

Xuan Song

CURRICULUM VITAE

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EDUCATION

PhD	Industrial & Systems Engineering University of Southern California , Los Angeles, USA Dissertation: <i>Slurry-based Stereolithography: A Solid Freeform Fabrication Method of Ceramics and Composites</i>	08/2016
M.S.	Computer Science University of Southern California , Los Angeles, USA	05/2016
M.S.	<i>Mechanical Engineering</i> Zhejiang University , Hangzhou, China	03/2011
B.S.	Mechanical Engineering Wuhan University , Wuhan, China	06/2008

PROFESSIONAL EXPERIENCE

08/2016-present	<i>Assistant Professor</i> , Industrial and Systems Engineering, University of Iowa, Iowa City, IA
08/2011-07/2016	<i>Research Assistant/Teaching Assistant</i> , Industrial and Systems Engineering, University of Southern California, Los Angeles, CA
06/2015-08/2015	<i>Mechatronics R&D Engineer</i> , Futurewei Technologies (Huawei US Research Center), Santa Clara, CA
09/2012-present	<i>Member</i> , American Society of Mechanical Engineers
12/2017-present	<i>Member</i> , The American Ceramic Society

PUBLICATIONS

Journal Articles:

1. Fei, F., He, L., Zhou, B., Xu, Z. and **Song, X.**, 2019. "Hydrothermal-Assisted Transient Binder Jetting of Ceramics for Achieving High Green Density". JOM, pp.1-7.
2. **Song, X.**, He, L., Yang, W., Wang, Z., Chen, Z., Guo, J., Wang, H., Chen, L., 2019. "Additive Manufacturing of Bi-continuous Piezocomposites with Triply Periodic Phase Interfaces for Combined Flexibility and Piezoelectricity". ASME Journal of Manufacturing Science and Engineering.
3. Alluri, R., **Song, X.**, Bougioukli, S., Pannell, W., Vakhshori, V., Sugiyama, O., Tang, A., Park, S.H., Chen, Y.,

- Lieberman, J.R., 2019. "Regional Gene Therapy with 3D Printed Scaffolds to Heal Critical Sized Bone Defects in a Rat Model". Journal of Biomedical Materials Research: Part A.
4. He, L., Fei, F., Wang, W., **Song, X.**, 2019. "Support-Free Ceramic Stereolithography of Complex Overhanging Structures based on an Elasto-viscoplastic Suspension Feedstock". ACS Applied Materials & Interfaces.
 5. Chen, Z., Qian, X., **Song, X.**, Jiang, Q., Huang, R., Yang, Y., Li, R., Shung, K., Chen, Y., and Zhou, Q., 2019. "Three-Dimensional Printed Piezoelectric Array for Improving Acoustic Field and Spatial Resolution in Medical Ultrasonic Imaging". Micromachines.
 6. Yang, Y., **Song, X.**, Li, X., Chen, Z., Zhou, C., Zhou, Q., Chen, Y., 2018. "Recent Progress in Biomimetic Additive Manufacturing Technology: From Materials to Functional Structures". Advanced Materials, 1706539.
 7. He, L. and **Song, X.**, 2017. "Supportability of a High-Yield-Stress Slurry in a New Stereolithography-Based Ceramic Fabrication Process". JOM, pp.1-6.
 8. Ji, Y.Z., Wang, Z., Wang, B., Chen, Y., Zhang, T., Chen, L.Q., **Song, X.** and Chen, L., 2017. "Effect of Meso - Scale Geometry on Piezoelectric Performances of Additively Manufactured Flexible Polymer - $Pb(Zr_xTi_{1-x})O_3$ Composites". Advanced Engineering Materials.
 9. Yang, Y.#, Chen, Z.#, **Song, X.**#(Co-first author), Zhang, Z., Zhang, J., Shung, K.K., Zhou, Q. and Chen, Y., 2017. "Biomimetic anisotropic reinforcement architectures by electrically assisted nanocomposite 3D printing". Advanced Materials, 2017, 29, 1605750.
 10. **Song, X.**, Zhang, Z., Chen, Z. and Chen, Y., 2017. "Porous Structure Fabrication Using a Stereolithography-based Sugar Foaming Method". ASME Journal of Manufacturing Science and Engineering, 139(3), p.031015.
 11. Wu, H., Liu, W., He, R., Wu, Z., Jiang, Q., **Song, X.**, Chen, Y., Cheng, L. and Wu, S., 2017. "Fabrication of dense zirconia-toughened alumina ceramics through a stereolithography-based additive manufacturing". Ceramics International.
 12. **Song, X.**, Chen, Z., Lei, L., Shung, K., Zhou, Q., Chen, Y., 2017."Piezoelectric Component Fabrication Using Projection-based Stereolithography of Barium Titanate Ceramic Suspensions". Rapid Prototyping Journal, 23(1).
 13. Liu, W., Wu, H., Zhou, M., He, R., Jiang, Q., Wu, Z., Cheng, Y., **Song, X.**, Chen, Y. and Wu, S., 2016. "Fabrication of Fine-grained Alumina Ceramics by a Novel Process integrating Stereolithography and Liquid Precursor Infiltration Processing". Ceramics International.
 14. Wu, H., Cheng, Y., Liu, W., He, R., Zhou, M., Wu, S., **Song, X.** and Chen, Y., 2016. "Effect of the Particle Size and the Debinding Process on the Density of Alumina Ceramics Fabricated by 3D Printing based on Stereolithography". Ceramics International.
 15. Chen, Z.#, **Song, X.**#(Co-first author), Lei, L., Chen, Y., Zhou, Q., Shung, K., 2016. "3D Printing of Piezoelectric Element for Ultrasonic Sensing and Imaging ". Nano Energy 27: 78-86.
 16. Zhou, M., Liu, W., Wu, H., **Song, X.**, Chen, Y., Cheng, L., He, F., Chen, S., Wu, S., 2016. "Preparation of a defect-free alumina cutting tool via additive manufacturing based on stereolithography –optimization of the drying and debinding processes". Ceramics International.

