

KOREA-US Frontiers in Health and Life Sciences

2025. 11. 6^(Thu) - 7^(Fri)
Four Seasons Hotel, Grandballroom(3F)



Curriculum Vitae

Name	First Name	Jennifer	Last Name	Shin
Country	Korea			
Affiliation	KAIST			



Educational Background

MIT, Mechanical Engineering, BA, 1998
MIT, Mechanical Engineering, MS, 2000
MIT, Mechanical Engineering, PhD, 2004

Professional Career

2024- KAIST Endowed Chair Professor, KAIST
2019- Professor of Mechanical Engineering, KAIST
2010-2019 Associate Professor of Mechanical Engineering, KAIST
2005-2010 Assistant Professor of Mechanical Engineering, KAIST

Research Field

Cell Mechanics and Mechanobiology

Our lab investigates the physical principles underlying these dynamic cellular responses through quantitative experiments conducted under controlled conditions. Our research sits at the interface of mechanobiology, cell mechanics, and biomedical engineering. We aim to uncover how diverse physical stimuli, including mechanical stress, bioelectric fields, and microenvironmental topology, modulate cell behavior in both normal and disease states, with implications for diagnostics and therapeutics. To this end, we develop tailored experimental systems such as microfluidic biochips and engineer physiologically relevant 3D spheroid-based disease models. Cellular function is evaluated using gene and protein expression profiling, along with mechanical stress analyses, including traction force microscopy and monolayer stress microscopy. In parallel, we are developing AI-based platforms to extract high-dimensional morphological and behavioral metrics from live-cell imaging. These phenotype-based metrics are not only used to dissect cellular heterogeneity in stem cells, cancer cells, and cancer-associated fibroblasts (CAFs) but also hold promise as novel quality control tools for evaluating therapeutic cell products, contributing to the advancement of precision cell therapy.

Papers, Books, etc. presented or published by your name

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1. M. Kang, C. Min, S. Devarasou, **J.H. Shin**, "Classification of differentially activated groups of fibroblasts using morphodynamic and motile features," *APL Bioengineering*, 9(2) (2025)
2. M. Kang, S. Devarasou, N.J. Sung, T.Y. Kwon, **J.H. Shin**, "EMT induction in normal breast epithelial cells by COX2-expressing fibroblasts," *Cell Communication and Signaling*, 23(1), 237 (2025).
3. M. Kang, U.H. Ko, E.J. Oh, H.M. Kim, H.Y. Chung, **J.H. Shin**, "Tension-sensitive HOX gene expression in fibroblasts for differential scar formation," *Journal of Translational Medicine*, 23(1), 168 (2025).
4. D. Bhatia, U. Jegal, E. Ko, N.J. Sung, **J.H. Shin**, **H.S. Park**, "Triboelectric nanogenerator for modulating neuronal outgrowth and neuroplasticity through controlled stimulation," *Nano Energy*, 110997 (2025)
5. M.L.S. Poon, E. Ko, E. Park, **J.H. Shin**, "Hypoxic postconditioning modulates neuroprotective glial reactivity in a 3D cortical ischemic-hypoxic injury model," *Scientific Reports*, 14(1), 27032 (2024)