Xuan Bi, Ph.D.

CONTACT INFORMATION

Address:
321 19th Avenue South, 3-233
Minneapolis, MN 55455

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https://carlsonschool.umn.edu/faculty/xuan-bi

RESEARCH INTERESTS

Personalization
Recommender systems, representation learning

Trustworthy Machine Learning
Data privacy, adversarial learning, watermarking

ACADEMIC APPOINTMENTS

University of Minnesota

Associate Professor	2024-present
Assistant Professor	2018-2024

Department of Information and Decision Sciences

Carlson School of Management

Yale University

Postdoctoral Associate	2016-2018

Department of Biostatistics

- Advisor: Professor Heping Zhang

EDUCATION

University of Illinois at Urbana-Champaign

Ph.D. in Statistics	2011-2016

- Advisor: Professor Annie Qu
- Thesis: Dimension reduction and efficient recommender system for large-scale complex data

Tsinghua University

B.S. in Mathematics	2007-2011

GRANTS

ATD: Advancing privacy and security in complex networks by statistical algorithms: Safeguarding, monitoring, and remediation
National Science Foundation   09/01/2024-08/31/2027
Role: Co-PI (PI: Tianxi Li)
Total award: $199,997

Advancing security in social networks: Strategic data release mechanisms to counteract adversarial threats
DSI Seed Grant   03/29/2024-03/28/2025

Data Science Initiative, University of Minnesota
Role: PI (other PIs: Tianxi Li)
Total award: $10,000

- Featured by the University of Minnesota Research and Innovation Office

Efficient and reliable watermarking for generative AI
Cisco Systems, Inc.   03/19/2024-03/18/2025
Role: PI (other PIs: Jie Ding and Mingyi Hong)
Total award: $149,907

- Featured by the University of Minnesota Technology Commercialization
  and the University of Minnesota Corporate Engagement Center

Recommender systems for the influencer economy
Dean's Small Grant   02/21/2024-05/31/2025
Carlson School of Management, University of Minnesota
Role: PI
Total award: $2,000

New foundations and algorithms for advancing adversarial learning
Cisco Systems, Inc.   10/18/2022-12/31/2023
Role: Co-Investigator (PI: Jie Ding)
Total award: $155,664

Privacy-preserving machine learning and decision making
Cisco Systems, Inc.   06/01/2021-12/31/2022
Role: PI (other PIs: Jie Ding and Mingyi Hong)
Total award: $150,388

Understanding and improving federated learning in healthcare
Cisco Systems, Inc.   04/20/2021-06/30/2022
Role: PI (other PIs: Mochen Yang)
Total award: $137,297

HONORS AND
AWARDS

Gordon B. Davis Young Scholar Award, INFORMS Information Systems
Society   2024

Outstanding Research Award, Carlson School of Management, University
of Minnesota   2022

Best Session Chair Award, INFORMS Information Systems Society 2022

Best Reviewer Award, INFORMS Workshop on Data Science   2021

MSBA Outstanding Teacher (specialty courses, full-time class 2020-2021),
Carlson School of Management, University of Minnesota   2021

MSBA Outstanding Teacher (specialty courses, part-time class 2016-2019),

Carlson School of Management, University of Minnesota 2019

MSBA Teacher of the Year (specialty courses, part-time class 2017-2019), Carlson School of Management, University of Minnesota 2019

Certificate for Outstanding Teaching (Thank a Teacher Project), Center for Educational Innovation, University of Minnesota 2019

SLDS Conference Travel Award, the Conference on Statistical Learning and Data Science 2016

ASA Student Paper Award, American Statistical Association 2016

Horace W. Norton Prize for outstanding thesis research (sole awardee), Department of Statistics, UIUC 2014

Graduate College Conference Travel Award, UIUC 2014, 2015, 2016

PATENTS **Bi, X.** and Shen, X. (2022). Distribution-invariant data protection mechanism. USPTO 17710145, pending.