17. Yang, Y#, Chen, Z.#, **Song, X.#** (Co-first author), Zhu, B., Wu, P., Xiong, R., Shi, J., Chen, Y., Zhou, Q., Shung, K., 2016. “*Three-Dimensional printing of High Dielectric Capacitor using Projection based Stereolithography*”. *Nano Energy*, 22: 414-421.
18. **Song, X.**, Chen Y., Lee, T.W., Wu, S., Cheng, L., 2015. “*Ceramic Fabrication Using Mask-Image-Projection-based Stereolithography Integrated with Tape-casting*”. *SME Journal of Manufacturing Processes*, doi:10.1016/j.jmapro.2015.06.022.
19. **Song, X.**, Pan, Y., Chen, Y., 2015. “*Development of a Low-cost Parallel Kinematic Machine for Multi-directional Additive Manufacturing*”. *ASME Journal of Manufacturing Science and Engineering*, 137(2), 021005. doi: 10.1115/1.4028897.
20. Feng, Y., Cheng, J., **Song, X.**, Tan, J., 2014. “*Robust engineering: improved inductive design exploration approach to bionic system*”. *Materials Research Innovations*. 18(s5) , pp. s5-73-s5-75.
21. Feng, Y., Gao, Y., **Song, X.**, Tan, J., 2013.” *Equilibrium Design Based on Design Thinking Solving: An Integrated Multicriteria Decision-Making Methodology.*” *Advances in Mechanical Engineering*. 8, 27, doi:10.1155/2013/125291.
22. Feng, Y., **Song, X.**, Tan, J., Ding, L., 2012. “*K-WFA based kinematic scheme design method of mechanical product*”. (in Chinese). *Journal of Zhejiang University (Engineering Science)*, 46(3), Mar. 515-523.

Referred Conference Proceedings (full paper):

