

# Xuan Bi, Ph.D.

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## CONTACT INFORMATION

Address: 321 19th Avenue South, 3-233  
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Email: xbi@umn.edu

## RESEARCH INTERESTS

### Personalization

Recommender systems, consumer acquisition, product forecasting;  
Representation learning, tensor factorization

### Data Privacy

Differential privacy, federated learning

## ACADEMIC APPOINTMENTS

### University of Minnesota

*Assistant Professor*

2018-present

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

### 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**

**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**

**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

Chen, J., He, L., Liu, H., Yang, Y. and **Bi, X.** (2023). Background music recommendation on short video sharing platforms.

Zhang, J., Yang, M., **Bi, X.** and Wei, Q. (2023). Algorithmic governance of two-sided platforms: The case of short video recommendation.

Yang, M. and **Bi, X.** (2023). Cost-aware calibration of classifiers.

Xian, X., **Bi, X.**, Hong, M. and Ding, J. (2023). DLP: Data-driven label-poisoning backdoor attack.

Wang, G., Xian, X., Kundu, A., Srinivasa, J., **Bi, X.**, Hong, M. and Ding, J. (2023). Demystifying poisoning backdoor attacks from a statistical perspective.

Xian, X., Wang, G., Srinivasa, J., Kundu, A., **Bi, X.**, Hong, M. and Ding, J. (2023). A Unified Framework for Inference-Stage Backdoor Defenses.

**OTHER  
PUBLICATIONS**

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

**TEACHING  
EXPERIENCE**

**Information and Decision Sciences, University of Minnesota**

*Instructor* Fall 2022

- IDSC 4444: Descriptive and Predictive Analytics

*Instructor* Summer 2022, Spring 2023

- MSBA 6431: Advanced Issues in Business Analytics

*Instructor* Spring 2019, 2020, 2021, Summer 2021

- MSBA 6430: Advanced Issues in Business Analytics

*Instructor* Fall 2021, 2022

- MABA 6431: Advanced Topics on Business Analytics

*Faculty Advisor* Spring 2019, 2020, 2023, Summer 2021, 2022

- MSBA 6510: Business Analytics Experiential Learning

**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 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* Summer 2020 and Fall 2020

- Elizabeth Zhu (MSBA 2020)
- Chuchen Xiong (MSBA 2020)
- Tian Zhang (Master of Finance 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 CUFU

**Department of Biostatistics, Yale University**

*Undergraduate Research Supervisor*

Summer 2017

- Shiyang 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 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:
  - International Conference on Information Systems, Workshop on Information Technologies and Systems, INFORMS Workshop on Data Science, Conference on Information Systems and Technology

*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-present  
*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  
 Association for Information Systems  
 Institute for Operations Research and the Management Sciences  
 Institute of Mathematical Statistics  
 International Chinese Statistical Association