

# YINSHUANG XIAO

🌐 Lab Website 🌐 Personal Website 📄 Google Scholar 🔗 LinkedIn

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## EDUCATION

- **Ph.D. in Mechanical Engineering** Aug 2024  
*The University of Texas at Austin* Austin, TX, USA
- **Master of Science in Mechanical Engineering** Jun. 2018  
*University of Electronic Science and Technology of China* Chengdu, China
- **Bachelor of Science in Mechanical Engineering** Jun. 2014  
*University of Electronic Science and Technology of China* Chengdu, China

## PROFESSIONAL EXPERIENCE

- **Postdoctoral Fellow** Aug. 2024 - Present  
*The University of Texas at Austin* Austin, TX, USA
- **Data Scientist Intern** Jun. 2023 - Jan. 2024  
*Ford Motor Company* Remote
- **Graduate Research Assistant** Aug. 2021 - Aug. 2024  
*The University of Texas at Austin* Austin, TX, USA
- **Graduate Research Assistant** Aug. 2019 - Jul. 2021  
*The University of Arkansas* Fayetteville, AR, USA
- **New Energy Vehicles R&D Engineer** Aug. 2018 - Aug. 2019  
*Shanghai Volkswagen Automotive* Shanghai, China

## PUBLICATIONS

### Journal Articles

- [1] A. Noorghasemi, **Y. Xiao**, Z. Sha, M. Xiao, C. McComb, "Agent-Based Modeling for the Evaluation of Community Resilience In Silico," *Journal of Computing and Information Science in Engineering*. In review.
- [2] Y. Cui, Z. Sun, **Y. Xiao**, Z. Sha, J. Koskinen, N. Contractor, W. Chen, "Network-Based Analysis of Heterogeneous Customer Preferences in Consideration-then-Choice Decision-Making with Market Segmentation," *Journal of Computing and Information Science in Engineering*. In press.
- [3] **Y. Xiao**, Y. Cui, W. Chen, J. Koskinen, N. Contractor, Z. Sha, "Product Design Incorporating Competition Relations: A Network-Based Design Framework Considering Local Dependencies," *Journal of Mechanical Design*. volume 147, issue 2, pp: 021702 (13), Feb 2025.
- [4] **Y. Xiao**, Y. Cui, N. Raut, J. Januar, J. Koskinen, N. Contractor, W. Chen, Z. Sha, "Survey Data on Customer Two-Stage Decision-Making Process in Household Vacuum Cleaner Market," *Data in Brief*, 54, p.110353.
- [5] **Y. Xiao**, F. Ahmed, Z. Sha, "Graph Neural network-based design decision support for shared mobility systems," *Journal of Mechanical Design*, volume 145, issue 9, pp: 091703 (13), 2023. (**Editor's Choice (Best Paper) Honorable Mention**)
- [6] Z. Sha, Y. Cui, **Y. Xiao**, A. B. Stathopoulos, N. Contractor, Y. Fu, W. Chen, "A Network-Based Discrete Choice Model for Decision-Based Design," *Design Science*, 9, E7, 2023.
- [7] **Y. Xiao**, Z. Sha, "Robust Design of Complex Socio-Technical Systems against Seasonal Effects: A Network Motif-Based Approach," *Design Science*, 8, E2, 2022.
- [8] **Y. Xiao**, D. Ren, P. Xiao, P. Du, "An Equivalent Modeling Method for the Radiated Electromagnetic Interference of PCB Based on Near-field Scanning," *Applied Computational Electromagnetics Society Journal*, 34(5), 2019.

