

# Xuan(Sean) Song

## CURRICULUM VITAE

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### EDUCATION

- PhD Epstein Department of Industrial & Systems Engineering, 08/2016  
**University of Southern California**, Los Angeles, USA.  
Dissertation: *Slurry based Stereolithography: A Solid Freeform Fabrication Method of Ceramics and Composites*
- M.S. Computer Science, 05/2016  
**University of Southern California**, Los Angeles, USA
- M.S. *Mechanical Engineering*, 03/2011  
**Zhejiang University**, Hangzhou, China.  
Thesis: *Kinematic Scheme Solving and Performance Parameter Optimization Technologies for Complex Products and Their Application*
- B.S. *Mechanical Engineering*, 06/2008  
**Wuhan University**, Wuhan, China.

### PROFESSIONAL EXPERIENCE

- 08/2016-present *Assistant Professor*, Department of Mechanical and Industrial Engineering, University of Iowa, Iowa City, Iowa
- 08/2011-08/2016 *Graduate Research/Teaching Assistant*, USC
- 06/2015-08/2015 *Mechatronics R&D Engineer*, Futurewei Technologies (Huawei US Research Center), Santa Clara, CA
- 10/2012-present *Co-founder*, *Soonsolid Technologies/Sprintray*, Shaoxing, Zhejiang, China
- 09/2012-present *Member*, American Society of Mechanical Engineers
- 09/2008-03/2011 *Graduate Research Assistant*, Zhejiang University

### HARDWARE SYSTEMS DEVELOPED

- A platform for nanocomposite and gradient material fabrication with adjustable high voltage field. The platform is also used to fabricate polymer composite suspension using a novel rotary tape-casting method,

University of Southern California, 2015~2016.

- A Tape-Casting Integrated Mask Image Projection Stereolithography System for Piezoelectric Ceramics and piezo-composite, University of Southern California, 2013~2015.
- A 6-Axis Stewart Platform based Multi-directional Additive Manufacturing System for Fused Deposition Modeling (FDM), University of Southern California, 2012~2013. (Reported in the media, e.g., *Boingboing* and *USC's viterbi school*. Its *Youtube video* has been viewed over **269,000 times** until Oct.2015.)
- A multi-scale stereolithography machine, with an online optical system for image calibration, University of Southern California, 2014~2015.

### **SOFTWARE SYSTEMS DEVELOPED**

- Simulation and Motion Control Software System for 6-Axis Parallel Kinematic Machine.
- Mask Projection Image Slicing, Projection and Motion Control Software System for Ceramic 3D printing.
- Imaging and Motion Control System for gradient material fabrication based on adjustable high voltage field.

### **PATENTS**

- **Song, X.**, He, L., "Fabrication of Complex Ceramic Components without Building Support Structures by Using Yield Stress of Highly Loaded Ceramic Slurry", US Provisional Patent, submitted (pending)
- Pannell, W., Lieberman, J., Chen, Y., **Song, X.**, Bougioukli, S., "Mesochmal-loaded Ceramic Scaffold for Bone Regeneration and Repair", US Provisional Patent Application, 2016. (pending)
- Zhu, J., Wang, Z., **Song, X.**, Hu, R.C., Mortazavi, M., "*Multiple Disk Loader Apparatus*", US Patent, 2016. (pending)

### **PUBLICATIONS**

#### Journal Articles:

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(ZrxTi1-x)O3 Composites*. Advanced Engineering Materials.

Yang Yang#, Zeyu Chen#, **Xuan Song#(Co-first author)**, Zhuofeng Zhang, Jun Zhang, K. Kirk Shung, Qifa Zhou, Yong Chen, 2017. "*Biomimetic anisotropic reinforcement architectures by electrically assisted nanocomposite 3D printing*". Advanced Materials, 2017, 29, 1605750.

**Song, X.**, Zhang, Z.F., Chen, Z.Y. 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.

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.

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.

Zeyu Chen<sup>#</sup>, **Xuan Song<sup>#</sup>(Co-first author)**, Liwen Lei, Yong Chen, Qifa Zhou, Kirk Shung, 2016. "3D Printing of Piezoelectric Element for Ultrasonic Sensing and Imaging". Nano Energy 27: 78-86.

**Xuan Song**, Zeyu Chen, Liwen Lei, Kirk Shung, Qifa Zhou, Yong Chen, 2017."Piezoelectric Component Fabrication Using Projection-based Stereolithography of Barium Titanate Ceramic Suspensions". Rapid Prototyping Journal, 23(1).

Maopeng Zhou, Wei Liu, Haidong Wu, **Xuan Song**, Yong Chen, Lixia Cheng, Fupo He, Shixi Chen, Shanghua Wu, 2016. "Preparation of a defect-free alumina cutting tool via additive manufacturing based on stereolithography –optimization of the drying and debinding processes". Ceramics International.

Yang Yang<sup>#</sup>, Zeyu Chen<sup>#</sup>, **Xuan Song<sup>#</sup> (Co-first author)**, Benpeng Zhu, Pin-I Wu, Rui Xiong, Jing Shi, Yong Chen, Qifa Zhou, K. Kirk Shung, 2016. "Three-Dimensional printing of High Dielectric Capacitor using Projection based Stereolithography". Nano Energy, 22: 414-421.

