

ZHENGHUI SHA

Assistant Professor
Department of Mechanical Engineering
University of Arkansas, Fayetteville, AR, USA

Contact Information

Address: 204 Mechanical Engineering
863 W Dickson St., Fayetteville, AR 72701
Phone: 1-479-575-3422 (Office)
Fax: 1-479-575-6982
Email Address: zsha@uark.edu
Research Lab: <https://sidilab.net>

Education

Degree: Doctor of Philosophy, Mechanical Engineering, Purdue University, USA
Major: Complex Systems Engineering and Design
Minor: Graduate Certification in Applied Statistics
Completed: August 2015

Degree: Master of Science, Mechanical Engineering, Xi'an Jiaotong University, China
Major: Mechatronics
Completed: April 2010

Degree: Bachelor of Science, Mechanical Engineering, Xi'an University of Technology, China
Major: Measurement Control and Instrumentation
Minor: Computer Science
Completed: June 2006

Academic Appointment

Assistant Professor, January 2017 – Present
Department of Mechanical Engineering, University of Arkansas, Fayetteville, AR

Postdoctoral Fellow, January 2016 – December 2016
Department of Mechanical Engineering, Northwestern University, Evanston, IL

Postdoctoral Research Associate, August 2015 – December 2015
School of Mechanical Engineering, Purdue University, West Lafayette, IN

Industrial Experience

Mechanical Engineer Summer Intern, May 2008 – August 2008
Heavy Industry & New-tech Limited Company of Lanshi Group, Lanzhou, China

Awards and Honors

1. **ASME Robert E. Fulton SEIKM Best Paper Award** for M. H. Rahman, C. Xie, and **Z. Sha**, "A Deep-Learning Based Approach to Predicting Sequential Design Decisions", *ASME 2018 International Design Engineering Technical Conferences &*

- Computers and Information in Engineering Conference*, Anaheim, CA, Aug. 18-21, 2019. Award amount: \$700.
2. **ASME CIE Best Dissertation Award of The Year** (2017) for **Z. Sha**, “Decision-Centric Foundations for Complex Systems Engineering and Design”, Purdue University. *PhD Advisor*: Jitesh H. Panchal. Award amount: \$1,000.
 3. **ASME Robert E. Fulton SEIKM Best Paper Award** for: **Z. Sha**, and J. H. Panchal, “Estimating the Node-Level Behaviors in Complex Networks from Structural Datasets,” *ASME 2013 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, Portland, OR. Award amount: \$1,000.
 4. **Open Education Resources (OER) Incentive Award Recognition**, Associated Student Government (ASG), University of Arkansas, 2017.
 5. **NSF CMMI Conference Fellowship**, awarded by NSF division of Civil, Mechanical and Manufacturing Innovation (CMMI), 2012.
 6. **Excellent Performance Award** for volunteers in the International Orientation Week, awarded by the Office of International Programs at Washington State University, 2011.
 7. **Chinese National Scholarship for Outstanding Student Overseas**, awarded by China Scholarship Council, 2010.
 8. **Si-Yuan Innovation Scholarship**, awarded by Xi’an Jiaotong University, 2007 – 2010.
 9. **Outstanding Graduate Student Leader**, awarded by School of Mechanical Engineering at Xi’an Jiaotong University, 2008.
 10. **Excellent Social Practice**, awarded by the School of Mechanical Engineering at Xi’an Jiaotong University, top five of the entire school, 2007.
 11. **Top 10 Student Leader**, awarded by the Student Union, Xi’an University of Technology, 2006.
 12. **First-class Freshman Scholarship**, Xi’an University of Technology, 2002.

Publications

PhD Dissertation

Z. Sha, “Decision-Centric Foundations for Complex Systems Engineering and Design”, presented to the faculty of The School of Mechanical Engineering, August 2015, Purdue University: West Lafayette, Indiana.

Electronic copy available at: <http://docs.lib.purdue.edu/dissertations/AI3734360/>

MS Thesis

Z. Sha, “Theoretical and Experimental Studies on Design of Numerical Controlled Die Spotting Press”, presented to the faculty of The School of Mechanical Engineering, April 2010, Xi’an Jiaotong University, Xi’an, China.

Electronic copy available at:

<https://drive.google.com/file/d/0B41k4IQqo9DEOVbfMFIPSHBHeTA/view>

Book Chapters

- B1. **Z. Sha** and J. H. Panchal, “A Decision-Centric Framework for Modeling Evolutionary Complex Networked Systems,” *Advances in Computers and Information in Engineering Research, ACIER Book Series vol. 2*, (Editors: J. Michopoulos, D. Rosen, C.J.J. Paredis, and J. Vance), ASME press.
- B2. W. Chen, Faez Ahmed, Y. Cui, **Z. Sha**, N. Contractor, “Data-driven preference modelling in engineering systems design”, *Springer Handbook of Engineering Systems Design*, (Editors: Anja Maier, Joseph Oehmen, Pieter E. Vermaas), Springer. Under Review.

