score of Feature Maps,” ***Data Compression Conference (DCC)***, 2021.
19. J. Wang, M. Xue, and R. Culhane, E. Diao, J. Ding, and V. Tarokh, “Speech Emotion Recognition with Dual-Sequence LSTM Architecture,” ***IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)***, 2020.
20. S. Wu, E. Diao, J. Ding, V. Tarokh, “Deep Clustering of Compressed Variational Embeddings,” ***Data Compression Conference (DCC)***, 2020.
21. E. Diao, J. Ding, V. Tarokh, “DRASIC: Distributed Recurrent Autoencoder for Scalable Image Compression,” ***Data Compression Conference (DCC)***, 2020.
22. E. Diao, J. Ding, V. Tarokh, “Restricted Recurrent Neural Networks,” ***IEEE International Conference on Big Data (IEEE BigData)***, 2019.
23. J. Ding, R. Calderbank, V. Tarokh, “Gradient Information for Representation and Modeling,” ***Conference on Neural Information Processing Systems (NeurIPS)***, 2019.

### ***Signal Processing Theory and Methods***

24. X. Xian, M. Hong, J. Ding, “Mismatched Supervised Learning,” ***International Conference on Acoustics, Speech, and Signal Processing (ICASSP)***, to appear, 2022.
25. K. Elkhilil, A. Hasan, J. Ding, S. Farsiu, V. Tarokh, “Fisher Auto-Encoders,” ***International Conference on Artificial Intelligence and Statistics (AISTAT)***, 352-360, 2021.
26. T. Xie, J. Ding, “Forecasting with Multiple Seasonality,” ***IEEE International Conference on Big Data (IEEE BigData)***, 2020.

27. J. Ding, J. Zhou, and V. Tarokh, "Asymptotically Optimal Prediction for Time-Varying Data Generating Processes," *IEEE Transactions on Information Theory*, vol. 65, no. 5, pp. 3034-3067, 2019.
28. Y. Xiang, J. Ding, V. Tarokh, "Evolutionary Spectra Based on the Multitaper Method with Application to Stationarity Test," *IEEE Transactions on Signal Processing*, vol. 67, no. 9, pp. 1353-1365, 2019.
29. J. Ding, Y. Yang, V. Tarokh, "Model Selection Techniques--an overview," *IEEE Signal Processing Magazine (featured article)*, vol. 35, no. 6, pp. 16-34, 2018.
30. J. Ding, S. Shahrapour, K. Heal, and V. Tarokh, "Analysis and Prediction of Multi-State Autoregressive Models," *IEEE Transactions on Signal Processing*, vol. 66, no. 9, pp. 2429-2440, 2018.
31. S. Shahrapour, M. Noshad, J. Ding, V. Tarokh, "Online Learning for Multimodal Data Fusion with Application to Object Recognition," *IEEE Transactions on Circuits and Systems II: Express Briefs*, vol. 65, no. 9, pp. 1259-1263, 2018.
32. J. Ding, Y. Xiang, L. Shen, and V. Tarokh, "Multiple Change Point Analysis: Fast Implementation and Strong Consistency," *IEEE Transactions on Signal Processing*, vol. 65, no. 17, pp. 4495-4510, 2017.
33. Q. Han, J. Ding, E. Airoldi, and V. Tarokh, "SLANTS: Sequential Adaptive Nonlinear Modeling of Time Series," *IEEE Transactions on Signal Processing*, vol. 65, no. 19, pp. 4994-5005, 2017.
34. J. Ding, L. Chen, Y. Gu, "Perturbation Analysis of Orthogonal Matching Pursuit," *IEEE Transactions on Signal Processing*, vol. 61, no. 2, pp. 398-410, 2013.

### **Miscellaneous**

35. J. Gao, J. Ding, "Large Deviation Principle for the Whittaker 2d Growth Model," arXiv preprint arXiv:2009.12907, 2020.
36. J. Ding, M. Noshad, and V. Tarokh, "Complementary Lattice Arrays for Coded Aperture Imaging," *Journal of the Optical Society of America*, vol. 33, no. 5, pp. 863-881, 2016.
37. J. Ding, A. Bouabdallah, and V. Tarokh, "Key Pre-Distributions from Graph-Based Block Designs," *IEEE Sensors Journal*, vol. 16, no. 6, pp. 1842-1850, 2015.

### **INVITED TALKS**

---

- "Human-Centric Privacy-Preserving Data Collection via Intervals," Department of Applied Economics and Statistics, University of Delaware, Mar. 11, 2022.
- "Interval Privacy: A New Framework for Privacy-Preserving Data Collection," 56th Annual Conference on Information Sciences and Systems (CISS), Mar. 9, 2022.
- "Interval Privacy: A New Framework for Privacy-Preserving Data Collection," Department of Statistics and Actuarial Science, University of Iowa, Feb. 10, 2022.
- "Organizational Collaboration with Assisted Learning," Computer Science Department Colloquium, Texas Tech University, Nov. 9, 2021.
- "Organizational Collaboration with Assisted Learning," IMA Data Science Seminar, Oct. 12, 2021.