1. He, L., Fei, F., Wang, W., **Song, X.** “*Layerless Additive Manufacturing of Metal Alloy Components Using Immiscible-Interface Assisted Direct Metal Drawing*”. *Procedia Manufacturing*, SME NAMRC 47, Penn State Behrend, Erie, PA, 2019.
2. He, L., Fei, F., Wang, W., **Song, X.** “*Immiscible-interface Assisted Direct Metal Drawing*”. 29th Annual International Solid Freeform Fabrication Symposium. August 13-15, Austin, Texas, 2018.
3. He, Y., Fei, F., Wang, W., **Song, X.**, Sun, Z, Baek, S.. “*Predicting Manufactured Shapes Of A Projection Micro-Stereolithography Process Via Convolutional Encoder-Decoder Networks*”. *ASME IDETC/CIE*, 2018.
4. **Song, X.**, He, L., Yang, W., Wang, Z., Chen, L. “*Co-continuous Piezocomposites With Triply Periodic Phase Interfaces For Enhanced Mechanical Flexibility and Piezoelectricity*”. The 13th Manufacturing Science and Engineering Conference of ASME (MSEC2018).
5. Chen, Z., Jiang, Q., **Song, X.**, Wang, K., Wu, S., Zhou, Q., Chen, Y., Shung, K.. “*Piezoelectric array for transducer application using additive manufacturing,*” 2017 IEEE International Ultrasonics Symposium (IUS), Washington, DC, 2017, pp. 1-4.
6. He, L., **Song, X.** “*Supportability of A Highly Viscous Slurry in a New Stereolithography-based Ceramic Fabrication Process*”. 28th Annual International Solid Freeform Fabrication Symposium. August 7-9, Austin, Texas, 2017.
7. **Song, X.**, Zhang, Z., Chen, Z., Chen, Y.. “*A Stereolithography-Based Sugar Foaming Method for Porous Strucutre Fabrication*”. The 11th Manufacturing Science and Engineering Conference of ASME (MSEC2016).
8. Li, X., Baldacchini, T., **Song, X.**, Chen, Y.. “*Multi-Scale Additive Manufacturing: An Investigation on Building Objects with Macro-, Micro- and Nano-scales Features and Its Applications*”. The 11th International Conference on MicroManufacturing (ICOMM2016).

9. **Song, X.**, Chen, Y., Lee, T.W., Wu, S., Cheng, L., “*Ceramic Fabrication Using Mask-Image-Projection-based Stereolithography Integrated with Tape-casting*”. Proceedings of NAMRC/SME, NAMRC43-121, 2015.
10. **Song, X.**, Pan, Y., Chen, Y.. “*Development of a Low-cost Parallel Kinematic Machine for Multi-directional Additive Manufacturing*”. 24TH Annual International Solid Freeform Fabrication Symposium. August 12-14, Austin, Texas, 2013.
11. **Song, X.**, Chen, Y.. “*Joint Design for 3-D Printing Non-Assembly Mechanisms*”. ASME 2012 IDETC/CIE Conference, Paper Number: DETC2012-71528. Chicago, Illinois, 2012.

Abstract/Posters (presentation only):

1. Henprasert P, Dawson DV, El-Kerdani T, **Song X**, Couso-queiruga E, Holloway JA. “*Comparison of the Accuracy of Implant Position Using Surgical Guides Fabricated by Additive and Subtractive Techniques*”. American College of Prosthodontist meeting 2019.
2. **Song, X.**, He, L., Yang, W., Chen, Z., Chen, L.. “*Additive Manufacturing of Bi-continuous Piezocomposites based on Triply Periodic Micro-skeleton for Tailorable Hydrostatic Performance*”. 30th Annual International Solid Freeform Fabrication Symposium. Austin, Texas, 2019.
3. **Song, X.**, He, L.. “*A Suspension-Enclosing Projection-stereolithography Process for Complex Ceramic Component Fabrication without Building Support Structures*”. Materials Science & Technology 2018. (Invited)
4. He, L., **Song, X.**.. “*Leveraging Temperature-dependent Rheological Behaviors of Ceramic Slurry for Support-free Fabrication*”. 29th Annual International Solid Freeform Fabrication Symposium. Austin, Texas, 2018.
5. **Song, X.**, He, L., Yang, W., Chen, Z., Chen, L.. “*Additive manufacturing of flexible 3-3 ferroelectric ceramic/polymer composite based on triply periodic cellular micro-skeleton*”. the 42nd International Conference and Exposition on Advanced Ceramics and Composites (ICACC 2018), Jan 22, 2018, Daytona Beach, Florida.
6. Chen, Z., **Song, X.**, Chen, Y., Shung, K.K. and Zhou, Q., 2017. *3D printing of piezoelectric transducer/array for ultrasonic imaging*. In Ultrasonics Symposium (IUS), 2017 IEEE International (pp. 1-1). IEEE.
7. Pannell, W., Bougioukli, S., **Song, X.**, Ortega, B., Sugiyama, O., Tang, A., Chen, Y., Lieberman, J.R.. “*Three Dimensionally Printed Calcium Phosphate Scaffolds with Gene Therapy for Difficult Bone Graft Scenarios in a Rodent Model*”. Poster accepted at: American Academy of Orthopaedic Surgeons Annual Meeting. March 14-17, 2017. San Diego, CA.
8. **Song, X.**, He, L., Yang, W., Chen, Z., Chen, L.. “*Additive Manufacturing of Flexible 3-3 Ferroelectric Ceramic/Polymer Composite Based on Triply Periodic Cellular Micro-skeleton*”. 28th Annual International Solid Freeform Fabrication Symposium. Austin, Texas, 2017.