Journal Articles

- J1. J. Xie, Y. Bi, **Z. Sha**, M. Wang, Y. Fu, N. Contractor, G. Lin, W. Chen, "Data-Driven Dynamic Network Modeling for Analyzing the Evolutions of Product Competition", *Journal of Mechanical Design, Transactions of the ASME*. In Press.
- J2. L. Poudel, C. Bair, J. McPherson, **Z. Sha**, W. Zhou, "Heuristic Scaling for Multi-Robot Cooperative 3D Printing", *Journal of Computing and Information Science in Engineering, Transactions of the ASME*, volume 20, issue 12, pp: 041002 (12), 2020.
- J3. Z. Zhang, L. Poudel, **Z. Sha**, W. Zhou, D. Wu, "Prediction of Tensile Strength of Components Fabricated by Cooperative 3D Printing", *Journal of Computing and Information Science in Engineering, Transactions of the ASME*, volume 20, issue 2, pp: 021002 (10), 2020.
- J4. M. H. Rahman, C. Schimpf, C. Xie, **Z. Sha**, "A CAD-Based Research Platform for Design Thinking Studies", *Journal of Mechanical Design, Transactions of the ASME*, volume 141, issue 12, pp: 121102 (12), 2019.
- J5. **Z. Sha**, A. Chaudhari, J. H. Panchal, "Modeling Participation Behaviors in Design Crowdsourcing Using A Bipartite Network-Based Approach", *Journal of Computing and Information Science in Engineering, Transactions of the ASME*, volume 19, issue 3, pp: 031010 (10), 2019.
- J6. A. Chaudhari, **Z. Sha**, J. H. Panchal, "Analyzing Participant Behaviors in Design Crowdsourcing Contests using Causal Inference on Field Data", *Journal of Mechanical Design, Transactions of the ASME*, Vol. 140, Issue 9, 091401-091401-12, 2018.
- J7. M. Wang, **Z. Sha**, Y. Huang, N. Contractor, Y. Fu, W. Chen, "Predicting Products' Co-Considerations and Market Competitions for Technology-driven Product Design: A Network-based Approach", *Thematic Collection on Network-based Modeling and Analysis in Design, Design Science*, Vol. 4, e9, 2018.
- J8. **Z. Sha**, Y. Huang, S. J. Fu, M. Wang, N. Contractor, Y. Fu, W. Chen, "A Network-Based Approach to Modeling and Predicting Product Co-Consideration Relations", *Complexity, special issue on Emerging Applications of Complex Networks*, vol. 2018, Article ID 2753638, 14 pages.
- J9. L. Poudel, **Z. Sha**, W. Zhou, "Mechanical Strength of Chunk-Based 3D Printed Parts for Cooperative 3D Printing", *Procedia Manufacturing*, vol. 26, pp. 962-972, 2018.
- J10. J. H. Panchal, **Z. Sha** and K. N. Kannan, "Understanding Design Decisions under Competition Using Games with Information Acquisition and a Function Optimization Experiment", *Journal of Mechanical Design, Transactions of the ASME*, volume 139, issue 9, pp: 091402 (12), 2017.
- J11. **Z. Sha**, V. Saeger, M. Wang, Y. Fu and W. Chen, "Analyzing Customer Preference to Product Optional Features in Supporting Product Configuration", *SAE International Journal of Materials and Manufacturing*, Vol. 10, Issue 3, 2017.
- J12. **Z. Sha**, K. A. Moolchandani, J. H. Panchal and D. A. DeLaurentis "Modeling Airlines' Decisions on City-Pair Route Selection Using Discrete Choice Models", *AIAA Journal of Air Transportation*, Vol. 24, No. 3, pp. 63-73, 2016.
- J13. **Z. Sha**, K. N. Kannan and J. H. Panchal, "Behavioral Experimentation and Game Theory in Engineering Systems Design", *Journal of Mechanical Design, Transactions of the ASME*, volume 137, issue 5, pp: 051405 (10), 2015.
- J14. **Z. Sha**, J. H. Panchal, "Estimating Local Decision-Making Behavior in Complex Evolutionary Systems", *Journal of Mechanical Design, Transactions of the ASME*, volume 136, issue 6, pp: 061003 (11), 2014.

- J15. Q. Le, **Z. Sha**, and J. H. Panchal, "A Generative Network Model for Product Evolution", *Journal of Computing and Information Science in Engineering, Transactions of the ASME*, volume 14, issue 11, pp: 011003 (11), 2014.
- J16. **Z. Sha**, J. H. Panchal, "Towards the Design of Complex Evolving Networks with High Robustness and Resilience", *Procedia Computer Science*, Volume 16, pp. 522-531, 2013.
- J17. **Z. Sha**, S. Zhao, "Design and Simulation of Hydraulic Dual-Cylinder Synchronous Control System Based on MRFAC", *Machine Tools & Hydraulics*, volume 5, pp: 89-96, 2013. (In Chinese)
- J18. J. Xie, D. Kang, B. Woo, J. Lee, **Z. Sha**, and S. Zhao, "Optimum Design of Transverse Flux Machine for High Contribution of Permanent Magnet to Torque Using Response Surface Methodology", *Journal of Electrical Engineering & Technology*, volume 7, issue 5, pp: 745-752, 2012.
- J19. G. Yan, S. Zhao and **Z. Sha**, "Simulation of semisolid die-casting process of four-way valve of HPb59-1 alloy for air-conditioner", *Transactions of Nonferrous Metals Society of China*, volume 20, pp: s931- s936, 2010.
- J20. **Z. Sha**, S. Zhao, "AVR MCU-based Constant Tension Controller", *Instrument Technique & Sensor*, volume 8, pp: 71-73, 2009. (In Chinese)
- J21. J. Xie, S. Zhao and **Z. Sha**, "Review on the Development of Motor in Drive Systems of Mechanical Press", *China Metal Forming Equipment & Manufacturing Technology*, volume 6, pp: 13-17, 2009. DOI: 10.16316/j.issn.1672-0121.2009.06.021. (In Chinese)