**Xuan Song**, Yong Chen, Tae Woo Lee, Shanghua Wu, Lixia Cheng, 2015. "Ceramic Fabrication Using Mask-Image-Projection-based Stereolithography Integrated with Tape-casting". SME Journal of Manufacturing Processes, doi:10.1016/j.jmpro.2015.06.022.

**Xuan Song**, Yayue Pan, Yong Chen, 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.

Yixiong Feng, Jin Cheng, **Xuan Song**, Jianrong Tan, 2014. "Robust engineering: improved inductive design exploration approach to bionic system". Materials Research Innovations. 18(s5) , pp. s5-73-s5-75.

Yixiong Feng, Yicong Gao, **Xuan Song**, Jianrong Tan, 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.

**Xuan Song**, Yixiong Feng, Jianrong Tan, Wei Wei, 2012. "Robust design of mechanical product based on improved Inductive Design Exploration Method". High Technology Letters, 18(2), Jun: 64-70.

Yixiong Feng, **Xuan Song**, Jianrong Tan, Liping Ding, 2012. "K-WFA based kinematic scheme design method of mechanical product". (in Chinese). Journal of Zhejiang University (Engineering Science), 46(3), Mar. 515-523.

#### Conference Proceedings:

**Xuan Song**, Zhuofeng Zhang, Zeyu Chen, Yong Chen. "A Stereolithography-Based Sugar Foaming Method for Porous Structure Fabrication". The 11<sup>th</sup> Manufacturing Science and Engineering Conference of ASME (MSEC2016).

Xiangjia Li, Tommaso Baldacchini, **Xuan Song**, Yong Chen. "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).

**Xuan Song**, Yong Chen, Tae Woo Lee, Shanghua Wu, Lixia Cheng. “*Ceramic Fabrication Using Mask-Image-Projection-based Stereolithography Integrated with Tape-casting*”. Proceedings of NAMRC/SME, NAMRC43-121, 2015.

**Xuan Song**, Yayue Pan, Yong Chen. “*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.

**Xuan Song**, Yong Chen. “*Joint Design for 3-D Printing Non-Assembly Mechanisms*”. ASME 2012 IDETC/CIE Conference, Paper Number: DETC2012-71528. Chicago, Illinois, 2012.

Posters/Abstract:

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.

**PRESENTATION/INVITED TALKS**

Sep 22, 2016, Iowa City, Iowa

Title: “Extend Fabrication Capability of Additive Manufacturing Through a Slurry-based Stereolithography Process”

Event: IE Graduate seminar at UIowa

Aug 10-12, 2015, Austin, Texas

Title: “Piezoelectric Device Fabrication based on 3D Printing Barium Titanate Ceramics”

Event: 26TH Annual International Solid Freeform Fabrication Symposium

August 4-6, 2014, Austin, Texas

Title: “Ceramic Suspension Fabrication using Mask Image Projection based Stereolithography”

Event: 25TH Annual International Solid Freeform Fabrication Symposium

August 4-6, 2014, Austin, Texas

Title: “Energy Modeling and Control for Ultra-thin Layer Fabrication in Micro-Stereolithography”

Event: 25TH Annual International Solid Freeform Fabrication Symposium

**TEACHING EXPERIENCE**

2017 Spring      IE 4650 Mechatronics Engineering for Smart Device Design, UIowa.

**STUDENT MENTORING**

Ph.D. Students:

- Li He, Additive Manufacturing Process Development for Ceramics, starting in 2016 fall.

Undergraduate Students:

- Wenbo Wang, Mechanical Engineering
- Oliver Stroh, Industrial Engineering, University Honors Program

**HONORS**

- 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*. Reported by USC Viterbi news.
- 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

**SERVICE ACTIVITIES**

Professional Community:

- 08.2017 SFF symposium, Session chair
- 06.2017 ASME MSEC2017 “Advances in Micro- and Nano-Additive Manufacturing”, Session Co-Organizer
- 06.2017 SME NAMRC Track 4 “Cyber-Physical Systems in Manufacturing”, Session Chair
- 08.2016 ASME IDETC2016 “Design for Sustainable Additive Manufacturing”, Session Co-Organizer

University Level:

- 02.2017 Mentor of a team of blind and visually impaired students in the “2017 First Robotics Competition”
- 2016 fall Design for Manufacturing (DFM) Committee

Paper Review:

Journal Review

SME Journal of Manufacturing Processes

SME Journal of Manufacturing Systems

ASME Journal of Mechanical Design

ASME Journal of Micro- and Nano-Manufacturing

Additive Manufacturing

Conference Proceeding Review

2017 NAMRC/MSEC

ASME IDETC/CIE, 2012~present

2016 International Symposium on Flexible Automation

2014 International Conference on Innovative Design and Manufacturing (ICIDM2014)

ASME 2013 International Mechanical Engineering Congress & Exposition (IMECE2013)