INVITED TALKS

- Graduate seminar, “*Achieving Geometric Complexity for Superior Functionality via Additive Manufacturing*,” industrial and manufacturing systems engineering, the Iowa State University, Ames, Iowa, 03/06/2019.
- Graduate seminar, “*Achieving Complexity via Additive Manufacturing*,” mechanical engineering, the University of Iowa, Iowa City, Iowa, 09/28/2017.

- Graduate seminar, “*Extend Fabrication Capability of Additive Manufacturing Through a Slurry-based Stereolithography Process*,” industrial engineering, the University of Iowa, Iowa City, Iowa, 09/22/2016.

PATENTS

- **Song, X.**, He, L., “Immiscible-Interface Assisted Direct Metal Drawing”, US Provisional Patent Application, 2018.
- **Song, X.**, He, L., “Support-free additive manufacturing of ceramics”, US Provisional Patent Application, 2017.
- Pannell, W., Lieberman, J., Chen, Y., **Song, X.**, Bougioukli, S., “Mesechmal-loaded Ceramic Scaffold for Bone Regeneration and Repair”, US Provisional Patent Application, 2016.
- Zhu, J., Wang, Z., **Song, X.**, Hu, R.C., Mortazavi, M., 2017. “*Multiple Disk Loader Apparatus*”, U.S. Patent 9,799,367.

HONORS

- 2018 Old Gold Summer Fellowship, University of Iowa.
- 2019, 2018 On the list of “Faculty or staff recognized by students as making a positive difference in their lives”, University of Iowa.
- 2017 NAMRC Outstanding Young Reviewer, North American Manufacturing Research Institution of SME (NAMRI/SME)
- 2016 NSF Student Travel Award for SFF 2016 Symposium
- 2015 NSF Student Travel Award for MSEC/NAMRC 2015
- 2014 The Grand Prize, USC *Maseeh Entrepreneurship Prize Competition* (MEPC), along with \$50K in cash and \$20K in legal services for *ComfortCorrect*.
- 2014 Finalist, USC *Maseeh Entrepreneurship Prize Competition* (MEPC), for *VisionFab*, a student team to commercialize a low cost 3D printer with high resolution and fast speed.
- 2012 USC-GSG Conference Travel Grant, University of Southern California

STUDENT MENTORING

In Progress:

Ph.D. Students:

- Li He, additive manufacturing process development for ceramics, starting in fall 2016.
- Fan Fei, starting in fall 2017.
- Levi Kirby, starting in spring 2019.

Master Students:

- Wenbo Wang, with thesis, starting in spring 2018.
- Baizhuang Zhou, with thesis, starting in spring 2019.

Undergraduate Students:

Completed:

Undergraduate Students:

- Ryan Dauzvardis, Industrial Engineering, fall 2018– spring 2019.
- Baizhuang Zhou, Mechanical Engineering, spring 2018- spring 2019.
- Ziyang Xu, Mechanical Engineering, summer 2018– spring 2019.
- Qiwei Zhu, Mechanical Engineering, spring 2017 –fall 2017.
- Genevieve Goelz, Biomedical Engineering, spring 2018–fall 2018.
- Lamis Awdi, Industrial Engineering, fall 2017 –fall 2018.
- Oliver Stroh, Industrial Engineering, University Honors program, 01/2017-05/2017.

Summer Interns:

- Yash Fichadia, Millard North High School (Nebraska), K-12 SSTP program, June.2019 ~ July.2019.
- Haoran Wu, West Senior High School (Iowa), June.2019 ~ August.2019.
- Junkai Wu, No.2 High school of East China Normal University, K-12 SSTP program, June.2018 ~ July.2018.

THESIS COMMITTEE

Ph.D. Thesis Committee:

- Zhiyu Sun, “*Deep Learning on Curved Surfaces: Manifold-Formulation of Convolutional Neural Networks and its Operations*”, chair: Prof. Steve Baek, 11/2019.