Journal Articles (Under review/revision/preparation)

- J22. M. H. Rahman, C. Xie, **Z. Sha**, "Combining Static and Dynamic Data in Deep Learning to Predict Sequential Design Decisions", *Thematic Collection on Deep Learning for Design, Design Science*. Under second-round revision.
- J23. M. H. Rahman, C. Xie, **Z. Sha**, "A Deep-Learning Based Approach to Predicting Sequential Design Decisions", *Journal of Mechanical Design, Transactions of the ASME*. Under review.
- J24. L. Poudel, W. Zhou, **Z. Sha**, "A Generative Framework for Scheduling Multi-Robot Cooperative 3D Printing", *Journal of Computing and Information Science in Engineering, Transactions of the ASME*. Under review.
- J25. Y. Bi, Y. Qiu, J. Xie, **Z. Sha**, M. Wang, Y. Fu, N. Contractor, W. Chen, "Modeling Multi-Year Customers' Considerations and Choices in China's Auto Market Using Two-Stage Bipartite Network Analysis", *Networks and Spatial Economics*. Under review.
- J26. Y. Bi, J. Xie, **Z. Sha**, M. Wang, Y. Fu, W. Chen, "Modeling Spatiotemporal Heterogeneity of Customer Preferences in Engineering Design", *International Journal of Production Research*. Draft completed and ready to submit.
- J27. J. Fu, **Z. Sha**, Y. Huang, Youyi Bi, M. Wang, Y. Fu, N. Contractor, W. Chen, "Two-Stage Modeling of Customer Choice Preferences in Engineering Design using Bipartite Network Analysis", *Management Science*. Draft completed and ready to submit.
- J28. A. Emrah Bayrak, **Z. Sha**, Integrating Deep Learning and Game Theory to Predict Sequential Decisions in Design Competition, *Journal of Mechanical Design, Transactions of the ASME*. Draft completed and ready to submit.
- J29. **Z. Sha**, Y. Cui, Y. Bi, M. Wang, A. B. Stathopoulos, N. Contractor, Y. Fu, W. Chen, "Comparing Utility-Based and Network-Based Approaches in Modeling Customer Preferences for Engineering Design", *Design Science*. Draft completed and ready to submit.

Referred Conference Papers

- C1. J. Clay, M. H. Rahman, D. Zabelina, C. Xie, **Z. Sha**, “Systems Thinking and Sequential Decision Making in Engineering Design: The Psychological Implications”, The Ninth International Conference on Design Computing and Cognition (DCC), 29 June – 1 July 2020, Atlanta, GA. Under Review.
- C2. S. Elagandula, L. Poudel, **Z. Sha**, W. Zhou, “Multi-Robot Path Planning for Cooperative 3D Printing”, the ASME 2020 15th International Manufacturing Science and Engineering Conference (MSEC), June 22 – June 26, 2020, Cincinnati, OH. Under second-round revision.
- C3. K. Trinh, **Z. Sha**, “Towards the Design of Artificial Swarms Using Network Motifs”, *18th Annual Conference on Systems Engineering Research (CSER)*. Accepted.
- C4. M. Rahman, C. Xie, **Z. Sha**, “A Deep Learning Based Approach to Predicting Sequential Design Decisions”, *ASME 2018 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Anaheim, CA, Aug. 18-21, 2019. (**ASME Robert E. Fulton SEIKM Best Paper Award**).
- C5. J. Xie, Y. Bi, **Z. Sha**, M. Wang, Y. Fu, N. Contractor, W. Chen, “A Dynamic Network Analysis Approach to Understanding the Impact of Engineering Design on Evolutions of Market Competition”, *ASME 2019 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Anaheim, CA, Aug. 18-21, 2019. (**Ranked top 10% among the submission**).
- C6. L. Poudel, W. Zhou, **Z. Sha**, “Computational Design of Scheduling Strategies for Multi-Robot Cooperative 3D Printing”, *ASME 2019 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Anaheim, CA, Aug. 18-21, 2019.
- C7. C. T. Schimpf, X. Huang, **Z. Sha**, C. Xie, “Developing Instructional Design Agents to Support Novice and K-12 Design Education”, *The 126th ASEE Annual Conference & Exposition*, Tampa, FL, June 16-19, 2019.
- C8. **Z. Sha**, Y. Bi, M. Wang, A. B. Stathopoulos, N. Contractor, Y. Fu, W. Chen, “Comparing Utility-Based and Network-Based Approaches in Modeling Customer Preferences for Engineering Design”, the *22nd International Conference on Engineering Design, ICED19*, Delft, Netherlands, Aug. 5-8, 2019.
- C9. Y. Bi, J. Xie, **Z. Sha**, M. Wang, Y. Fu, W. Chen, “Modeling Spatiotemporal Heterogeneity Customer Preferences in Engineering Design”, *ASME 2018 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Quebec City, Canada. 2018. Paper number: DETC2018-86245.
- C10. **Z. Sha**, A. Chaudhari, J. H. Panchal, “Modeling Participation Behaviors in Design Crowdsourcing Using A Bipartite Network-Based Approach”, *ASME 2018 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Quebec City, Canada. 2018. Paper number: DETC2018-85686. (**ASME Robert E. Fulton SEIKM Best Paper Finalist**)
- C11. M. Rahman, M. Gashler, C. Xie, **Z. Sha**, “Automatic Clustering of Sequential Design Behaviors”, *ASME 2018 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Quebec City, Canada. 2018.
- C12. J. Fu, **Z. Sha**, Y. Huang, M. Wang, Y. Fu, N. Contractor, W. Chen, “Modeling Customer Choice Preferences in Engineering Design using Bipartite Network Analysis”, *The 43rd Design Automation Conference (DAC) in the ASME 2017 International Design Engineering Technical*

