YINSHUANG XIAO

Personal Website | Google Scholar | LinkedIn

Email: yinshuangxiao@utexas.edu
Tel: +1-479-301-0254

Education

- **Ph.D. in Mechanical Engineering** — Expected May 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 Development

- **Data Scientist Intern** — Jun. 2023 - Present
  Ford Motor Company — *Remote*
- **Graduate Research Assistant** — Aug. 2021 - Present
  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] **Y. Xiao**, Y. Cui, W. Chen, J. Koskinen, N. Contractor, Z. Sha, "Network-Based Complex System Engineering Optimization Design With Considering Local Dependencies," *Journal of Mechanical Design. In preparation.*

[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 Marketing. In Review.*

[3] **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. In review.*

[4] **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.

[5] 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.

[6] **Y. Xiao**, Z. Sha, "Robust Design of Complex Socio-Technical Systems against Seasonal Effects: A Network Motif-Based Approach," *Design Science*, 8, E2, 2022.

[7] **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

[8] 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. *In review.*

[9] 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. *Accepted.*

[10] 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.

[11] **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.

[12] 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.

[13] **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.

[14] **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.

[15] **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

[16] 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. *Accepted.*

[17] **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.

[18] **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).**

[19] **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.

[20] 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.

[21] **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).**

[22] **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.

MS 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

- **ASME IDETC-CIE, Student Hackathon** — **First Place** Aug. 2022
  Awarded by ASME Computer and Information in Engineering Division, *Award amount: $1300.*
- **ASME IDETC-CIE, DTM PhD Student Poster Session** — **Travel Award** Aug. 2022
  Awarded by ASME Design Engineering Division, *Award amount: $1000.*
  (Only the **top ten** abstracts were selected)
- **ASME IDETC-CIE, 2021 Graduate Research Poster Session** — **Travel Award** Aug. 2021
  Awarded by ASME Computer and Information in Engineering Division, *Award amount: $200.*
- **ASME IDETC-CIE, Student Hackathon** — **Third Place** Aug. 2021
  Awarded by ASME Computer and Information in Engineering Division, *Award amount: $500.*
- **ASME IMECE, Student Hackathon** — **Third Place** Nov. 2020
  Awarded by ASME Computer and Information in Engineering Division, *Award amount: $500.*

Projects

Network-Based Approach to Customer Preference Modeling Apr. 2020 - Present

- Developed an exponential random graph model (ERGM)-based approach for new car buyer choice prediction.
- Developed a systematic approach that combines information retrieval and survey design in support of data collection for EV and non-EV buyer preference modeling.
- Formulated a network representation of the vehicle market system 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 with considering local-level market competition relationships to enhance EV competitiveness.

Electric Vehicle (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.

Teaching and Mentoring

Guest Lecturer Fall. 2022

- 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 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 students from both UT Austin and Northwestern in year-long or semester-long research endeavors pertaining to network-based market system engineering and design, providing assistance 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 mentees in the preparation and presentation of conference papers for publication, with one mentee showcasing our work at the 2023 IDETC conference.

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

A Multidimensional Network-Based Approach to Modeling Urban Growth in U.S. Megaregions (*In Review*) Mar. 2024 - Mar. 2025

- Funded By: The University of Texas at Austin Bold Inquiry Incubator Seed Fund
- Principal Investigator: Zhenghui Sha
- Amount: $15,000
- Role: Developed preliminary draft of the proposal.

INTERN DCL: Attribute Recommendation for Future Vehicles: A Network-Based Cost-Optimal Predictive Model Jun. 2023 - Dec. 2023

- Funded By: National Science Foundation
- Principal Investigator: Zhenghui Sha
- Company Host: Ford Motor Company
- Amount: $50,000
- Role: Developed preliminary draft of the proposal.

A Multidimensional Network-Based Approach to Modeling Urban Growth in Texas Triangle Megaregion Jan. 2023 - Aug. 2023

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

REU Supplement: A Hierarchical Multidimensional Network-based Approach for Multi-Competitor Product Design Jun. 2022 - May. 2023

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

Skills

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

Service And Professional Membership

- Volunteer of 9th International Engineering Systems Symposium: CESUN 2023
- Assistant reviewer for academic papers and research project reports.
- Lab tour volunteer for department visiting students
- ASME Student Member