PUBLICATIONS Xian, X., Wang, G., **Bi, X.**, Srinivasa, J., Kundu, A., Hong, M. and Ding, J. (2024). RAW: A robust and agile plug-and-play watermark framework for AI-generated images with provable guarantees. *Conference on Neural Information Processing Systems (NeurIPS)*.

Yang, M. and **Bi, X.** (2024). Cost-aware calibration of classifiers. *INFORMS Journal on Data Science*, forthcoming.

Wang, G., Xian, X., Kundu, A., Srinivasa, J., **Bi, X.**, Hong, M. and Ding, J. (2024). Demystifying poisoning backdoor attacks from a statistical perspective. *International Conference on Learning Representations (ICLR)*.

Chen, J., He, L., Liu, H., Yang, Y. and **Bi, X.** (2023). Background music recommendation on short video sharing platforms. *Information Systems Research*, forthcoming.
  - Media Coverage: Discovery at Carlson

Xian, X., Wang, G., Srinivasa, J., Kundu, A., **Bi, X.**, Hong, M. and Ding, J. (2023). A Unified Framework for Inference-Stage Backdoor Defenses. *Conference on Neural Information Processing Systems (NeurIPS)*.

Bi, X., Gupta, A. and Yang, M. (2023). Understanding partnership formation and repeated contributions in federated learning: An analytical investigation. *Management Science*, forthcoming.
  - Featured by the Business Advancement Center for Health at the Carlson School of Management

Xian, X., Wang, G., Srinivasa, J., Kundu, A., **Bi, X.**, Hong, M. and Ding, J. (2023). Understanding backdoor attacks through the adaptability hypothesis. *International Conference on Machine Learning (ICML)*.

Bi, X., Yang, M. and Adomavicius, G. (2023). Consumer acquisition for recommender systems: A theoretical framework and empirical validations. *Information Systems Research*, forthcoming.

Travadi, Y., Peng, L., **Bi, X.**, Sun, J. and Yang, M. (2023). Welfare and fairness dynamics in federated learning: A client selection perspective. *Statistics and Its Interface*, forthcoming.

Bi, X. and Shen, X. (2023). Distribution-invariant differential privacy. *Journal of Econometrics*, **235**, 444-453.

Shen, X., **Bi, X.** and Shen, R. (2022). Data flush. *Harvard Data Science Review*, **4**(2).

Bi, X.*, Feng, L.*, Li, C.* and Zhang, H. (2022). Modeling pregnancy outcomes through sequentially nested regression models. *Journal of the American Statistical Association*, **117**, 602-616.
  - Media Coverage: HealthITAnalytics, University of Minnesota News and Events

Bi, X., Adomavicius, G., Li, W. and Qu, A. (2022). Improving sales forecasting accuracy: A tensor factorization approach with demand awareness. *INFORMS Journal on Computing*, **34**, 1644-1660.

Zhang, Y., **Bi, X.**, Tang, N.-S. and Qu, A. (2021). Dynamic tensor recommender systems. *Journal of Machine Learning Research*, **22**, 1-35.

Feng, L.*, **Bi, X.*** and Zhang, H. (2021). Brain regions identified as being associated with verbal reasoning through the use of imaging regression via internal variation. *Journal of the American Statistical Association*, **116**, 144-158.

Bi, X.*, Tang, X.*, Yuan, Y.*, Zhang, Y.* and Qu, A.* (2021). Tensors in Statistics. *Annual Review of Statistics and Its Application*, **8**, 345-368.

Tang, X., **Bi, X.** and Qu, A. (2020). Individualized multilayer tensor learning with an application in imaging analysis. *Journal of the American Statistical Association*, **115**, 836-851.
  - Winner of ASA Student Paper Award (SLDS Section, 2017).

Wang, Y., **Bi, X.** and Qu, A. (2020). A logistic factorization model for recommender systems with multinomial responses. *Journal of Computational and Graphical Statistics*, **29**, 396-404.