- Conferences & Computers and Information in Engineering Conference*, Cleveland, Ohio, Aug. 6-9, 2017.
- C13. **Z. Sha**, M. Wang, Y. Huang, N. Contractor, Y. Fu, W. Chen, "Modeling Product Co-Consideration Relations: A Comparative Study of Two Network Models", *The 21st International Conference on Engineering Design, ICED17*, Vancouver, Canada, Aug. 21-25, 2017.
- C14. **Z. Sha**, J. H. Panchal "A Degree-Based Decision-Centric Model for Complex Networked Systems", *ASME 2016 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Charlotte, NC. 2016.
- C15. M. Wang, **Z. Sha**, Y. Huang, N. Contractor, Y. Fu, W. Chen, "Forecasting Technological Impacts on Customers' Co-consideration Behaviors: A Data-driven Network Analysis Approach", *43rd Design Automation Conference (DAC) in ASME 2016 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Charlotte, NC. 2016.
- C16. K. A. Moolchandani, **Z. Sha**, A. Maheshwari, J. Thekinen, N. Davendralingam, J. H. Panchal and D. A. DeLaurentis "Hierarchical Decision-Modeling Framework for Air Transportation Systems", the *16th AIAA Aviation Technology, Integration, and Operations Conference*, June 13 - 17, 2016, Washington D. C.
- C17. **Z. Sha**, K. Moolchandani, A. Maheshwari, J. Thekinen, J. H. Panchal, and DeLaurentis D., 2015, "Modeling Airline Decisions on Route Planning Using Discrete Choice Models", the *15th AIAA Aviation Technology, Integration, and Operations Conference*, Aviation Forum, Dallas, TX.
- C18. N. Davendralingam, **Z. Sha**, K. A. Moolchandani, A. Maheshwari, J. H. Panchal and D. A. DeLaurentis "Scientific Foundations for Systems Engineering: Challenges and Strategies", *ASME 2015 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Boston, MA.
- C19. **Z. Sha**, J. H. Panchal, "Estimating Linking Preferences and Behaviors of Autonomous Systems in the Internet using Discrete Choice Models", *2014 IEEE International Conference on Systems, Man, and Cybernetics (SMC) Conference*, San Diego, CA, 2014.
- C20. B. Nagiligari, J. Shah, **Z. Sha**, S. K. Thirugnanam, A. Jain, and J. H. Panchal, "Integrated Part Classification for Product Cost and Complexity Reduction", *ASME 2014 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Buffalo, NY, 2014.
- C21. **Z. Sha**, J. H. Panchal, "Estimating the Node-Level Behaviors In Complex Networks from Structural Datasets", *ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Portland, OR, 2013. (**ASME Robert E. Fulton SEIKM Best Paper Award**).
- C22. B. Hawthorne, **Z. Sha**, J. H. Panchal and M. Farrokh, "Developing Competencies for the 21st Century Engineer", *10th International Conference on Design Education in ASME 2012 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Chicago, IL, 2012.
- C23. **Z. Sha**, Q. Le, and J. H. Panchal, "Using SysML for Conceptual Representation of Agent-based Models", *ASME 2011 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Washington D.C., 2011.
- C24. **Z. Sha**, G. Ameta, "Life-cycle Assessment of An Electric Rice Cooker: A Case Study", *ASME 2011 International Mechanical Engineering Congress and Exposition*, Denver, CO, 2011.

- C25. J. Xie, S. Zhao, **Z. Sha**, and J. Liang, “Position Servo Control of the Slider in Double Toggle Mechanical Press Using Bezier Curve Model and Fuzzy Control”, *IEEE 2011 International Conference on Automation Science and Engineering*, Trieste, Italy, 2011. doi: 10.1109/CASE.2011.6042424.
- C26. J. Xie, S. Zhao, **Z. Sha**, and J. Liang, “An Online Adaptive Fast Control Approach Based on Local Linearization and Its Application to a Large Inertia System”, *2011 ASME Annual Dynamic Systems and Control conference*, Arlington, VA, 2011.
- C27. J. Xie, S. Zhao, **Z. Sha**, and J. Liang, “Hybrid Control Using Sampling PI and Fuzzy Control Methods for Large Inertia and Time Delay System”, *Lecture Notes in Electrical Engineering*, volume 100, pp. 387-393, proceedings of *International Conference on Electric and Electronics*, Nanchang, China. 2011.
- C28. J. Xie, S. Zhao, **Z. Sha**, and J. Liang, “Slider Position Servo Control of the Double Toggle Mechanical Press Directly Driven by Transverse Flux Machine”, *Advanced Materials Research*, volume 201, pp. 2360-2365, proceedings of the *International Conference on Manufacturing Science and Engineering*, Guilin, China, 2011.
- C29. J. Xie, S. Zhao, **Z. Sha**, and J. Liang, “Optimum Design of Toggle Transmission System in Double Toggle Mechanical Press Using Response Surface Methodology Combined with Experimental Design”, *Applied Mechanics and Materials*, volume 86, pp. 858-862, 2011.
- C30. G. Yan, S. Zhao and **Z. Sha**, “Parameters Optimization of Semisolid Diecasting Process for Air-Conditioner Triple Valve in HPb59-1 Alloy”, *Advanced Materials Research*, volume 129-131, pp. 936-941, 2010.