Ph.D. Comprehensive Exam Committee:

- Xudong Zhang, “New Functional Depths and Applications”, chair: Prof. Yong Chen, 05/2019.
- Sidhartha Roy, “Structure-Property-Performance Linkage Using Machine Learning Based Multiscale Models for Shocked Heterogeneous Materials”, chair: Prof. H.S. Udaykumar, 03/2019.
- Zhiyu Sun, “*Deep Learning on Curved Surfaces: Manifold-Formulation of Convolutional Neural Networks and its Operations*”, chair: Prof. Steve Baek, 11/2018.

M.S. Thesis Committee:

- Pantip Henprasert, “*Comparison of the Accuracy of Implant Surgical Guides Fabricated by Additive and Subtractive Techniques*”, chair: Prof. Julie A. Holloway, 07/2019.

- Zachary Nolte, “Mosquito Popper: A Multiplayer Online Game for 3D Human Body Scan Data Segmentation”, chair: Prof. Steve Baek, 03/2017.

TEACHING

- IE6810 Advanced Topics on Additive Manufacturing, UIowa. Spring, 19
- IE4650 Mechatronics Engineering for Smart Device Design, UIowa. Spring, 17/18/19
- ENGR2760 Design for Manufacturing, UIowa. Fall, 17/18

OUTREACH

- 01.2019 Speaker at the outreach speaking event for the Iowa City school district (North Central Jr High)
- 06.2018 Mentor of the Secondary Student Training Program (SSTP) at the Belin-Blank Center
- 03.2018 Host of the lab tours for the regional Junior Sciences and Humanities Symposium (JSHS)
- 02.2017 Mentor of a team of blind and visually impaired students in the “2017 First Robotics Competition”

SERVICE ACTIVITIES

Professional Community:

- 10.2020 Symposium organizer, “Additive Manufacturing of Ceramic-based Materials: Process Development, Materials, Process Optimization and Applications,” MS&T 2020.
- 06.2020 Symposium organizer, “Symposium on Additive Manufacturing of Ceramics, Concretes, and Composites,” ASME MSEC2020.
- 06.2019 Session chair, ASME MSEC2019.
- 06.2019 Proposal reviewer, the Marsden Fund, New Zealand.
- 05.2019 Technical program committee, UrbCom 2019: Workshop on Urban Computing, , Santorini Island, Greece
- 11.2017/04.2018 Proposal review panelist, the National Science Foundation.
- 10.2017/12.2019 Proposal reviewer, Swiss National Science Foundation.
- 11.2017 Proposal reviewer, Kazakhstan National Centre of Science and Technology Evaluation.
- 08.2017 Session chair, SFF symposium.
- 06.2017 Session co-organizer, ASME MSEC2017.
- 06.2017 Session chair, SME NAMRC Track 4 “Cyber-Physical Systems in Manufacturing”.

- 08.2016 Session co-organizer, ASME IDETC2016 “Design for Sustainable Additive Manufacturing”.

University Level:

- 10.2018-present ISE Design and Manufacturing EFA coordinator, UIowa
- 09.2018-present Faculty mentor of Iowa 3D Club, UIowa
- 2018-present Chair of the Committee of Public Relations for CCAD
- 2018-2019 ISE Undergraduate Committee
- 2018-2019 ISE Faculty Search Committee
- 2017-2018 MIE Lecturer Search Committee
- 2016-2018 Design for Manufacturing (DFM) Course Committee
- 2016-2017 IE program secretary

Paper Review:

Journal Review

SME Journal of Manufacturing Processes

SME Journal of Manufacturing Systems

ASME Journal of Manufacturing Science and Engineering

ASME Journal of Micro- and Nano-Manufacturing

ASME Journal of Mechanical Design

ASME Journal of Computing and Information Science in Engineering

Rapid Prototyping Journal

Additive Manufacturing

3D Printing and Additive Manufacturing

Journal of the American Ceramic Society

International Journal of Applied Ceramic Technology

Ceramics International

Advanced Engineering Materials

Materials & Design

Procedia CIRP

IISE Transactions

Composites Part B: engineering

Composite Interfaces

Polymers

Journal of Biomedical Materials Research Part A

Research

ASM Handbooks

Measurement

Advanced Composite Materials

Materials

SN Applied Sciences

Cogent Business & Management

Conference Proceeding Review

NAMRC/MSEC

ASME IDETC/CIE

Solid Freeform Fabrication Symposium

International Symposium on Flexible Automation

International Conference on Innovative Design and Manufacturing (ICIDM)

ASME International Mechanical Engineering Congress & Exposition (IMECE)