

Xiao Zhang

CONTACT

Department of Industrial & Manufacturing Systems Engineering
1117 Black Engineering Building, 2529 Union Drive
College of Engineering
Iowa State University, Ames, IA, 50010-2030
Email: xiao1@iastate.edu

EDUCATION

Iowa State University, Ames, IA

Ph.D. of Industrial Engineering - Expected Graduation Time Spring 2021, GPA 3.77

Wuhan University of Technology, Wuhan, China - 2015

M.S. of Material Science Engineering

Wuhan University of Technology, Wuhan, China - 2012

B. E. of Material Modeling & Control Engineering

Wuhan University, Wuhan, China - 2012

B. B. A of Business Administration

HONORS & AWARDS

- **First Place Winner of the DAIS Division Web/Mobile App Competition 2020 IISE Annual Conference**, Virtual Conference, November 2020
- **The American Society for Nondestructive Testing (ASNT) Fellowship Award** at Iowa State University, July 2020
- **George Lamp Jr. Graduate Student Teaching Excellence Award** at Iowa State University, June 2020
- **Teaching Excellence Award (TEX)** at Iowa State University, June 2020
- **Runner Up Poster Presentation Award of Nano@IAState**, Ames Lab & Iowa State University, August 2019
- **IMSE Research Symposium: Best Overall Award** (graduate student mentor), 2019-2020
- **NSF Travel Award Winner** of the 47th North American Manufacturing Research Conference, April 2019
- **NSF Travel Award Winner** of 2018 Annual International Solid Freeform Fabrication Symposium, August 2018
- **National Scholarship**, Wuhan University of Technology, 2013 – 2015
- **University Scholarship**, Wuhan University of Technology, 2009 – 2011

INSTRUCTION AND TEACHING

Iowa State University

- **IE 348 Solidification Processes (Fall 2020)**

Theory and applications related to metal casting, welding, polymer processing, powder metallurgy, and composites manufacturing, and related rapid manufacturing processes.

- **IE 248 Engineering System Design, Manufacturing Processes & Specifications (Fall 2018, Fall 2019)**

Introduction to metrology, engineering drawings, and specifications. Engineering methods for designing and improving systems. Theory, applications, and quality issues related to machining processes.

- **ENG 160 Engineering Fundamentals & Problem Solving (Spring 2018)**

Solving engineering problems and presenting solutions through technical reports. Significant figures. Use of SI units. Graphing and curve-fitting. Flowcharting. Introduction to mechanics, statistics, and engineering economics. Use of spreadsheet programs to solve and present engineering problems. Solution of engineering problems using computer programming languages. (The honors section includes application of programming to mobile robotics).

- **Graduate Student Mentor, Summer Program for Interdisciplinary Research and Education – Emerging Interface Technologies (SPIRE-EIT) (2019 Summer)**

JOURNAL PUBLICATIONS

Process monitoring of electrohydrodynamic inkjet printing

1. **X. Zhang**, B. Lies, H. Lyu, and H. Qin*, “In-situ monitoring of electrohydrodynamic inkjet printing via scalar diffraction for printed droplets”, *Journal of Manufacturing Systems*. Volume 53 (2019): 1-10. <https://doi.org/10.1016/j.jmsy.2019.08.001>
2. R. Singh, **X. Zhang**, Y. Chen, J. Zheng, and H. Qin*, “In-situ Real-time Characterization of Micro Filaments in Electrohydrodynamic Inkjet Printing Using Machine Vision”, *Procedia Manufacturing* (2018). <https://doi.org/10.1016/j.promfg.2018.10.011>
3. H. Qin, **X. Zhang**, R. Singh, Z. Zhang, Y. Chen, “In-process monitoring of electrohydrodynamic inkjet printing using machine vision”, *AIP Conference Proceedings*, 2102 (1), 070008, <https://aip.scitation.org/doi/abs/10.1063/1.5099808>
4. **X. Zhang**, Y. Cai, R. Sigh, B. Li, S. Ravi-Kumar, Y. Chen, H. Qin*, “Toward the digital twin in electrohydrodynamic inkjet printing: in-situ real-time monitoring of micro-filaments via machine vision”, Under Review at *Robotics and Computer-Integrated Manufacturing*.

Micro/nano-scale e-jet printing of new materials

5. L. Jiang, Y. Huang, **X. Zhang**, H. Qin, “Electrohydrodynamic inkjet printing of Polydimethylsiloxane (PDMS)”, *Procedia Manufacturing*, 48 (2020): 90-94. <https://doi.org/10.1016/j.promfg.2020.05.024>
6. H. Lyu, **X. Zhang**, F. Liu, Y. Huang, S. Jiang, and H. Qin*, “Fabrication of micro-scale radiation shielding structures using tungsten nanoink through electrohydrodynamic inkjet printing”, *Journal of Micromechanics and Microengineering (JMM)*. 29 (2019): 115004, . <https://doi.org/10.1088/1361-6439/ab3b26>
7. **X. Zhang**, Z. Zhang, H. Lyu, and H. Qin*, “X-ray characterization of functional silver microstructures via electrohydrodynamic inkjet printing”, Under Review at *The International Journal of Advanced Manufacturing Technology*.