Abstract, Posters and Reports

- A1. L. Poudel, W. Zhou, **Z. Sha**, “Swarm 3D Printing and Assembly for Autonomous Manufacturing”, NSF Research Poster Competition, *The International Mechanical Engineering Congress and Exposition (IMECE)*, Salt Lake City, UT, Nov. 8-14, 2019. *Poster*.
- A2. M. Rahman, **Z. Sha**, “Towards Building an AI-Integrated Computer-Aided Design Platform for Design Research”, NSF Research Poster Competition, *The International Mechanical Engineering Congress and Exposition (IMECE)*, Salt Lake City, UT, Nov. 8-14, 2019. *Poster*.
- A3. L. Poudel, W. Zhou, **Z. Sha**, “A Computational Framework to Cooperative 3D Printing Schedule”, ASME-CIE Graduate Research Poster Competition, *ASME 2019 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Anaheim, CA, Aug. 18-21, 2019. *Poster*.
- A4. **Z. Sha**, L. Godfrey, M. Gashler, “Modeling Sequential Design Decisions Using Fine-Grained Empirical Data”, *2018 Design Science Research (DSR) Workshop*, Montreal, Canada, August 23-25, 2018. *Peer-reviewed extended abstract*.
- A5. **Z. Sha**, Q. Li, “An Integrated Game-Theoretic Framework for Secure Strategies Development against Insider Threat in Power Systems”, Industry Aboard Meeting, Cybersecurity Center for Secure Evolvable Energy Delivery Systems (SEEDS), Department of Energy, April 18-20, Fayetteville, AR. *Poster*.
- A6. L. Poudel, W. Zhou, **Z. Sha**, “Towards Autonomous Digital Additive Manufacturing (ADAM)”, *ASME 2018 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Quebec City, Canada. 2018. *Abstract and Video Presentation*.

- A7. M. Wang, **Z. Sha**, Y. Huang, S. J. Fu, Y. Fu, N. Contractor, W. Chen, “Data-Driven Vehicle Preference Modeling and Prediction: A Multidimensional Network Analysis Approach”, the 7th *International Conference on Collaborative Innovation Networks (COINs17)*, Detroit, MI. 2017. *Extended abstract*.
- A8. **Z. Sha**, M. Wang, Y. Huang, N. Contractor, Y. Fu, W. Chen, “Forecasting Technological Impacts on Customers’ Co-consideration Behaviors – A network-based framework to analyze the impact of new technologies on the vehicle market”, The 7th *International Conference on Design Computing and Cognition (DCC’16)*, Evanston, IL. 2016. *Extended abstract*.
- A9. **Z. Sha.**, K. Moolchandani, J. H. Panchal, D. DeLaurentis, "Modeling Airlines Decisions On Route Selection Using Discrete Choice Models - Data and Supplementary Materials", *Purdue University Research Repository*, 2015. doi:10.4231/R74747TG. *Report*.
- A10. **Z. Sha**, J. H. Panchal, “A Decision-centric Framework for Design and Modeling of Complex Evolutionary Systems”, ASME-CIE Graduate Research Poster Session, the 33rd *Computers and Information in Engineering Conference*, Portland, OR, Aug. 2013. *Poster*.
- A11. **Z. Sha**, J. H. Panchal, “Extracting and Executing Agent-based Models from SysML representations”, ASME-CIE Graduate Research Poster Session, the 31st *Computers and Information in Engineering Conference*, Washington D.C., Aug. 2011. *Poster*.

Grants

Research

Extramural grants (Total: \$2,683,318; PI contributions: \$2,608,366; co-PI contributions: \$74,952):

1. **“Educating Generative Designers in Engineering”**, National Science Foundation, 10/2019 – 09/2023. *Total: \$2,180,230. PI.*
2. **“SmartCAD: Guiding Engineering Design with Science Simulations” (continuation)**, National Science Foundation, subcontracted from The Concord Consortium, 10/2019 – 05/2020. *Total: \$108,629. PI of UA.*
3. **“SBIR Phase I: Swarm 3D Printing and Assembly for Autonomous Manufacturing”**, National Science Foundation, subcontracted from AMBOTs Inc., 07/2019 – 06/2020. *Total: \$74,925. Co-PI of UA.*
4. **“SmartCAD: Guiding Engineering Design with Science Simulations”**, National Science Foundation, subcontracted from The Concord Consortium, 04/2019 – 09/2019. *Total: \$94,534. PI of UA.*
5. **“EAGER: A Fine-Grained Data-Driven Approach to Studying Sequential Decision-Making in Engineering Systems Design”**, National Science Foundation, 09/2018 – 08/2020. *Total: \$225,000. PI.*

Internal grants (Total: \$117,669; PI contributions: \$43,198; co-PI contributions: \$74,471):