Bi, X., Feng, L., Wang, S., Lin, Z., Li, T., Zhao, B., Zhu, H. and Zhang, H. (2019). Common genetic variants have associations with human cortical brain regions and risk of schizophrenia. *Genetic Epidemiology*, **43**, 548-558.

Zhang, H., Liu, D., Zhao, J. and **Bi, X.** (2018). Modeling hybrid traits for comorbidity and genetic studies of alcohol and nicotine co-dependence. *Annals of Applied Statistics*, **12**, 2359-2378.

Bi, X. and Qu, A. (2018). A mixed-effects estimating equation approach to nonignorable missing longitudinal data with refreshment samples. *Statistica Sinica*, **28**, 1653-1675.

Bi, X., Qu, A. and Shen, X. (2018). Multilayer tensor factorization with applications to recommender systems. *Annals of Statistics*, **46**, 3308-3333.

Bi, X., Qu, A., Wang, J. and Shen, X. (2017). A group-specific recommender system. *Journal of the American Statistical Association*, **112**, 1344-1353.
  - Winner of ASA Student Paper Award (SLDS Section, 2016).

Bi, X., Yang, L., Li, T., Wang, B., Zhu, H. and Zhang, H. (2017). Genome-wide mediation analysis of psychiatric and cognitive traits through imaging phenotypes. *Human Brain Mapping*, **38**, 4088-4097.
  - Finalist for the journal issue cover.

Clark, S. E., Purcell, J. E., **Bi, X.** and Fortman, J. D. (2017). Cross-foster rederivation compared with antibiotic administration in the drinking water to eradicate bordetella pseudohinzii. *Journal of the American Association for Laboratory Animal Science*, **56**, 1-5.

Liechty, J. M., **Bi, X.** and Qu, A. (2016). Feasibility and validity of a statistical adjustment to reduce self-reported bias of height and weight in wave 1 of the Add Health Study. *BMC Medical Research Methodology*, 16(1): 124.

Bi, X. and Qu, A. (2015). Sufficient dimension reduction for longitudinal data. *Statistica Sinica*, **25**, 787-807.

(* indicates equal contribution.)

WORKING PAPERS

Zhu, Y., Chan, J., **Bi, X.**, Guo, Y. and Wu, J. (2024). The boomerang effect of puffery: Empirical evidence from product upgrading advertisements.

Li, T., Lee, J., Tang, X., and **Bi, X.** (2024). A network-based decentralization scheme for recommender systems.

Qiu, L.*, Tang, C.*, **Bi, X.***, Burtch, G.*, Chen, Y.* and Zhang, H. (2024). Physician perceptions and use of large language models at work.

Xian, X., Wang, G., **Bi, X.**, Srinivasa, J., Kundu, A., Fleming, C., Hong, M. and Ding, J. (2024). On the vulnerability of applying retrieval-augmented generation within knowledge-intensive application domains.

Zhang, J., Yang, M., **Bi, X.** and Wei, Q. (2024). Algorithmic governance of two-sided platforms: The case of short video recommendation.

Zhu, Y., **Bi, X.**, Adomavicius, G. and Curley, S. (2024). Forecasting goal-oriented activities: A deep learning approach leveraging cross-activity relationships.

Xian, X., **Bi, X.**, Hong, M. and Ding, J. (2024). DLP: Data-driven label-poisoning backdoor attack.

OTHER PUBLICATIONS

Bi, X. (2022). ENAR 2023: IMS Program Highlights. *IMS Bulletin*, **51**(6), 13.