Micro/nano-scale laser ablation of materials

8. S. Ravi-Kumar, B. Lies, **X. Zhang**, H. Lyu, and H. Qin*, “Laser Ablation of Polymers: A Review.” *Polymer International*. 68.8 (2019): 1391-1401. <https://doi.org/10.1002/PI.5834>
9. S. Ravi-Kumar, **X. Zhang**, B. Lies, L. Jiang, and H. Qin*, “An area-depth approximation model of micro-drilling on high-density polyethylene (HDPE) soft films using pulsed laser

ablation”, ASME-Journal of Micro- and Nano-Manufacturing, Available online October 1, 2019. <https://doi.org/10.1115/1.4045331>

Non-contact measurement of additive manufactured parts

10. **X. Zhang**, V. Suresh, Y. Zheng, S. Wang, Q. Li, H. Lyu, B. Li, H. Qin, “Surface Roughness Measurement of Additive Manufactured Parts Using Focus Variation Microscopy and Structured Light System”, ASME 2019 Conference, MSEC2019-2874, V001T01A029, <https://doi.org/10.1115/MSEC2019-2874>
11. Y. Zheng, **X. Zhang**, S. Wang, Q. Li, H. Qin*, and B. Li*, “Similarity Evaluation of Topography Measurement Results by Different Optical Metrology Technologies for Additive Manufactured Parts”, Optics and Lasers in Engineering 126 (2020): 105920. <https://doi.org/10.1016/j.optlaseng.2019.105920>
12. **X. Zhang**, Y. Zheng, S. Wang, Q. Li, B. Li*, and H. Qin*, “Correlation Approach for 3D Surface Measurement Data of Additive Manufactured Parts Based on Optical Metrology”, Journal of Manufacturing Processes, 53 (2020): 310-317. <https://doi.org/10.1016/j.jmapro.2020.02.037>
13. V. Suresh, Y. Zheng, **X. Zhang**, S. Wang, H. Qin, Q. Li, and B. Li, “Similarity evaluation of 3D topological measurement results using statistical methods”, Dimensional Optical Metrology and Inspection for Practical Applications IX, April 2020, Vol. 11397, p. 113970A. International Society for Optics and Photonics. <https://doi.org/10.1117/12.2557627>
14. S. Wang, **X. Zhang**, Y. Zheng, B. Li, H. Qin, and Q. Li, “Similarity Evaluation of 3D Surface Topography Measurement in Additive Manufacturing”, Under Review at Additive Manufacturing.

3D printing application in food science and civil engineering field

15. K. Manikandan, K. Wi, **X. Zhang**, A. Chen, K. Wang, and H. Qin*, “Characterizing cement mixtures for concrete 3D printing”, Manufacturing Letters, 24 (2020): 33-37. <https://doi.org/10.1016/j.mfglet.2020.03.002>
16. B. Melugiri-Shankaramurthy, Y. Sargam, **X. Zhang**, W. Sun, K. Wang, and H. Qin*, “Evaluation of Cement Paste Containing Recycled Stainless Steel Powder for Sustainable Additive Manufacturing.” Journal of Construction and Building Materials. 227 (2019). <https://doi.org/10.1016/j.conbuildmat.2019.116696>
17. P. Polamapilly, Y. Cheng, X. Shi, K. Manikandan, **X. Zhang**, G.E. Kremer, H. Qin*, “3D printing and characterization of hydroxypropyl methylcellulose and methylcellulose for biodegradable support structures”, Polymer, 173 (2019): 119-126, ISSN 0032-3861. <https://doi.org/10.1016/j.polymer.2019.04.013>
18. Z. Li, **X. Zhang**, B. Li, and H. Qin*, “Nonlinear consideration of the in-plane buckling analysis of the confined functionally graded porous arches with nanocomposites reinforcement subjected to radially-directed uniform loading”, Under Review at Composites Part B: Engineering.

CONFERENCE PUBLICATIONS AND PRESENTATIONS

1. **X. Zhang**, H. Qin, “Effects of Geometric Variations on Mechanical Properties of Bioscaffolds for Bone Regeneration”, IISE Annual Conference & Expo 2018 (IISE 2018), Orlando, FL, May 18-21, 2018.
2. **X. Zhang**, H. Qin, “In-situ Quality Inspection for Micro/Nano Scale Additive Manufacturing System Based on Electrohydrodynamic Inkjet Printing Using Machine