## Refereed Conference Papers

- [9] **Y. Xiao**, H. Kaushik, J. Wang, J. Zhang, Z. Sha, “Electric Vehicle Charging Network Optimization Considering Regional Resource Dependencies,” *ASME 2025 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Anaheim, CA, USA, Aug 17-20, 2025.
- [10] **Y. Xiao**, Z. Sha, “Graph Neural Network-Based Link Prediction for Highly Imbalanced Network Data,” *ASME 2024 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Washington, DC, USA, Aug 25-28, 2024.
- [11] B. Thongmak, **Y. Xiao**, A. Layton, Z. Sha, “From Plant-Pollinator to Product-Customer: Bio-Inspired Network Modularity Analysis in Design for Market Systems,” *The 21st Annual Conference on Systems Engineering Research (CSER 2024)*, Tucson, Arizona, Mar 25-27, 2024.
- [12] B. Thongmak, **Y. Xiao**, P. Gavino, M. Zhang, Z. Sha, “Geospatial Network Analysis of US Megaregions in 40 Years,” *The 57th Hawaii International Conference on System Science (HICSS)*, Maui, HI, Jan. 3-6, 2024.
- [13] P. Gavino, **Y. Xiao**, Y. Cui, W. Chen, Z. Sha, “Evolutionary Co-Mention Network Analysis via Social Media Mining,” *ASME 2023 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Boston, MA, Aug. 20-23, 2023.
- [14] **Y. Xiao**, Y. Cui, M. Cardone, W. Chen, Z. Sha, “Product Competition Analysis for Engineering Design: A Network Mining Approach,” *The 20th Annual Conference on Systems Engineering Research (CSER 2023)*, Hoboken, New Jersey, Mar 16-17, 2023.
- [15] Y. Cui, **Y. Xiao**, Z. Sha, W. Chen, “Network-Based Analysis of Heterogeneous Consideration-then Choice Customer Preferences with Market Segmentations,” *The 20th Annual Conference on Systems Engineering Research (CSER 2023)*, Hoboken, New Jersey, Mar 16-17, 2023.
- [16] **Y. Xiao**, F. Ahmed, Z. Sha, “Travel Links Prediction In Shared Mobility Networks Using Graph Neural Network Models,” *ASME 2022 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, St. Louis, Missouri, Aug. 14-17, 2022.
- [17] **Y. Xiao**, Y. Cui, N. Raut, J. H. Januar, J. Koskinen, N. Contractor, W. Chen, Z. Sha, “Information Retrieval and Survey Design For Two-Stage Customer Preference Modeling,” *The 17th International Design Conference*, Cavtat, Croatia, May 23-26, 2022.
- [18] **Y. Xiao**, Z. Sha, “Towards Engineering Complex Sociotechnical Systems Using Network Motifs: A Case Study on Bike-Sharing Systems,” *ASME 2020 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Virtual, Online, Aug 17-19, 2020.

## Conference Abstracts and Posters

- [19] B. Thongmak, **Y. Xiao**, M. Zhang, Z. Sha, “Network Analysis of Urban Growth in U.S. Megaregions,” *10th International Engineering Systems Symposium: CESUN 2025*, Arlington, Virginia, Jun 9-11, 2025.
- [20] **Y. Xiao**, J. Zhang, Z. Sha, “Electric Vehicle Charging Network Optimization Considering Regional Resource Dependencies,” *10th International Engineering Systems Symposium: CESUN 2025*, Arlington, Virginia, Jun 9-11, 2025.
- [21] M. Zhang, B. Thongmak, **Y. Xiao**, P. Gavino, Z. Sha, L. Zhao “Explore U.S. Megaregion Dynamics from a Network Science Perspective,” *The 1st International Conference on Urban Science and Sustainability*, Xiamen, China, Dec. 14-18, 2023.
- [22] **Y. Xiao**, Y. Cui, W. Chen, N. Contractor, J. Koskinen, Z. Sha, “Design for Market Systems with Network-Based Product Competition Analysis,” *9th International Engineering Systems Symposium: CESUN 2023*, Evanston, Illinois, Nov 6-7, 2023.

- [23] **Y. Xiao**, Z. Sha, “Socio-Technical Systems Engineering and Design: A Meso-Level Network-Based Approach,” DTM Student Poster Competition, *ASME 2022 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, St. Louis, Missouri, Aug. 14-17, 2022. **(Won the Trave Award)**.
- [24] **Y. Xiao**, Y. Cui, W. Chen, J. Koskinen, N. Contractor, Z. Sha, “A Network-Based Approach to Modeling Product Co-consideration and Choice Relations,” *Sunbelt 2022 – The XLII International Sunbelt Social Networks Conference*, Cairns, Australia, Jul 12-16, 2022.
- [25] Y. Cui, **Y. Xiao**, Z. Sha, N. Contractor, J. Koskinen, W. Chen, “Network-based Customer Preference Modeling,” *Sunbelt 2022 – The XLII International Sunbelt Social Networks Conference*, Cairns, Australia, Jul 12-16, 2022.
- [26] **Y. Xiao**, Z. Sha, “Robust Design of Complex Socio-Technical Systems using Complex Networks,” CIE Graduate Research Poster Competition, *ASME 2021 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Virtual, Online, Aug 17-19, 2021. **(Won the Trave Award)**.
- [27] **Y. Xiao**, Z. Sha, “A Network Motifs-Based Approach to Improving Robustness of Complex Socio-Technical Systems Against Seasonal Effects,” *Networks 2021: A Joint Sunbelt and NetSci Conference*, Virtual, Online, Jul. 6-11, 2021. Extended Abstract and Oral Presentation.

