Pei ZHANG

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Email: *15890058368@163.com* Pei's Google Scholar

Education

- 2013.09-2019.06 M.S. and B.S. in Materials Science, Zhengzhou University, Zhengzhou, China
- 2021.09-Present Ph.D. in Intelligent Manufacturing and Robotics, SUSTech, Shenzhen, China

Work Experience

2019.09-2021.08 Research Assistant(RA) in SUSTech, Group Leader: Professor Ji Liu, Functional Soft Materials and Biomaterials Lab

Research Interest

Soft electronics, Flexible display, Structure color, 3D printing, Soft Robotics

Research Experience

◆ *Ph.D.* Phase (2021-2025)

Thesis Topic: 3D printing flexible interactive display

Advisor: Ji Liu

Description: This research focuses on the development of functional display inks and multi-material 3D printing strategies for flexible and interactive electronic or robotic systems. It encompasses three key projects: (1) the design of electroluminescent inks for stretchable light-emitting displays; (2) the development of photonic crystal-based inks for integrated sensing and visualization; and (3) the formulation of liquid crystal inks for environmental stimulus-responsive visualization. These studies aim to advance the integration of multifunctional display components and establish a solid technical foundation for next-generation interactive electronic systems.

◆ *RA* Phase (2019-2021)

Research Topic: Hierarchical sponge-hydrogel hybrid structures with robust interfaces

Advisor: Ji Liu

Description: This research proposes a simple strategy to construct sponge-hydrogel hybrids with a robust hydrophobic-hydrophilic interface. The sponge provides mechanical strength and macroporosity, while the hydrogel offers high water content (98 wt%), biocompatibility, and nanoscale pores for molecule transport. The hydrophilic component enhances liquid absorption, coagulation, hemostatic efficiency, and hemocompatibility, highlighting potential for hemostatic applications.

◆ *M.S.* Phase (2017-2019)

Thesis Topic: Body temperature responsive shape memory polyurethane

Advisor: Chengshen Zhu

Description: This research focuses on developing thermoplastic shape memory polyurethanes that respond to body temperature. The switching temperature is adjusted by controlling the crystallization of polycaprolactone soft segments. Through systematic study of their phase transition behavior and structure, the materials exhibit shape memory effects near body temperature and show promise for use in biomedical implants and human-machine interfaces.

Research Skills:

➢ Materials design

- Display materials (*e.g.* electroluminescent ZnS:Cu, Fe_3O_4 photonic crystals, liquid crystals)
- Conductive elastomer/hydrogel preparation (*e.g.* liquid metal, carbon-based fillers doped PDMS/PU etc. PEDOT:PSS hydrogel)
- Dielectric and piezoelectric elastomers (*e.g.* PVDF-HFP, PVDF-TRFE, Perfluoroacrylate)

➢ Instrumentation and analysis

- Additive manufacturing technologies (*e.g.* direct ink writing (DIW), digital light processing (DLP), fused deposition modeling (FDM), stereolithography(SLA))
- Micro-nano processing methods (*e.g.* laser lithography, ion sputtering)
- Characterization equipment (*e.g.* SEM, AFM, confocal laser scanning microscope(CLSM))
- Software (*e.g.* illustrator, solidworks, AutoCAD, 3Dmax and keyshot)

Publications # Co-first author * Corresponding author

First and Co-first author publications:

