Chengyao Deng

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EDUCATION

Institute of High Energy Physics, Chinese Academy of Sciences Sep. 2023-Present
Master of Engineering Degree with majors in Computer Technology *Expected in June 2019*

- **GPA:** 3.77/4.0
- **Expected Coursework:** Control and Application of Micro-Nano Robots, Bionic Nanomachine, Reinforcement Learning and Applications, Pattern Recognition and Machine Learning, Deep Learning, Principle and Algorithms of Artificial Intelligence, Advanced Artificial Intelligence

Beijing Jiaotong University, Beijing Sep. 2018- Jun. 2022
Bachelor of Engineering Degree with majors in Mechanical Engineering

PUBLICATION

First Author:

- **Deng, C.**, Qu, J., Dong, J., Guo, Y., Wu, X., Fang, Y., Sun, X., Wei, Y., & Li, Z. (2024). 4D printing of magnetic smart structures based on light-cured magnetic hydrogel. *Chemical Engineering Journal*, *494*, 152992. https://doi.org/10.1016/j.cej.2024.152992 (JCR Q1, TOP)
- **Deng, C.**, & Li, Z. (2025). Review: Advanced Drive Technologies for Bionic Soft Robots. *Journal of Bionic Engineering*. https://doi.org/10.1007/s42235-025-00664-1 (JCR Q1)
- **Deng, C.**, Sun, H., Wu, X., Fang, Y., Guo, Y., Sun, X., & Li, Z. (2024). Study of Magnetic Hydrogel 4D Printability and Smart Self‐Folding Structure. *Advanced Engineering Materials*, *26*(22), 2401602. https://doi.org/10.1002/adem.202401602 (JCR Q2)
- **Deng, C.**, Dong, J., Guo, Y., Sun, X., Song, Z., & Li, Z. (2023). Amoeboid soft robot based on multi-material composite 3D printing technology. *Journal of Magnetism and Magnetic Materials*, *588*, 171390. https://doi.org/10.1016/j.jmmm.2023.171390 (JCR Q3)

Contributing Author:

- Li, Z., Dong, J., Zhang, S., Li, Y., **Deng, C.**, Li, D., Cui, H., Li, Z., Song, Z., Yao, J., & Qu, J. (2023). Phase transition reversible 3D printing of magnetic thixotropic fluid. *Applied Materials Today*, *34*, 101920. https://doi.org/10.1016/j.apmt.2023.101920 (JCR Q1)
- Li, Z., Guo, Y., Wang, H., **Deng, C.**, Dong, J., Song, Z., & Li, Z. (2023). Study of Dynamic Viscoelasticity of a Mineral Oil-Based Magnetic Fluid. Magnetochemistry, *9*(6), 143. Q2. https://doi.org/10.3390/magnetochemistry9060143 (JCR Q2)
- Qu, J., Li, Z., Fan, Q., Cui, H., & Liu, Y. (2024). Introduction to advanced soft robotics. BENTHAM SCIENCE PUBLISHERS. https://doi.org/10.2174/9789815256475124020l (Contributed)

Under Review:

- **Deng, C.** & Li, Z. (2024). Shape-controlled voxel-based printing of magnetic smart droplets and its application in Rheobot.
- Yi, S., **Deng, C.**, Yi, K., Cui, H. & Li, Z. (2024). Magnetic-controlled 4D Printing Process Technology for Manufacture of Soft Robots. *Smart Materials and Structures.* (JCR Q1)
- Cui, H., Zhou, H., Xu, H., **Deng, C.,** Lu, J., Cheng, Y. & Li, Z. (2024). Designing and fabrication of a biomimetic soft gripper utilizing phase transition 3D printing technology. *Advanced Engineering Materials.* (JCR Q2)

- Wei, Y., Li, Z., … **Deng, C.** & Liu, L. (2024). Research on the Printing Characteristics and Driving Performance of Bionic Soft Structures Based on SD-2 Bentonite Magnetic Thixotropic Fluid. *Composite Structures.* (JCR Q1, TOP)

PATENT

- A 4D Printing Device and Method for Magnetization and Magnetic Domain Writing Integration
- A Magnetically Responsive Nanocomposite Material and Its Preparation Method, 4D Printing Device, and Printing Method
- A 4D Printable Magnetically Responsive Silicone Elastomer, Its Preparation Method, and Applications
- A 4D Printable Magnetically Responsive Hydrogel Material, Its Preparation Method, and Applications