#### Ph.D. Dissertation

**Y. Xiao**, “Socio-Technical Systems Engineering and Design: A Meso-Level Network-Based Approach,” presented to the faculty of Walker Department of Mechanical Engineering, May 2024, The University of Texas at Austin, Austin, Texas.

#### M.S. Thesis

**Y. Xiao**, “An Equivalent Modeling Method for the Electromagnetic Radiation of PCB Based on Near-Field Scanning,” presented to the faculty of The School of Mechanical and Electrical Engineering, June 2018, University of Electronic Science and Technology of China, Sichuan, China.

#### AWARDS

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|---|-----------|
| <ul style="list-style-type: none"> <li>• <b>2024 Rising Star in Mechanical Engineering</b></li> </ul>                           | Oct. 2024 |
| Held by Carnegie Mellon University, <b>30 candidates</b> being selected   |           |
| <ul style="list-style-type: none"> <li>• <b>2023 ASME JMD Editor’s Choice (Best Paper) Honorable Mention</b></li> </ul>         | Aug. 2024 |
| Awarded by ASME Journal of Mechanical Design (JMD)  |           |
| <ul style="list-style-type: none"> <li>• <b>ASME IDETC-CIE, Student Hackathon — First Place</b></li> </ul>                      | Aug. 2022 |
| Awarded by ASME Computer and Information in Engineering Division, <i>Award amount: \$1300.</i>                                  |           |
| <ul style="list-style-type: none"> <li>• <b>ASME IDETC-CIE, DTM PhD Student Poster Session — Travel Award</b></li> </ul>        | Aug. 2022 |
| Awarded by ASME Design Engineering Division, <i>Award amount: \$1000.</i><br>(Only the <b>top ten</b> abstracts were selected)  |           |
| <ul style="list-style-type: none"> <li>• <b>ASME IDETC-CIE, 2021 Graduate Research Poster Session — Travel Award</b></li> </ul> | Aug. 2021 |
| Awarded by ASME Computer and Information in Engineering Division, <i>Award amount: \$200.</i>                                   |           |
| <ul style="list-style-type: none"> <li>• <b>ASME IDETC-CIE, Student Hackathon — Third Place</b></li> </ul>                      | Aug. 2021 |
| Awarded by ASME Computer and Information in Engineering Division, <i>Award amount: \$500.</i>                                   |           |
| <ul style="list-style-type: none"> <li>• <b>ASME IMECE, Student Hackathon — Third Place</b></li> </ul>                          | Nov. 2020 |
| Awarded by ASME Computer and Information in Engineering Division, <i>Award amount: \$500.</i>                                   |           |

## TEACHING AND MENTORING

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### Guest Lecturer

Fall 2022 & Spring 2025

- Course: ME 397 Data-Driven Design And Decision-Making In Complex Systems (Walker Department of Mechanical Engineering, UT Austin)
- Conducted engaging guest lectures on deep learning applications within the realm of complex socio-technical system engineering and design for ME 397.
- Developed supplemental materials and resources to enhance student understanding.
- Received positive feedback from students for clarity and effectiveness of presentations.

### Undergraduate Course Project Advisor

Fall 2024

- Course: CSE 370 Individual Reading and Research (Oden Institute of Computational Engineering and Sciences, UT Austin)
- Develop and supervise a research project focused on network science, data mining, and complex systems engineering for an undergraduate student.
- Organize weekly meetings to guide the student through independent research, providing hands-on learning opportunities in big data mining and systems engineering.

### Undergraduate & Graduate Mentor

Jun. 2021 - Aug. 2023

- Project: A Hierarchical Multidimensional Network-based Approach for Multi-Competitor Product Design (Collaborative Project Between UT Austin & Northwestern)
- Mentored undergraduate students in the REU program, guiding them through independent research projects focused on market system data collection and competition relationship extraction.
- Supervised undergraduate & graduate students from both UT Austin and Northwestern in year-long or semester-long research endeavors on network-based market system engineering and design, assisting in research proposal development, experimental design, and data analysis.
- Coordinated regular meetings to track progress and provide constructive feedback, contributing to successful project outcomes.
- Facilitated collaborative opportunities for undergraduate & graduate mentees in the preparation and presentation of conference and journal papers for publication. One mentee showcased our work at the 2023 IDETC conference, and three mentees successfully gained experience in publishing conference and journal papers.

