Xiru Fan

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Education

Shanghai Jiao Tong University *Shanghai*

M. E. in Mechanical Engineering Sep. 2017 - Jun. 2021

Shanghai Jiao Tong University *Shanghai*

B. E. in Nuclear Engineering Sep. 2021 - March. 2024

Publications & Manuscripts

[1] **X. Fan**, C. Valenzuela, W. Zhao, Z. Chen*, D. Wang*, S. J. Mentzer*. "Stochastic simulations of self-organized elastogenesis in the developing lung", *PLOS Computational Biology*, 19(6): p. e1011219, 2023. [Link]

[2] D. Wang, **X. Fan**, M. Zhang. "Six-degree-of-freedom photocuring 3D printing device and 3D printing method", CN Patent, CN115503232A, filed Sep 28, 2022, and issued Dec 23, 2022.(under substantive review) [Link]

[3] D. Wang, M. Zhang, **X. Fan**. "Multi-material photocuring 3D printing device and method with super air knife assisting in cleaning", CN Patent, 115625893A, filed Oct 31, 2022, and issued Jan 20, 2023.(under substantive review) [Link]

[4] **X. Fan**, M. Zhang, D. Wang*. "Multiphysics modeling and spatio-temporal optimization of grayscale digital light processing 3D printed structures with high resolution" (under review).

[5] M. Zhang, **X. Fan**, D. Wang*. "Voxel design of grayscale DLP 3D printed soft robots" (under review).

Research Projects

Research on free-form digital light processing (DLP) 3D printing *Shanghai*

Graduation Program | Advisor: Dong Wang, *Associate Professor of School of Mechanical Engineering, SJTU* Sep. 2022 - Now

- build a free-form 6-DOF DLP 3D printing system using 6-axis robot arm
- build multi-physics model for the free-form DLP 3D printing process considering light field and resin photopolymerization
- develop a spatio-temporal optimization algorithm for high-resolution grayscale DLP 3D printing
- inversely design and fabricate high-resolution structures, such as micro-fluidic devices, lattice metamaterials, and pneumatic actuators
- visualize the objective structure based on the planned path and projected images

Research on voxel design for soft robots *Shanghai*

Advisor: Dong Wang, *Associate Professor of School of Mechanical Engineering, SJTU* Mar. 2022 - Now

- model the DLP 3D printing process considering Gaussian beam propagation, light divergence, and the photobleaching effect of the resin
- calibrate the light field parameters of the digital light engine and the photopolymerization parameters of different resin
- establish a "grayscale value - degree of conversion - mechanical properties" relationship
- simulate the degree of conversion(DoC) of layered photopolymerized polymers

Research on stochastic simulations of self-organized elastogenesis *Shanghai*

Collaborative Research | Advisor: Dong Wang, *Associate Professor of School of Mechanical Engineering, SJTU*; Steven J. Mentzer, *Professor at Harvard Medical School* Sep. 2021 - May 2023

- model the self-organization of tropoelastin in the developing lung using cellula automata based on experimental results
- analysis the impacts of different factors on the process of tropoelastin extracellular assembly

Research on reconstruction and evaluation of 3D flow field *Shanghai*

Graduation Program | Advisor: Li Yang, *Associate Professor of School of Mechanical Engineering, SJTU* Nov. 2020 - Jun. 2021

- reconstruct flow field of a whole ship based on cross-sections after data registration and combination
- evaluate the results of 3D reconstruction using statistical and fluid mechanics indicators
- put forward a workflow of the 3D flow field reconstruction of ships based on cross-sections

Research on origami-inspired pneumatic soft actuator (PSA) *Shanghai*

Chung-Tsung Program | Advisor: Hesheng Wang, *Professor of Department of Automation, SJTU* Jun. 2019 - Jun. 2021

- design variable-stiffness skeleton inspired by origami for PSA
- simulate the transformation of the origami-inspired skeleton
- design and fabricate PSAs with programmable performance

Technical Skills

Programming	Matlab, Python
Professional Softwares	Origin, Abaqus, Solidworks, Rhino, Mathematica, Simulink, ParaView, Lammps
Drawing & Typesetting	Office, Illustrator, Premiere Pro, Photoshop, LaTeX, Markdown
Languages	English(C1)

Awards and Honors

Dec. 2022	**Honorary Title**: “The Chung-Tsung Scholar” (0.1%)	*Shanghai*
Jun. 2021	**Honorary Title**: “Outstanding Graduate of Shanghai Jiao Tong University” (1%)	*Shanghai*
Oct. 2019	**Honorary Title**: “The Three Good Student of Shanghai Jiao Tong University” (1%)	*Shanghai*
Jun. 2019	**Award**: Excellent Paper Presenter of “The 5th Annual International Conference for Students”	*Shanghai*
Dec. 2017	**Award**: First Prize in “Engineering Design Showcase, 2017 Fall”	*Shanghai*
Oct. 2019-2022	**Scholarship**: “ ‘Rongchang’ Inovation Scholarship ” (30000 RMB per year)	*Shanghai*
Oct. 2018-2019	**Scholarship**: Second Prize of the “ NPIC Scholarship ” (6000 RMB)	*Shanghai*
Jun. 2020	**Contest**: First Prize in “The Ninth Shanghai Mechanical Engineering Innovation Competition”	*Shanghai*
Nov. 2018	**Contest**: First Prize in “The “Zhixing Cup” Shanghai Student Social Practice Project Competition ”	*Shanghai*
May 2018	**Contest**: Champion of the “ 10th SJTU Mechanical Innovation Competition for Freshman ”	*Shanghai*

Volunteer Services

International Academic Conferences

Presentation / Attendance

- 16th International Conference on Intelligent Robotics and Applications (ICIRA 2023), Hangzhou, July 2023
- 9th International Conference on Mechanical Engineering and Automation Science (ICMEAS 2023), Xi’an, Oct. 2023

International Events *Shanghai*

Volunteer

- 3rd China International Import Expo, Oct. 2020
- Shanghai Marathon 2019, Nov. 2019
- 40th Odyssey of the Mind World Final, Mar. 2019

SK Sunny Student Volunteer Organization *Shanghai*

Volunteer Sep. 2017 - Jun. 2019

- Creative Innovation Class, Minhang Central Elementary School