

Longlong Li

PhD Student | BioMEMS / Biosensors / Engineered Cardiac Tissue Monitoring

Department of Mechanical Engineering, Chonnam National University

Gwangju, South Korea | lilonglong2000@jnu.ac.kr | Homepage: longlongli.com

Condensed version for HR screening, R&D; roles, and industry-facing applications.

Profile

- PhD student specializing in BioMEMS, multimodal biosensors, engineered cardiac tissue monitoring, and drug cardiotoxicity evaluation.
- Experienced in MEMS device design, microfabrication, cell and tissue culture, sensing system integration, and multimodal biosignal analysis.
- Develops strain-sensor / microelectrode-array platforms for synchronized and quantitative assessment of cardiac tissue function.

Education

- 2022-Present | Ph.D. in Mechanical Engineering, Chonnam National University, Gwangju, South Korea
- 2018-2022 | B.Eng. in Mechanical Engineering, Wenzhou University, Wenzhou, China

Research Experience

- Designed BioMEMS-based multimodal sensing platforms for engineered cardiac tissues.
- Integrated strain sensors and microelectrode arrays for synchronized monitoring of contraction and electrical activity.
- Built 3D cardiac tissue culture, drug stimulation, and signal-analysis workflows for cardiotoxicity screening and disease modeling.
- Developed low-noise measurement setups involving microscopy, sensor calibration, DAQ, and multimodal data analysis.

Technical Skills

- Microfabrication: Photolithography, metal deposition, SU-8 / PI processing, MEMS sensor fabrication.
- Biosensing: Strain sensors, microelectrode arrays, electromechanical monitoring, sensor calibration.
- Cell & Tissue Engineering: NRVM / hiPSC-CMs culture, engineered heart tissue construction, collagen / dECM bioinks.
- Data Analysis: MATLAB, Python, cardiac signal processing, feature extraction, visualization.
- System Integration: DAQ systems, amplifier circuits, microscopy, automated measurement platforms.

Selected Projects

- Bioinspired Hypoxic Cardiac Model and Electromechanical Evaluation Platform | 2026.03-Present | MNLT | Developed an in vitro cardiac hypoxia model with integrated electromechanical readouts for disease-relevant tissue assessment.
- High-Throughput Drug Toxicity Screening Platform Based on 3D Cardiac Tissues | 2024.03-2026.03 | MNLT | Designed a 3D cardiac tissue-based platform integrating mechanical and electrophysiological sensing for cardiotoxicity evaluation.
- Graphene-Conductive Microenvironment for Cardiomyocyte Maturation and Electrophysiological Communication | 2022.09-2024.03 | MNLT | Developed graphene/SU-8 platforms and contributed to publication and conference outputs.

Selected Publications

- Graphene SU-8 platform for enhanced cardiomyocyte maturation and intercellular communication in cardiac drug screening. Longlong Li et al. ACS Nano 18(49): 33293-33309, 2024. First author.
- Harnessing native blueprints for designing bioinks to bioprint functional cardiac tissue. Mst Zobaida Akter et al.; Longlong Li among co-authors. iScience 28(3), 2025.
- Development of multifunctional PAA-alginate-carboxymethyl cellulose hydrogel-loaded fiber-reinforced biomimetic scaffolds for controlled release of curcumin. Kamrun Nahar Fatema, Longlong Li et al. International Journal of Biological Macromolecules 301: 140449, 2025.
- Enhancing cardiomyocyte maturation through PEDOT:PSS-coated surfaces and mechanical stimulation with strain sensors. Jongyun Kim, Longlong Li et al. Journal of Micromechanics and Microengineering 35(4): 045002, 2025.
- Air-Breakdown Triboelectric Nanogenerator Inspired by Transistor Architecture for Low-Force Human-Machine Interfaces. Karthikeyan Munirathinam, Longlong Li et al. Nano-Micro Letters 18(1): 251, 2026.

Selected Conferences

- IEEE NANOMED 2024 | Enhancing Cardiomyocyte Maturation via Mechanical Stimulation of 3D Printed Cardiac Tissue Using a Origami-based 3D Sensor and Magnetic Fields.
- IEEE MEMS 2025 | A Dual-Detection Approach for Cardiotoxicity Screening: Utilizing Nano Silicon Strain Sensor and MEA to Monitor Contractility and Field Potential in Cardiomyocytes.
- IEEE SENSORS 2025 | Origami-Inspired 3D Sensor Platform for Real-Time Electromechanical Coupling Analysis in Engineered Heart Tissues.
- MicroTAS 2025 | Development of a Multi-Channel Wireless Monitoring Platform for Long-Term Cardiomyocyte Contraction Assessment Using a Polymer Cantilever with Integrated Sensor.
- IEEE MEMS 2026 | Multimodal Microelectrode-Microcantilever Array for Electromechanical Analysis of Cardiomyocyte Tissue in Drug Testing.

Patent Summary

- 15 patents in total: 4 invention patents, including 3 granted invention patents and 1 published invention patent application.
- 11 utility model patents spanning agricultural equipment, smart devices, robotics, and electromechanical systems.
- Representative patents: Vertical-Folding-Based Clothes Folding Machine (CN113186699B), Household Intelligent Toy Storage Robot (CN112407980B), Automatic Potato Harvester (CN216415123U), Intelligent Launch-and-Recovery Management Device for UAV Swarms (CN216269980U).

Awards

- 2025 | BK21 Fellowship Scholarship
- 2025 | RLRC Outstanding Graduate Student
- 2021 | China National Scholarship
- 2019 | Zhejiang Provincial Government Scholarship