TEACHING EXPERIENCE

Carlson School of Management, University of Minnesota
Instructor
- IDSC 8620: Data Mining and Personalization   Spring 2024
- BA 3551: Business Analytics   Spring 2024
- IDSC 4444: Descriptive and Predictive Analytics   Fall 2022, 2024
- MSBA 6431: Advanced Issues in Business Analytics   2019-2024
- MABA 6431: Advanced Topics on Business Analytics   2019-2022

Faculty Advisor
- MSBA 6511: Business Analytics Experiential Learning   2019-2024

Department of Statistics, UIUC
Instructor
- STAT 200: Statistical Analysis   Spring 2013

Teaching Assistant
- STAT 429: Time Series Analysis   Fall 2012
- STAT 400: Statistics and Probability I   Fall 2011 and Spring 2012

STUDENT SUPERVISION

Information & Decision Sciences, University of Minnesota
PhD Dissertation Committee Chair   Spring 2024
- Yi Zhu

PhD Dissertation Committee Member   Summer 2023
- Zihong Huang

PhD RA Advisor
- Yi Zhu   2019-2022
- Chaofan Zhai   Fall 2021-present

PhD 2nd Year Paper Committee Chair   Fall 2020-Summer 2021
- Yi Zhu

Graduate Research Supervisor
- Leann Chen (MHRIR 2023)   Fall 2023
- Tian Zhang (Master of Finance 2020)   Fall 2020
- Elizabeth Zhu (MSBA 2020)   Summer 2020
- Chuchen Xiong (MSBA 2020)   Summer 2020

Undergraduate Research Supervisor
- Benjamin Stevenson (Honors Thesis)   Spring 2023
- Alex Dimitrov (Honors Thesis)   Spring 2022
- Yiyi Jiang (Exchange student)   Fall 2019
  - The supervised research project "Machine learning in venture capital investment: A data-driven approach for predicting the success of start-ups" won the First Prize of the Enterprise Management Academic Paper Competition in the Business School at CUFE

Department of Biostatistics, Yale University
Undergraduate Research Supervisor   Summer 2017
- Shiying Wang (Peking University, China)
- Zijie Lin (Zhejiang University, China)

CONSULTING EXPERIENCE

Illinois Statistics Office, UIUC
Statistical Consultant   June 2013 - July 2016

- Provided statistical consulting to 60+ clients
  - clients from BioFortis Inc, Carle Foundation Hospital, Prairie Research Institute, Store Supply Warehouse LLC, University of Illinois at Chicago, and University of Illinois at Urbana-Champaign
  - in the fields of accounting, biology, ecology, engineering, finance, law, logistics, marketing, medicine, psychology, sociology, etc.
- Covered a wide range of services, including:
  - grant proposal and medical protocol review,
  - experimental design (survey design, clinical trial design),
  - data analysis (ANOVA, regression, time series, mixed models, etc.),
  - prediction (market prediction, yield prediction),
  - software tutorial and technical report writing.

TALKS AND PRESENTATIONS

Invited Talks
- School of Business, The George Washington University, Washington, DC, November 2024 (scheduled)
- School of Business, The University of Kansas, Lawrence, KS, November 2024

- Conference on Innovative Statistics and Machine Learning for Data Science and AI, Bend, OR, August 2024
- Joint Statistical Meeting, Portland, OR, August 2024
- International Conference on Econometrics and Statistics, Beijing, China, July 2024
- Joint Conference on Statistics and Data Science, Kunming, China, July 2024
- School of Management and Economics, The Chinese University of Hong Kong, Shenzhen, China, July 2024
- College of Business, Southern University of Science and Technology, Shenzhen, China, July 2024
- Annual POMS Conference, Minneapolis, MN, April 2024
- DSMMA Technical Workshop, University of Minnesota, Minneapolis, MN, March 2024
- ENAR Spring Meeting, Baltimore, MD, March 2024
- School of Computing, National University of Singapore, Singapore, November 2023
- Institute for Mathematical Sciences Young Mathematical Scientist Forum – Statistics and Data Science, National University of Singapore, Singapore, November 2023
- Miami Herbert Business School, University of Miami, Miami, FL, October 2023
- Foster School of Business, University of Washington, Seattle, WA, September 2023
- School of Economics and Management, Tsinghua University, Beijing, China, June 2023
- Department of Statistics, University of California, Irvine, CA, April 2023
- ENAR Spring Meeting, Nashville, TN, March 2023
- Department of Biostatistics and Health Data Science, Indiana University, Indianapolis, IN, March 2023
- Hackathon TED talk, Carlson School of Management, University of Minnesota, February 2023
- CMStatistics, London, UK, December 2022 (virtual)
- Conference on Statistical Challenges and New Solutions for Large-Scale Complex Data, Yunnan, China, November 2022 (virtual)
- International Symposium on Modern Data Science Application, Practice, and Theory, New Haven, CT, November 2022
- INFORMS Annual Meeting, Indianapolis, IN, October 2022
- Department of Management Science and Statistics, The University of Texas at San Antonio, San Antonio, TX, September 2022 (virtual)

