

Xiao Zhang

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EDUCATION

Iowa State University, Ames, IA

- Ph.D. of Industrial Engineering - Expected Graduation Time 2020, GPA 3.7

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

RESEARCH LABORATORY & FIELDS

- Flexible Electronics and Additive Printing (FEAP) Laboratory
 - www.imse.iastate.edu/feap
- Hybrid additive manufacturing and prototyping
- Electrohydrodynamic Ink-Jet Printing of micro/nano flexible electronics
- Laser diffraction technique, laser ablation technique, machine vision
- Bio-printing, food printing, concrete printing

PROJECT EXPERIENCE

RESEARCH EXPERIENCE

American Society for Nondestructive Testing (ASNT) Iowa Section Chair Secretary (July 1, 2019 – June 30, 2020)

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

- Designed an in-situ monitoring machine vision system to detect micro-filaments for electrohydrodynamic ink-jet printing
- Printed support structures with hydroxypropyl methylcellulose and methylcellulose which is eatable and biodegradable food material
- Reviewed laser ablation mechanism on different polymer materials

- Designed in-situ monitoring of electrohydrodynamic inkjet printing system via scalar diffraction for printed droplets
- Fabricated micro-scale radiation shielding structures using tungsten nanoink through electrohydrodynamic inkjet printing

FEAP lab manager, Industrial & Manufacturing Systems Engineering Department, Iowa State University
March 2018 – Current

- Evaluated cement paste containing recycled stainless steel powder for sustainable additive manufacturing
- Simulated an area-depth approximation model of micro-drilling on high-density polyethylene (HDPE) soft films using pulsed laser ablation
- Developed correlation Approach for 3D Surface Measurement Data of Additive Manufactured Parts Based on Optical Metrology
- Fabricated silver microstructures via electrohydrodynamic jet printing as customizable X-ray marker in bio-scaffold for biomedical diagnostic medical imaging
- Analyzed the in-plane buckling analysis of the confined functionally graded porous arches with nanocomposites reinforcement subjected to radially-directed uniform loading

WORK EXPERIENCE

Equipment Engineer, Semiconductor Manufacturing Incorporation (SMIC), Shanghai, China
January 2013 - September 2013

- Packed and tested wafer
- Maintained PVD, CVD, photoresist coater/decoater machine
- Developed recipe for processing wafer

JOURNAL PUBLICATIONS

1. 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>
2. 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>
3. 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>
4. **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>
5. 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>
6. 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>
7. S. Ravi-Kumar, **X. Zhang**, B. Lies, H. Lyu, and H. Qin*, “An area-depth approximation model of micro-drilling on high-density polyethylene (HDPE) soft films using pulsed laser ablation”, Accepted at ASME-Journal of Micro-and Nano-Manufacturing. Available online on October 1, 2019. <https://doi.org/10.1115/1.4045331>
 8. **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.” Under Revision at the *Journal of Manufacturing Processes*.
 9. 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”, Accepted at *Optics and Lasers in Engineering*.
 10. K. Manikandan, K. Wi, **X. Zhang**, A. Chen, K. Wang, and H. Qin*, “Characterizing cement mixtures for concrete 3D printing”, Under Revision at *Manufacturing Letters*.
 11. 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*.
 12. **X. Zhang**, Z. Zhang, H. Lyu, and H. Qin*, “X-ray characterization of functional silver microstructures via electrohydrodynamic inkjet printing”, Under Review at *3D Printing and Additive Manufacturing*.
 13. **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*.

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).

CONFERENCE PUBLICATIONS AND PRESENTATIONS

1. **X. Zhang**, H. Qin, “Effects of Geometric Variations on Mechanical Properties of Bio-scaffolds for Bone Regeneration”, 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 Manufacturing Research Conference (NAMRC 47), Erie PA, June 2019.

INSTRUCTION AND TEACHING

Iowa State University

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

This program provides a 10-week research experience as well as classroom teaching for undergraduate students who are enrolled from all over the United States. I served as the graduate mentor to instruct three undergraduate students to conduct the additive manufactured part 3D point cloud data project.

- **Fall 2019: IE 248 Engineering System Design, Manufacturing Processes & Specifications**

This course provides 10 lectures, 16 lab sections that combine theory learning and hands-on experience for the students to learn fundamental manufacturing knowledge. I led three graduate TAs, five undergraduate TAs, two training TAs to serve more than 160 students in IMSE department.

- **Spring 2018: ENGR 160 Engineering Fundamentals & Problem Solving**

I served as a TA and delivered several times of lectures in this course. ENGR 160 provides the knowledge of how to solve engineering problems and presenting solutions through technical reports, including using computer programming.

HONORS & AWARDS

- **Runner Up Poster Presentation Award of Nano@IAState**, Ames Lab & Iowa State University, August 2019
- **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

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

- Mentor of Undergraduate students in FEAP lab
- Journal Reviewer
Journal of Advanced Manufacturing;
Technology; Journal of Sustainability;
Journal of Physics D;
Journal of Micromechanics and Microengineering

ADDITIONAL SKILLS

- Python, C++, MATLAB, VBA, COMSOL, SOLIDWORKS, ANSYS, ABAQUS, DEFORM, ORIGIN, Mimics, JMP, LabView, CT scanner, Geomagic Laser scanner, Aerotech, 3/5 Axial CNC Machine, Arduino, Grinder Machine, FDM Metal 3D printer, Stratasys 3D Printer, Velleman K8200 3D Printer, Structured light system, Fine Blanking Machine, Vibrator, 10,000 tons hydraulic machine, Rheometer, Industrial Programmable Camera, Computer topography instrument, Tensile Tester, Drilling & Milling Machine, SEM, XRD

COURSES TAKEN

- IE 544X Micro/nano Scale Additive Printing
- ME/HCI 580 Virtual Environments, Virtual Worlds and Applications
- IE 547 Biomedical Design and Manufacturing
- IE 563 Engineering and Systems Management
- IE 577 Human Factors
- IE 681 Cognitive Engineering
- ME 556 Machine Vision
- IE 501 Graduate Seminar
- IE 699 Research