6. **“12th Annual FEP Honors Research Experience”**, First-Year Engineering Program, University of Arkansas. 08/2019 – 04/2020. *Total: \$1,000. Faculty mentor.*
7. **“A Swarm Printing and Assembly Platform”**, The Chancellor’s Commercialization Fund, Walton Family Charitable Support Foundation, University of Arkansas Office of Economic Development, 06/2019 – 06/2020. *Total: \$49,670. Co-PI.*
8. **“Customer Choice Modeling for Electric Vehicle Design: A Comparative Study”**, The Office of the Vice Provost for Research and Innovation, University of Arkansas. *Total: \$12,000. PI.*
9. **“Design of Artificial Swarms Using Network Motifs: A Simulation Study”**, Honors College Research Grant, 01/2019 – 05/2019. *Total: \$2,250. PI.*
10. **“11th Annual FEP Honors Research Experience”**, First-Year Engineering Program, University of Arkansas. 08/2018 – 04/2019. *Total: \$1,000. Faculty mentor.*

11. **“Enabling Large-Scale Network Analysis in Complex Systems Design”**, Engineering Research and Innovation Seed Funding Program (ERISF), College of Engineering, University of Arkansas, 07/2018 – 06/2019. *Total: \$24,801. Co-PI.*
12. **“Mining and Modeling Engineering Design Thinking Using Big Data Analytics”**, Engineering Research and Innovation Seed Funding Program (ERISF), College of Engineering, University of Arkansas, 06/2017 – 07/2018. *Total: \$24,948. PI.*
13. **“A Data-Driven Game-Theoretic Approach to Modeling Multi-Competitor Decision Making in Engineering Design”**, Provost’s Collaborative Research Grant, University of Arkansas, 11/2017 – 07/2018. *Total: \$2,000. PI.*

Teaching and Events (Total: \$30,650)

1. **“ASME Annual Hackathon”**, Technical Events & Content Sector, American Society of Mechanical Engineering, 07/2019 – 06/2020. *Total: \$27,650. PI.*
2. **“Adopting Open Educational Resources in MEEG 4104 – Machine Element Design”**, Open Education Resources (OER) Grant, the University of Arkansas Libraries and the Global Campus, 05/2017 – 12/2017. *Total: \$3,000. PI.*

Travel (Total: \$3,945)

1. **ORAU Travel Grants**, awarded by Oak Ridge Associated Universities (ORAU), 2017. *Total: \$800.*
2. **University of Arkansas Travel Assistance Grant**, awarded by Vice Provost for Faculty Development and Enhancement, University of Arkansas, 2017. *Total: \$500.*
3. **Purdue COE Conference Travel Grant** for excellent Ph.D. candidate, awarded by College of Engineering (COE), Purdue, 2014. *Total: \$500.*
4. **ASME CIE Travel Grant**, awarded by ASME Computers & Information in Engineering (CIE) division, 2013. *Total: \$750.*
5. **PGSG Travel Grant**, awarded by Purdue Graduate Student Government (PGSG), 2013. *Total: \$880.*
6. **DSCC Travel Grant**, awarded by ASME Dynamic System and Control Conference (DSCC), 2011. *Total: \$225.*
7. **GPSA Travel Grant**, awarded by Graduate and Professional Student Association (GPSA) at Washington State University, 2011. *Total: \$290.*

Technical Committee Services and Conference Organizers

1. *Program committee member*, “DCC 20 Workshop: Accelerating Design with Human-Machine Teaming”, Atlanta, GA, June 27-28, 2020.
2. *Advisory board member*, The Ninth International Conference On Design Computing and Cognition (DCC 20), Atlanta, GA, June 27-28, 2020.
3. *Chair of the Organizing Committee*, “ASME Annual Hackathon”, at the 40th Computers and Information in Engineering Conference (CIE), 2020.
4. *Award Chair*, American Society of Mechanical Engineering, Computer and Information in Engineering Division, Systems Engineering, Information and Knowledge Management Technical Committee, 2019 – Present.
5. *Panel Organizer*, “SEIKM Panel: The recent advances and future direction of model-based systems engineering”, at the 39th Computers and Information in Engineering Conference (CIE), 2019.
6. *Symposium Organizer*, “Human Behavior in Design”, DTM-6, at the 31st International Conference on Design Theory and Methodology (DTM), 2019.

7. *Chair*, American Society of Mechanical Engineering, Computer and Information in Engineering Division, Systems Engineering, Information and Knowledge Management Technical Committee, 2018 – 2019.
8. *Symposium Organizer*, “Systems Engineering Information Knowledge Management (SEIKM)”, CIE-4, at 39th Computers and Information in Engineering Conference (CIE), 2019.
9. *Symposium Organizer*, “SEIKM: Design Informatics”, CIE-15, at 39th Computers and Information in Engineering Conference (CIE), 2019.
10. *Symposium Organizer*, “SEIKM: Complex Systems Engineering and Design”, CIE-19, at 39th Computers and Information in Engineering Conference (CIE), 2019.
11. *Program Committee Member*, the 33rd AAAI Conference on Artificial Intelligence, January 27 - February 1, Honolulu, Hawaii. 2018
12. *Program Chair*, American Society of Mechanical Engineering, Computer and Information in Engineering Division, Systems Engineering, Information and Knowledge Management Technical Committee, 2017 – 2018.
13. *Program Committee Member*, Design Science Research (DSR) 2018, Workshop on Data Driven Design and Learning, August 23-25, 2018, Montreal, Canada.
14. *Symposium Organizer*, “SEIKM: Design Informatics”, CIE-2-13 at 38th Computers and Information in Engineering Conference (CIE), 2018.
15. *Symposium Co-Organizer*, “SEIKM: Design of Complex Systems”, CIE-2-17 at 38th Computers and Information in Engineering Conference (CIE), 2018.
16. *Symposium Co-Organizer*, “Systems Engineering Information Knowledge Management (SEIKM General)”, CIE-2-12 at 38th Computers and Information in Engineering Conference (CIE), 2018.
17. *Symposium Organizer*, “Evaluations and Assessment in Design Education”, DEC-4 at 14th International Conference on Design Education (DEC), 2017.
18. *Co-Organizer*, “Lab Experiments on Individual and Interactive Decision Making in Design” workshop at the 37th Computers and Information in Engineering (CIE) Conference, 2017.
19. *Conference Coordinator and Student Affair Leader*, 7th International Conference on Design Computing and Cognition (DCC), 2016.