1. **Pei Zhang**, Iek Man Lei, Guangda Chen, Jingsen Lin, Xingmei Chen, Jiajun Zhang, Chengcheng Cai, Xiangyu Liang, Ji Liu*. Integrated 3D printing of flexible electroluminescent devices and soft robots. ***Nature Communications***, 2022, 13(1): 4775. Link
2. **Pei Zhang#**, Yifan Yang#, Zhaobo Li#, Yu Xue, Fucheng Wang, Liangjie Shan, Yafei Wang, Xuetao Shi*, Kai Wu*, and Ji Liu*. Conducting hydrogel-based Neural Biointerfacing Technologies. ***Advance Functional Materials***. 2025: 2422869. Link
3. **Pei Zhang**, Guangda Chen, Xingmei Chen, Junfei Xing, Yue Tao, Ji Liu*. Hierarchical sponge-hydrogel hybrid structures with robust interfaces. ***Chinese Journal of Chemistry***, 2023, 41(20): 2635-2640. Link
4. Xingmei Chen#, Yinghui Feng#, **Pei Zhang#,** Zhipeng Ni, Yu Xue, Ji Liu*. Hydrogel fibers-based biointerfacing. ***Advanced Materials***, 2024: 2413476. Link
5. Chengcheng Cai#, **Pei Zhang#**, Yafei Wang, Yun Tan, Iek Man Lei, Ben Bin Xu, Ji Liu*. Sustainable three-dimensional printing of waste paper-based functional materials and constructs. ***Advanced Composites and Hybrid Materials***, 2024, 7(5): 156. Link
6. Tangyue Xue#, Zengqi Huang#, **Pei Zhang#**, Meng Su*, Xiaotian Hu*, Tingqing Wu, Baojin Fan, Gangshu Chen, Guanghui Yu, Wentao Liu, Xuying Liu, Yiqiang Zhang, Yanlin Song*. A shape memory scaffold for body temperature self-repairing wearable perovskite solar cells with efficiency exceeding 21%. ***InfoMat***, 2022, 4(12): e12358. Link
7. **Pei Zhang**, Shanshan Wan, Runyi Yan, Zhipeng Ni, Lingfeng Yuan, Yipeng Qin, Yafei Wang, Ziyi Yu, Liu Wang, and Ji Liu*. Machine learning-assisted 3D printing of structural colors for programmable and dynamic visual displays. 2025. In preparation.
8. **Pei Zhang**, Liangjie Shan, Runyi Yan, Chang Wang, and Ji Liu*. 3D printing cholesteric liquid crystals for visual perception and intelligent gripper control. 2025. In preparation.

Project Experience

National Natural Science Foundation of China general project……2024

Bioelectronic design, 3D printing preparation and application based on conductive polymer hydrogel

National Natural Science Foundation of China - General Joint Fund……2024

High-precision 3D printing method of flexible conductive bionic materials

Shenzhen Natural Science Foundation General research project……2023

Highly flexible conductive hydrogel nerve conduits

Awards

Academic conference awards:

1. The 61st Annual Technical Conference of the Society of Engineering Sciences (SES 2024), 2024-8-21~23, Hangzhou. ***Best Poster***
2. China Materials Conference 2024, 2024-7-8~11, Guangzhou. ***Best Poster***
3. Guangdong Provincial Postgraduate Academic Forum "Intelligent Manufacturing and Robotics" Sub-Forum, 2023-11-17~19, Shenzhen. ***Best Oral***
4. The 7th International Conference on Bionics (ICBE&IYCBSE 2023), 2023-10-12~15, Wuhan. ***Best Poster***
5. China Materials Conference 2022-2023, 2023-7-7~10, Shenzhen. ***Best Oral***
6. The 13th National Symposium on Polymer Molecular and Structural Characterization, 2023-3-31~4-2, Shenzhen. ***Best Poster***
7. Guangdong Postgraduate Academic Forum "Intelligent Manufacturing and Robotics" Forum, 2022-11-25~27, Shenzhen. ***Best Oral***

Honorary awards:

1. 2023 Shenzhen Excellent Science and Technology Paper (Top 100 Articles of the Year)
2. 2023 Southern University of Science and Technology Excellent Graduate (1/100)
3. 2022 Southern University of Science and Technology Excellent Teaching Assistant (5/80)
4. 2019 Zhengzhou University Graduate Basketball League First (Top 1)
5. 2017 Henan Province Excellent Undergraduate Graduate (1/1000)
6. 2014-2015 Zhengzhou University Excellent Student Leader (2/100)
7. 2014 National Encouragement Scholarship (3/100)
8. 2013 Zhengzhou University Excellent Freshman Scholarship (2/1000)

References

Ji Liu **Associate Professor**
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Chengshen Zhu **Full professor**
Department of Material Science and Engineering
Zhengzhou University (ZZU)
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