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2009-Present	Professor, Tsinghua University
2005-2009	Principle Investigator, Professor, National Centre for NanoScience & Technology
2003-2005	Postdoc Research Associate,University of Cambridge, UK
2002-2003	Postdoc Research Associate,The Hong Kong Polytechnic University
1999-2002 PhD	The Hong Kong Polytechnic University
1997-1999 MS	Institute of Chemistry, Chinese Academy of Sciences
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Research Interests:

Ultra-long DNA/RNA synthesis, Frame guided assembly to prepare shape and size controllable vesicles at nanometer scale, Supramolecular Hydrogels based on DNA Self-assembly

Selected Publications:

1. Yujie Li†, Ruofan Chen†, Bini Zhou, Yuanchen Dong*, and **Dongsheng Liu*** Rational Design of DNA Hydrogels Based on Molecular Dynamics of Polymers. Adv. Mater. Accepted online, 2023, 2307129.

2. Bini Zhou†, Bo Yang†, Qian Liu, Lu Jin, Yu Shao, Taoyang Yuan, Ya-nan Zhang Chao Wang Ziwei Shi,Xin Li, Yufan Pan, Ning Qiao, Jiang Fei Xu, Yuhe Renee Yang*, Yuanchen Dong, Lijin Xu, Songbai Gui*, and **Dongsheng Liu*** Effects of Univariate Stiffness and Degradation of DNA Hydrogels on the Transcriptomics of Neural Progenitor Cells J. Am. Chem. Soc., 145(16)(2023), 8954-8964.

3. Yujie Li, Yuqiao Ding, Bo Yang, Tianyang Cao, Jiangfei Xu, Yuanchen Dong, Quan Chen, Lijin Xu, and **Dongsheng Liu***Reinforcing DNA Supramolecular Hydrogel with Polymeric Multiple-Unit LinkerCCS Chem., 5(5)(2023), 434-444.

4. Yujie Li, Wei Yuan, Xiancheng Tian, Chenyou Zhu, Xin Li, Ruofan Chen, Ziyang Hao, Yuanchen Dong*, and **Dongsheng Liu*** A facile method to prepare non-cationic mRNA lipid-nanoparticles based on frame guided assembly strategy. Nano Today, 52(2023), 101991.

5. Ruofan Chen, Yujie Li, Yu Jing, Yawei Sun, Zhiyong Zhao*, Yun Xu, Jiang-Fei Xu, Yuanchen Dong*, and **Dongsheng Liu***Reinforcing supramolecular hyaluronan hydrogels via kinetically interlocking multiple-units strategy Carbohydr. Polym., 310(2023), 120703.

DNA Supramolecular Hydrogels

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Abstract

Based on the excellent rigidity of DNA duplexes, we designed and prepared kinds of pure DNA supramolecular hydrogels, which possess an 'all-rigid' molecular network. Based on experimental results and theoretical studies, we also demonstrate these hydrogels have extraordinary permeability of macromolecules such as proteins. Due to their supramolecular nature, these hydrogels also retain extraordinary self-healing and fast-responding thixotropic properties, which make them injectable and writable.

Holding all these advantages, the DNA supramolecular hydrogels are excellent mimics of extra-cellular matrix (ECM). We will show its application in server spinal-cord injury repairing, where implanted stem cells only respond to in-situ signals generated by the injured animals.

Through DNA sequence design, we enabled the univariant mechanical strength of materials based on DNA supramolecular hydrogel platform, and demonstrate that 'Univariate mechanical strength does not influence neural progenitor cell fate in 3D matrix' for the first time.

1. T. Yuan, Y. Shao, S. Gui*, H. Yan*, D. Liu* et al. *Adv. Mater.*, **2021**, *35,* e2102428.

2. Y. Shao, H. Jia, T. Cao and D. Liu* *Acc. Chem. Res.*, **2017**, *50*, 659–668.

3. C. Li, W. Shu* and D. Liu* et al. *Angew. Chem. Int. Ed.*, **2015,** *54,*3957.

4. J. Jin, S. Wang* and D. Liu* et al. *Advanced Materials*, **2013**, *25(34)*, 4714.

5. Y. Xing, D. Liu*, *et al. Advanced Materials*, **2011**, *23*, 1117.

6. E. Cheng, D. Liu, *et al. Angew. Chem., Int. Ed.*, **2009**, *48*, 7660.