Invited Talks

1. “Educating Designers for Generative Engineering”, online presentation invited by the Dean of College of Science, Technology, Engineering & Mathematics, University of Arkansas - Fort Smith, Feb. 28th, 2019.
2. “Modeling Sequential Decision-Making Behaviors in Engineering System Design”, invited by Dr. Charles Xie, The Concord Consortium, Concord, MA, Aug. 3rd, 2018.
3. “The Decision-Centric Foundations for Complex Systems Engineering and Design”, invited by The Intelligence System Laboratory, University of Central Florida, Orlando, FL, Sep. 16th, 2017.
4. “Lab Experiments on Individual and Interactive Decision Making in Design – Introduction to Three Human-Subject Experiments”, Workshop 4, the ASME 2017 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, Cleveland, Ohio, Aug. 6th, 2017.
5. “Modeling Stakeholders’ Decision-Making in Support of Complex Systems Design”, at the Department of Industrial Engineering, University of Arkansas, Fayetteville, AR, Apr. 28th, 2017.
6. “Behavioral Experimentation and Game Theory in Engineering Systems Design”, at the Games for Design Research and Education Workshop at the 7th International Conference on Design Computing and Cognition, June 25th, 2016.
7. “Decision-Centric Foundations for Complex Systems Engineering and Design”, at the Department of Mechanical Engineering, University of Arkansas, Fayetteville, AR, Feb. 26th, 2016.
8. “Decision-Centric Foundations for Complex Systems Engineering and Design”, at the Department of Mechanical Engineering, Northwestern University, Evanston, IL, Oct. 7th, 2015.

9. “Bottom-up Engineering and Design of Complex Systems”, at the New England Complex Systems Institute, Boston, MA, Sep. 16th, 2015.

Teaching

University of Arkansas

- **Graduate Level**
MEEG 591V: Decision-Making in Complex Systems Design (1x in Fall 2019)
- **Undergraduate Level**
MEEG 4103: Machine Element Design (1x in Spring 2020)
MEEG 491V: Special topics on Machine Element Design (1x in Spring 2020)
MEEG 4104: Machine Element Design (6x from Spring 2017 – Fall 2019)
- **Guest Lecturer**
MEEG2103: Introduction to Machine Analysis (1 lecture in Fall 2017)

Purdue University

- **Teaching Assistant and Lab Instructor**
ME475: Automatic Control System (Fall 2014)
- **Guest Lecturer**
ME597: Decision Making in Engineering Systems Design (1 lecture Fall 2014)

Students Advised/In-progress

PhD

- *Molla H. Rahman* (08/2017 - present): “Modeling and Predicting Human Sequential Decision-Making in Engineering Design”.
- *Laxmi P. Poudel* (08/2017 - present): “Swarm 3D Printing: Transforming the Fused Filament Fabrication Using Cooperative-Printing Robots”.
- *Xingang Li* (08/2019 – present): “Deep Learning for Generative Design”.
- *Yinshuang Xiao* (08/2019-present): “From Local to Global: Discover the Build Blocks Governing Complex System Structures and Performance Using Complex Network Theories”.

MS

- *Sree Chintalapudi* (08/2017 – 12/2018): “Analyzing Customer Preferences in Community-based Digital Manufacturing System”. Non-thesis research assistant.
- *Jared Poe* (01/2020 – present): “Design of Autonomous Infrared Imaging System”. Thesis MS.

BS

- *Kelab Porter* (05/2017 – 10/2017): “Game Theory and Behavioral Experimentation in Engineering Design”.
- *Chandler Bair* (05/2017 – 05/2018): “Coordinating Swarm 3D Printing Robots with Heuristics”.
- *Khoinguyen Trinh* (04/2018 – 05/2019): “Analyzing Swarming System Dynamics Based on Network Motif Theory”, **Honor Thesis**.
- *Collin Corcoran* (04/2018 – 05/2019): “A Study on Customer Choice behaviors on 3DHubs Using Fixed-Effect and Random-Effect Models”.
- *Eindra Nwe* (04/2018 – 03/2019): “Game-Theoretic Analysis of Insider Threat in Power Systems”.
- *Saivipulreja Elagandula and Logan Davis* (08/2018 – Present): “Uncertainty Quantification in the Design of Artificial Swarming Systems”, **FEP Honor Research Experience**.