- International Conference on Computational Statistics, Bologna, Italy, August 2022 (virtual)
- International Conference on Econometrics and Statistics, Kyoto, Japan, June 2022 (virtual)
- Statistical Learning and Data Science Webinar Series, American Statistical Association, January 2022 (virtual)
- Department of Statistics, The Chinese University of Hong Kong, Hong Kong, China, November 2021 (virtual)
- BIRS Workshop: Statistical Methods for Computational Advertising, Banff, Canada, October 2021 (virtual)
- VF Corporation, Fremont, CA, September 2021 (virtual)
- ICSA Applied Statistics Symposium, September 2021 (virtual)
- Joint Statistical Meeting, Seattle, WA, August 2021 (virtual)
- School of Information Management & Engineering, Shanghai University of Finance and Economics, Shanghai, China, July 2021 (virtual)
- Department of Mathematics, Statistics, and Computer Science, University of Illinois at Chicago, April 2021 (virtual)
- Department of Statistics, University of Virginia, April 2021 (virtual)
- ICSA Applied Statistics Symposium (virtual), December 2020
- INFORMS Annual Meeting (virtual), November 2020
- Computer Science & Engineering and Digital Technology Center (virtual), University of Minnesota, September 2020
- BIRS Workshop: Statistical Methods for Computational Advertising, Banff, Canada, April 2020 (cancelled due to COVID-19)
- ENAR Spring Meeting (virtual), Nashville, TN, March 2020
- 3rd Healthcare Analytics/IT Symposium, Minneapolis, MN, Nov 2019
- ICSA Applied Statistics Symposium, Raleigh, NC, June 2019
- Workshop on New Challenges and Journeys for Statistics in Science Discovery, Champaign, IL, April 2019
- Division of Biostatistics, University of Minnesota, April 2019
- School of Statistics, University of Minnesota, November 2018
- SLDS Conference, New York City, NY, June 2018
- UIUC Statistics Department Workshop, Champaign, IL, April 2018
- Department of ACMS, University of Notre Dame, December 2017
- School of Business Administration, University of Miami, December 2017
- Department of Statistics, University of Florida, December 2017
- Carlson School of Management, University of Minnesota, December 2017
- Discipline of Business Analytics, University of Sydney, December 2017
- Department of Statistics, Texas A&M University, November 2017

- Department of Decision Sciences, HEC Montreal, November 2017
- Department of Statistics and Actuarial Science, University of Waterloo, November 2017
- Farmer School of Business, Miami University, November 2017
- Joint Statistical Meeting, Baltimore, MD, August 2017
- ICSA Applied Statistics Symposium, Chicago, IL, June 2017
- UIUC Statistics Department Workshop, Champaign, IL, April 2017
- New England Statistics Symposium, Storrs, CT, April 2017
- Joint Statistical Meeting, Chicago, IL, August 2016
- Institute of Statistics and Big Data, Renmin University of China, Beijing, China, December 2015
- School of Management, Fudan University, Shanghai, China, December 2015
- School of Statistics and Management, Shanghai University of Finance and Economics, Shanghai, China, December 2015
- Norton Lecture, Bohrer Workshop, Champaign, IL, November 2014