- “Privacy-Sensitive Collaborations through Assisted Learning,” Department of Statistics, University of Virginia, Feb. 26, 2021.
- “Privacy-Sensitive Collaborations through Assisted Learning,” Department of Electrical and Computer Engineering, University of Utah, Feb. 19, 2021.
- “Privacy-Sensitive Machine Learning,” Alexa AI, Amazon, Jan. 7, 2021.
- “Kinetic Prediction -- Predicting Time Series with Abrupt Changes and Smooth Evolutions,” School of Finance and Statistics, East China Normal University, Dec. 18, 2019.
- “Modeling, Prediction, and Diagnostics for Trustworthy AI,” Interdisciplinary Distinguished Seminar Series (IDSS), Department of Electrical and Computer Engineering, North Carolina State University, Oct. 25, 2019.
- “Model Selection Principles for Data Analysis,” DTC Seminar Series, Digital Technology Center, University of Minnesota, Sept. 30, 2019.
- “Modeling, Prediction, and Diagnostics from Online Streaming Data,” ECE Colloquium Series, Department of Electrical and Computer Engineering, University of Minnesota, Sept. 26, 2019.
- “Predicting Time Series with Abrupt Changes and Smooth Evolutions,” International Conference on Econometrics and Statistics (EcoSta), June 26, 2019.

## **SERVICES**

---

### ***Elected Member, Nomination & Election Subcommittee Chair (in 2020)***

Machine Learning for Signal Processing Technical Committee, IEEE	Nov. 2018 - Dec. 2024
<b><i>Co-Organizer, UMN Machine Learning Seminar Series</i></b>	Jan. 2021 - present
<b><i>Program Committee, IEEE BigData Conference</i></b>	Dec. 2021
<b><i>Co-Organizer, IEEE BigData Workshop on “Scalable Reinforcement Learning with Big Data”</i></b>	Dec. 2021
<b><i>Faculty Lead, Data+ outreach program</i></b>	May 2019 - Aug. 2019
<b><i>Program Committee, International Workshop on Federated Learning for User Privacy and Data Confidentiality in Conjunction with ICML 2021 (FL-ICML'21)</i></b>	June 2021
<b><i>Area Chair, IEEE International Conference on Acoustics, Speech and Signal Processing</i></b>	May 2020
<b><i>Session Chair, IEEE International Conference on Big Data</i></b>	Dec. 2020
<b><i>Committee Member</i></b>	Sept. 2018 - present
of Master and Ph.D. Committees from the School of Statistics, Department of Electrical and Computer Engineering, Department of Computer Science, Department of Psychology, College of Design, and Department of Agriculture at the University of Minnesota, Twin Cities	

### ***Reviewer of***

NeurIPS, ICLR, Journal of Machine Learning Research, Annals of Statistics, IEEE Transactions on Signal Processing, IEEE Transactions on Information Theory, etc.

**ACADEMIC & COMMITTEE ADVISING**

---

***Doctoral Advisees***

Jiawei Zhang, Statistics Ph.D. (co-advised by Yuhong Yang)	2018 - Present
Xun Xian, ECE Ph.D. (co-advised by Mingyi Hong)	2018 - Present
Jiaying Zhou, Statistics Ph.D. (co-advised by Yuhong Yang)	2018 - Present
Ganghua Wang, Statistics Ph.D. (co-advised by Yuhong Yang)	2020 – Present

***Doctoral Preliminary Committee: Committee Chair***

Mitchell Kinney, Statistics Ph.D.	2018 - 2020
-----------------------------------	-------------

***Doctoral Final Committee: Committee Reviewer***

Seonmo Kim, Computer Science Ph.D.	2021
Vasileios Georgios Karanikolas, Electrical Engineering Ph.D.	2021

***Doctoral Preliminary Committee: Committee Member***

Daniel Ngo, Computer Science Ph.D.	2020
Wenjing Yang, Statistics Ph.D.	2020
Rui Wang, Statistics Ph.D.	2020
Vasileios Georgios Karanikolas, Electrical Engineering Ph.D.	2019
Bingxin Zhao, Statistics Ph.D.	2019

***Master's Thesis/Research Committee: Committee Chair***

Tianyang Xie, Statistics M.S.	2020
Yilin Hou, Statistics M.S.	2019
Eunji Min, Statistics M.S.	2019
Yi Rong, Statistics M.S.	2019
Suya Wu, Statistics M.S.	2019
Mitchell Kinney, Statistics M.S.	2018

***Master's Thesis/Research Committee: Committee Member***

Rutvij Umesh Bora, Data Science M.S.	2021
Xiangyi Chen, Elec & Comp Eng M.S.	2021
Anubha Agrawal, Data Science M.S.	2021
Sheng Huang, Data Science M.S.	2021
Sai Kumar Kayala, Data Science M.S.	2021
Aditya Anirudha Gaydhani, Data Science M.S.	2021
Anushree Choudhary, Data Science M.S.	2021
Mourya Karan Reddy Baddam, Data Science M.S.	2021
Yuanyuan Qiu, Data Science M.S.	2021

Buu Huynh, Statistics M.S.	2021
Rachit Jas, Data Science M.S.	2020
Wenjing Yang, Statistics M.S.	2020
Zachary Brown, Biostatistics M.S.	2020
Rui Wang, Statistics M.S.	2020
Rabin KC, Applied Plant Sciences M.S.	2020
Anchit Sharma, Data Science M.S.	2020
Garim Lee, Design M.S.	2019 - 2020
Bingxin Zhao, Statistics M.S.	2019 - 2020
Lanhuizi Gan, Mass Communication M.A.	2019
Xiaochen Jin, Statistics M.S.	2019
Elise Anderson, Psychology M.A.	2019