- *Anusha Bhattacharyya* (08/2019 – Present): “Integrating Heuristics in the Molding of Human Sequential Decision-Making in Engineering Design”, **FEP Honor Research Experience**.

Senior Design Team

- *Madison Whitby Adrian Ferruffino, Nicholas Myers, Tyler Jehle, Dakota Keys*, “Design of A Bolt-on Device for Health Monitoring and Prognostic of Conveyor Systems”, Sponsor: Tyson Foods, Inc. 2017 – 2018.
- *Macario Blyden, Colby Breithaupt, Tucker Brown, Eindra New, William Woodward*, “Tyson Package Sorting”, Sponsor: Tyson Foods, Inc. 2019 – 2020.
- *Kara Puntriano, Kelsey Nagel, Christian Lowery, Jake Petersen*, “Scott Family Amazeum Exhibit Design Project”, Sponsor: Scott Family Amazeum, 2019-2020.

Exchange Scholar

- *Bofan Yang* (06/2018 – 08/2018), “Investigating the Tensile Strength of Parts Fabricated by Cooperative 3D Printers”.

Thesis/Dissertation Committee

PhD Dissertation

- *Charlie DeStefano*, “A Study of Fault Adaptive Strategies for Manufacturing Robots”, University of Arkansas. May 2019.
- *Yu Jin*, “Geometric Quality Inspection of Additive Manufacturing”, University of Arkansas.
- *Wei Du*, “Fairness Aware Federated Learning”, University of Arkansas.

MS Thesis

- *Jonathan Ashley*, “The Effect of Incorporating End-User Customization into Additive Manufacturing Designs”, Dec. 2018, University of Arkansas.
- *Marvin Arroyo Rujano*, “A Generative Statistical Approach for Data Classification in a Biologically Inspired Design Tool”, Dec. 2018, University of Arkansas.

BS Honor Thesis

- *Jacob Brown*, “Baseline Data from Servo Motors in a Robotic Arm for Autonomous Machine Fault Diagnosis”, May 2018, University of Arkansas.
- *Khoinguyen Trinh*, “Analyzing Swarming System Dynamics Based on Complex Network Theory”, May 2019, University of Arkansas.

Other Services

Reviewer

Journals

1. Journal of Mechanical Design, ASME Transaction
2. Journal for Computing and Information Science in Engineering, ASME Transaction
3. Design Science
4. Systems Engineering
5. IIE Transactions
6. Artificial Intelligence for Engineering Design, Analysis and Manufacturing
7. Journal of Operational Research Society
8. Research in Transportation Economics
9. IEEE System, Man and Cybernetics – Systems

10. IEEE Transaction on Automation Science and Engineering
11. Structural and Multidisciplinary Optimization
12. Robotics and Computer-Integrated Manufacturing

International Conferences

1. AAAI Conference on Artificial Intelligence
2. ASME Computers and Information in Engineering Conference
3. Design Computing and Cognition Conference
4. Design Automation Conference
5. Conference on Systems Engineering Research
6. International Conference on Design Theory and Methodology
7. IEEE International Conference on Automation Science and Engineering
8. ASME International Mechanical Engineering Congress & Exposition
9. International Tools and Methods of Competitive Engineering Symposium

Proposals

1. Honors College Research Grant proposal, Honor College, University of Arkansas, 2018 and 2019.
2. The Student Undergraduate Research Fellowship Program, Arkansas Department of Higher Education, 2018.
3. Book proposal: "Optimization Techniques", Author: Vikrant Sharma, Editorial Assistant: Shikha Garg, CRC Press, Taylor & Francis Group, 2019.

External/Internal Mentor and Judges

1. *Mentor*, 2020 ASME-CIE Hackathon: Identifying, Extracting, Analyzing of Value from Large Unstructured Data Sets in Mechanical Engineering, St. Louis, MO. Aug. 15-16, 2020.
2. *Facilitator*, 2019 NSF workshop for Engineering Design and Systems Engineering Program: Positioning EDSE Research for Sustained Societal Impact, Purdue University, Oct. 7-8, 2019.
3. *Facilitator*, Engineering Summer Academy (ESA), Outreach and Summer Programs, College of Engineering, University of Arkansas, summer 2018 and summer 2019.
4. *Mentor*, 2018-2019 First-year Engineering Program (FEP), Honors Research Experience, College of Engineering, University of Arkansas.
5. *Judge*, ASME CIE Graduate Student Poster Competition, at 39th Computers and Information in Engineering Conference (CIE), 2019.
6. *Judge*, Student Poster Competition of NSF-Sponsored Project, at ASME 2018 International Mechanical Engineering Congress & Exposition, 2018.
7. *Judge*, Next Generation Mobility Challenge, Net Impact, Toyota Mobility Foundation, 2016.

Departmental Committee Services

1. *Member*, System Dynamics and Controls Committee, Department of Mechanical Engineering, University of Arkansas, 2019 - Present.
2. *Member and Co-Chair*, Design and Manufacturing Committee, Department of Mechanical Engineering, University of Arkansas, 2017 - Present.
3. *Committee member*, Tenure Track Assistant Professor Search Committee, Department of Mechanical Engineering, University of Arkansas, Fall 2017 – Spring 2018.

Professional Affiliations

1. *Member*, American Society of Mechanical Engineers (ASME)
2. *Member*, American Society of Engineering Education (ASEE)
3. *Member*, Network Science Society
4. *Member*, Golden Key International Honor Society, since 2013