Conference Presentations
- Winter Conference on Business Analytics, Snowbird, Utah, March 2020 (cancelled due to COVID-19)
- Winter Conference on Business Analytics, Snowbird, Utah, March 2019
- Joint Statistical Meeting, Vancouver, Canada, August 2018
- ENAR, Washington, DC, March 2017
- NIDA Genetics Consortium Meeting, Rockville, MD, December 2016
- SLDS Conference, Chapel Hill, NC, June 2016
- ENAR, Austin, TX, March 2016
- Joint Statistical Meeting, Seattle, WA, August 2015
- ENAR, Miami, FL, March 2015
- ENAR, Baltimore, MD, March 2014
- Bohrer Workshop, Champaign, IL, November 2013

PROFESSIONAL SERVICE

Associate Editor
- Journal of the American Statistical Association   2023 - present
- International Conference on Information Systems   2021

Institute of Mathematical Statistics Program Chair
- ENAR 2023

Keynote Session Organizer
- The IMS Medallion Lecture, ENAR 2023

Reviewer
- NSF grant proposals

Reviewer
- Statistics and Machine Learning Journals:
- Journal of the American Statistical Association, Electronic Journal of Statistics, Journal of Machine Learning Research, Journal of Computational and Graphical Statistics, Statistica Sinica, Statistical Analysis and Data Mining, Journal of the Royal Statistical Society, Series B, Statistics in Medicine, Statistics and Its Interface, Annals of Statistics, Annals of Applied Statistics, Biometrics, Biometrika, Canadian Journal of Statistics, Journal of Business & Economic Statistics, Journal of Multivariate Analysis, Journal of Systems Science and Complexity, Stat, Statistics
- Business Journals:
- Information Systems Research, INFORMS Journal on Computing, INFORMS Journal on Data Science, MIS Quarterly, Management Science, Production and Operations Management, Information & Management, Journal of Business Analytics
- Conferences and Other Journals:
- International Conference on Information Systems, Workshop on Information Technologies and Systems, INFORMS Workshop on Data Science, Conference on Information Systems and Technology, IEEE Signal Processing Letters, Fertility and Sterility

Webinar Organizer
- ASA SLDS Webinar on "Introductory Overview Lectures in Social Network" 2020

Invited Session Organizer
- JSM 2023
- EcoSta 2023
- INFORMS Annual Meeting 2022
- JSM 2021
- ICSA Applied Statistics Symposium 2020
- JSM 2017

Web & Virtual Logistics Coordinator
- WITS 2020

Session Chair
- INFORMS Annual Meeting 2022

- ENAR 2021
- WITS 2020
- SLDS Conference 2018
- ICSA Applied Statistics Symposium 2017
- JSM 2015

DEPARTMENT SERVICE	**Information & Decision Sciences, University of Minnesota**	
	Seminar Organizer	2022 - 2024
	Member, PhD student dissertation defense committee	2023
	Member, PhD student dissertation proposal committee	2023
	Member, PhD student oral prelim committee	2022
	Chair, PhD 2nd year paper committee	2021
	Member, PhD student admission committee	2021
	Member, PhD student first-year exam committee	2020

COMPUTER SKILLS	R, Python, Matlab, SAS; Linux	
INTERNSHIPS	**American International Assurance**, Beijing, China	
	Assistant to the Vice President	Spring 2011
	Beijing Municipal Bureau of Statistics, Beijing, China	
	Intern Statistician	Summer 2010
ACTUARIAL EXAMS PASSED	Probability, Financial Mathematics, Models for Financial Economics	
PROFESSIONAL MEMBERSHIPS	American Statistical Association	
	Institute for Operations Research and the Management Sciences	
	Institute of Mathematical Statistics	