- Vision”, IISE Annual Conference & Expo 2018 (IISE 2018), Orlando, FL, May 18-21, 2018.
3. R. Singh, **X. Zhang**, H. Qin, “Machine Vision Assisted Micro-filament Detection for Real-time Monitoring of E-jet Printing”, The 28th International Conference on Flexible Automation and Intelligent Manufacturing (FAIM 2018), Columbus, OH, June 10-14, 2018.
 4. B. Lies, **X. Zhang**, H. Qin, “Machine vision assisted micro-filament detection for real-time monitoring of electrohydrodynamic inkjet printing”, The 46th North American Manufacturing Research Conference (NAMRC 46), Texas A&M, College Station, TX, June 18-22, 2018.
 5. **X. Zhang**, I.V. Rivero, H. Qin, “Low-cost Bio-printer Gantry Design and Prototyping Process Control for Future Medical Application”, Solid Freeform Fabrication (SFF) 2018 conference, Austin, TX, August 2018.
 6. **X. Zhang**, H. Qin, “Surface Roughness Measurement of AM Parts Using Focus Variation and Structured Light System”, 2nd Midwest Statistical Machine Learning Colloquium, May 12, 2019.
 7. **X. Zhang**, O.K. Gul, H. Qin, “3D Printing and Characterization of Cellulose Derivatives for Biodegradable Support Structures”, IISE Annual Conference & Expo 2019 (IISE 2019), Orlando, FL, May 18-21, 2019.
 8. **X. Zhang**, Y. Cai, H. Qin, “A Low-Cost On-Board Sensing Device For Road Surface Condition Assessment”, IISE Annual Conference & Expo 2019 (IISE 2019), Orlando, FL, May 18-21, 2019.
 9. **X. Zhang**, Y. Zheng, B. Li, H. Qin, “Surface Roughness Measurement using Structured Light System and Focus Variation System”, ASME – Manufacturing Science and Engineering Conference (MSEC 2019), Erie PA, June 2019.
 10. **X. Zhang**, H. Qin, “Laser Ablation: a Review”, the 47 North American Research Conference (NAMRC 47), Erie PA, June 2019.
 11. **X. Zhang**, L. Jiang, H. Qin, finalist (final four) of IISE 2020 annual conference: Data Analytics and Information Systems (DAIS) Division_IISE-DAIS Mobile/Web App Competition

PATENTS:

1. H. Lyu, **X. Zhang**, and H. Qin*, “A novel design of an optical system for in-situ real-time monitoring of micro/nano scale inkjet printing.” in National Intellectual Property Administration (CNIPA, Chinese Patent Office, Patent #: 201910207498), and Under Review at Iowa State University Office of Intellectual Property and Technology Transfer Office (ISURF 04946).
2. H. Lyu, **X. Zhang**, F. Liu, Y. Huang, S. Jiang, and H. Qin*, “A novel tungsten nanoink for inkjet printing and its synthesis method”, in National Intellectual Property Administration (CNIPA, Chinese Patent Office, Patent #: CN201910400624), and Under Review at Iowa State University Office of Intellectual Property and Technology Transfer Office (ISURF 04952).
3. H. Lyu, X. Wang, S. Zhang, **X. Zhang**, H. Qin*, “A novel method to manufacturing flexible random laser using graphene-based on electrohydrodynamic inkjet printing” in National Intellectual Property Administration (CNIPA, Chinese Patent Office, Patent #: 201910398268).

4. L. Jiang, **X. Zhang**, Y. Cai, and H. Qin, “Virtual reality app to teach fundamental manufacturing laboratories”, Under Review at Iowa State University Office of Intellectual Property and Technology Transfer Office (ISURF 05117).

RESEARCH FIELDS

- Hybrid additive manufacturing and prototyping
- Electrohydrodynamic Ink-Jet Printing of micro/nano flexible electronics
- Direct energy deposition (metal additive printing)
- Bio-printing, food printing, concrete printing

MEMBERSHIP

- Institute of Industrial and Systems Engineers (IISE)
- Society of Manufacturing Engineers (SME)
- American Society of Mechanical Engineers (ASME)
- American Society for Nondestructive Testing (ASNT)
- Institute of Electrical and Electronics Engineers (IEEE)

SERVICE TO COMMUNITY

- American Society for Nondestructive Testing (ASNT) Iowa Section Chair Secretary (July 1 2019 – June 30 2021)

PROJECT EXPERIENCE

RESEARCH EXPERIENCE

Research Assistant, Industrial & Manufacturing Systems Engineering Department, Iowa State University **December 2017 – Current**

- DED funded project: In-situ Nondestructive Evaluation of In-flight Particle Dynamics and Intrinsic Properties for Thermal Spray Repairs
- DOT funded project: Feasibility Study of 3D Printing of Concrete for Transportation Infrastructures
- Funded project: Investigation of Correlations behind Point Cloud Data between Structure Light Scanning System and Depth from Defocus System for Surface Roughness Analysis
- Funded project: An Origami Structural Design for Pipeline Rehabilitation
- Funded project: Integrating Online Modules and Virtual Reality into Teaching of Hands-On Manufacturing Courses
- Funded project: Engineering-LAS Learning Development: Engineering-LAS Online (ELO) Course of IE 248 Engineering System Design, Manufacturing Processes and Specifications