### Freshman Mentor

Jun. 2012 - Aug. 2013

- Program: Freshman Mentorship Program at the University of Electronic Science and Technology of China
- Appointed as a freshman mentor, ranking in the **top 3%** for overall quality, to guide approximately 30 Mechanical Engineering freshmen in their transition to university life and academic studies.
- The major responsibilities include: organizing orientation events, coordinating regular learning activities like seminars and panel discussions, and offering academic guidance to students requiring assistance, etc.

## CONTRIBUTION TO FUNDED RESEARCH

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### INTERN DCL: Attribute Recommendation for Future Vehicles: A Network-Based Cost-Optimal Predictive Model

Jun. 2023 - Dec. 2024

- Funded By: National Science Foundation (NSF)
- Principal Investigator: Zhenghui Sha
- Company Host: Ford Motor Company
- Amount: \$100,000
- Role: Developed preliminary draft of the NSF proposal.

**A Multidimensional Network-Based Approach to Modeling Urban Growth in Texas Triangle Megaregion**

Jan. 2023 - Aug. 2023

- Funded By: Department of Transportation (DOT) via the Center for Cooperative Mobility for Competitive Megaregions (CM2)
- Principal Investigator: Zhenghui Sha
- Amount: \$55,161
- Role: Developed preliminary draft of the DOT proposal.

**REU Supplement: A Hierarchical Multidimensional Network-based Approach for Multi-Competitor Product Design**

Jun. 2022 - May. 2023

- Funded By: National Science Foundation (NSF)
- Principal Investigator: Zhenghui Sha
- Amount: \$16,000
- Role: Developed draft of the NSF proposal and foundational technology, and provided preliminary data.

**PROJECTS**

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**Network-Based Approach to Customer Preference Modeling** Apr. 2020 - Aug. 2024

- Developed an exponential random graph model (ERGM)-based approach for customer choice prediction, and validated by the new car buyer case study.
- Developed a systematic approach that combines information retrieval and survey design in support of data collection for US household vacuum cleaner buyer preference modeling.
- Formulated a network representation of the product market system, implemented it in two case studies: vehicle and vacuum cleaner market systems, and conducted a comparative analysis of the network topology between EV-associated and non-EV-associated sub-networks.
- Developed a network-based product optimization design framework considering local-level market competition relationships to enhance product competitiveness, and validated by vacuum cleaner market case study.

**EV Charging Infrastructure Optimization for Future Demand** Feb. 2022 - May. 2022

- Developed a geographic charging demand estimation model by considering zone-based social attributes including population density, traffic flow, and point of interest.
- Taking the demand estimation model as an input, developed an optimization model for determining the ideal locations and capacities of charging stations in Austin.

**Link Prediction for Shared Mobility Networks** Mar. 2021 - Sep. 2022

- Developed a graph neural network (GNN) based link prediction model to support shared mobility system engineering and design.

**Robust Design against Seasonal Effect in Socio-Technical Systems (STS)** Mar. 2020 - Jan. 2021

- Analyzed and quantified STS seasonal robustness based on network motif theory.
- Developed a design approach to supporting the STS capacity planning decision-making to improve the system robustness against seasonal changes.

**Bike-Sharing System (BSS) Analysis based on Network Motif Theory** Oct. 2019 - Feb. 2020

- Developed global-level trip networks, identified significant trip motif structures based on the network motif theory and analyzed global-level and local-level trip features.
- Evaluated the coherence and variance between global-level and local-level trip networks.

## SKILLS

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- **Coding:** Python, R, MATLAB
- **Frameworks:** Scikit, TensorFlow, Keras, Seaborn, NetworkX, StellarGraph, ergm, igraph
- **Tools:** Gephi, ArcGIS

## SERVICE

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- Session organizers for 51st Design Automation Conference (DAC), IDETC-CIE 2025
- Reviewer for ASME Journal of Mechanical Design (JMD)
- Reviewer for ASME Journal of Computing and Information Science in Engineering (JCISE)
- Reviewer for International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC-CIE 2024 & 2025)
- Reviewer for 21st Annual Conference on Systems Engineering Research (CSER 2024)
- Volunteer of 9th International Engineering Systems Symposium: CESUN 2023
- Assistant reviewer for academic papers and research project reports
- Lab operations manager responsible for recruiting team members, managing lab purchases, and organizing lab tours, etc.