RESEARCH EXPERIENCE

Beijing Jiaotong University, Magnetic Fluid Research Center Jan. 2020-Jun. 2023

4D printing of magnetic self-folding robots *Nov.2021-Jun.2023*

- Developed a magnetic hydrogel for 4D printing, achieving integrated additive manufacturing of soft robots' structures and functions, filling a gap in the field of magnetic hydrogel 4D printing.
- Created a novel 4D printing ink, enhancing stability by adding bentonite to prevent the aggregation of magnetic particles and improve printing performance.
- Employed a new direct-write printing technique, magnetizing the ink using a strong magnetic field generated by rapid capacitor charging and discharging, simplifying material preprocessing and programming.
- Designed and printed various self-folding flexible actuators, demonstrating their potential in practical applications such as interventional therapy and rehabilitation assistance.

Composite printing of amoeboid magnetic soft robots *Jan.2020-Jun.2023*

- Developed a novel rheological adjustable magnetic smart material, enabling self-assembly and sol-gel transition behavior controlled by magnetic fields.
- Proposed the concept of "Rheobot," a robot capable of flowing like a fluid and achieving sol-gel transitions, inspired by the movement mechanism of amoebas in nature.
- Designed and printed a fully soft robot that can simulate the sol-gel transition of an amoeba, utilizing the material's fluidity as structural support during the robot's printing process, providing driving force for movement.

Chinese Academy of Sciences, Institute of High Energy Physics Jun. 2023- Present

Computer Vision Localization System *Jun. 2023- Present*

- Developed a visual positioning system, encompassing mechanical design, hardware setup, visualization interface design, and software development.
- Utilized digital image processing techniques to enhance images and improve feature recognition success rates and accuracy.
- Planned to implement reinforcement learning algorithms to optimize the solution process for camera distortion parameters in the solution space.
- Aiming to establish a deep learning network for end-to-end object recognition and positioning functionality.

AWARDS & HONORS

- Second-class Academic Scholarship, University of Chinese Academy of Sciences, 2023
- Second-class Academic Scholarship, University of Chinese Academy of Sciences, 2024
- Excellent League Member of the University of Chinese Academy of Sciences, Communist Youth League Committee of the University of Chinese Academy of Sciences, 2024
- Excellent League Member of the Chinese Academy of Sciences, Communist Youth League Committee of the Chinese Academy of Sciences, 2024

- Nestling Swallow Scholarship, China Spallation Neutron Source, 2025
- Third Prize, The 8th “Maker China” Beijing Small and Medium-sized Enterprises Innovation and Entrepreneurship Competition and “Maker Beijing 2023” Innovation and Entrepreneurship Competition, 2023
- Gold Award, The 27th National lnvention Exhibition·Belt & Road and BRlCS Competition of Skills Development and Technology Innovation, 2024
- Merit Student of the University of Chinese Academy of Sciences, University of Chinese Academy of Sciences, 2024
- Second Prize, National Engineering Innovation and Labor Education Competition and 3rd “Tsinghua Craftsman Competition”, 2024
- Second Prize, National Engineering Innovation and Labor Education Competition and 3rd “Tsinghua Craftsman Competition”, 2024
- Top 100 Entrepreneurial Teams, The Third Beijing College students' Innovation and Entrepreneurship Competition, 2024
- Gold Award, The 18th Beijing Invention Innovation Competition Innovation Award, 2024
- Silver Award, The 18th Beijing Invention Innovation Competition Innovation Award, 2024
- Gold Award, "Challenge Cup" Capital College Student Business Plan Competition, 2024
- Second Prize, China International College Students' Innovation Competition, 2024
- Silver Award, The 14th "Challenge Cup" Qin Chuang Original China College Students' Business Plan Competition, 2024
- Gold Award, The 28th National lnvention Exhibition·Belt & Road and BRlCS Competition of Skills Development and Technology Innovation, 2024
- Third Prize, Future AI Design Competition and Emerging Engineering Innovation Digital Skills Contest, 2025

SKILLS

- Computer skills： Matlab, Python, etc.
- Softwares： Comsol, Origin, Solidworks, AutoCAD, etc.
- Experimental equipment： Modular Compact Rheometer