Zhuo Feng, Lee

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RESEARCH INTERESTS

My research interests span the areas of mechanics and materials, specifically focusing on developing characterization methodologies to assess and understand the mechanical behaviors of microscale materials. For the past five years, I have been actively engaged in employing micro-electromechanical system (MEMS) fabrication techniques to design microscale test specimens, developing evaluation techniques for mechanical characterization (microscale uniaxial tensile test, nanoindenter-based experiments, high-throughput experiments), and conducting microstructural analysis via scanning/ transmission electron microscopy (S/TEM) and X-ray diffraction techniques to elucidate the structure-property relations of different microscale materials. The material systems central to my experience primarily include NiTi-based shape memory alloy thin films and silicon-on-nothing thin film structures.

My current Ph.D. thesis addresses the existing gap in the testing efficiency of thin film tensile experiments at elevated temperatures, thereby introducing the high-temperature membrane deflection experiment for high-throughput assessment of the temperature-dependent thin film tensile responses.

EDUCATION

2023 – present	Korea Advanced Institute of Science and Technology (KAIST) Ph.D. in Mechanical Engineering, **Advising professor:** Prof. Gi-Dong Sim, *in-situ* Characterization and Reliability Evaluation (*i*CaRE) Laboratory, Daejeon, Republic of Korea.
2021 – 2023	Korea Advanced Institute of Science and Technology (KAIST) M.S. in Mechanical Engineering, **Thesis:** *Combinatorial Study on Submicron Nickel-Titanium (Ni-Ti) Thin Films Through Membrane Deflection Experiments (2023)*, **Advising professor:** Prof. Gi-Dong Sim, *in-situ* Characterization and Reliability Evaluation (iCaRE) Laboratory, Daejeon, Republic of Korea.
2017 – 2021	Korea Advanced Institute of Science and Technology (KAIST) B.S. in Mechanical Engineering, Individually Designed Major (Mechanical Engineering, additional courses in Business & Technology Management and Computer Science)

PUBLICATIONS

First author publications

[1] **Z. F. Lee***, T. Kim*, K. Jung, J. Lee#, G.-D. Sim#,
"Mechanical characterization of Silicon-on-Nothing structures with nanoindentation and point-load deflection experiments."
Sensors and Actuators A: Physical 398 (2026) 117312. (SCIE, IF = 4.9, JCI = 82.9%).
*equal contribution, #corresponding authors.

[2] **Z. F. Lee**, H. Ryu, J.-Y. Kim, H. Kim, J.-H. Choi, I. Oh, G.-D. Sim,
"High-throughput membrane deflection characterization of shape memory alloy thin films."
Materials Science and Engineering: A 892 (2024) 146028. (SCIE, IF = 7.0, JCI = 90.2%).

Co-author publications

[3] J. Kim, **Z. F. Lee**, G.-D. Sim, S. Kim, J. S. Jeon,
"Implementation of Drug-Induced Rhabdomyolysis and Acute Kidney Injury in Microphysiological System."
Advanced Functional Materials (2025) e13519. (SCIE, IF = 19.0, JCI = 96.7%).

[4] D. Kim, Y. Kang, H. Kim, S. Oh, S. Jang, M. Lee, **Z. F. Lee**, G.-D. Sim, K. T. Lee,
"Sub-1000 °C Sintering of Protonic Ceramic Electrochemical Cells via Microwave-Driven Vapor Phase Diffusion."
Advanced Materials 37.43 (2025) 2506905. (SCIE, IF = 26.8, JCI = 99.0%).

[5] J. Kim, I. U Kim, **Z. F. Lee**, J. Han, J. Ahn, Y. Jo, P. Kim, H. Yoo, G.-D. Sim, J. S. Jeon,
"Detrimental effects of advanced glycation end-products (AGEs) on a 3D skeletal muscle model in microphysiological system."
Biosensors and Bioelectronics 278 (2025) 117316. (SCIE, IF = 10.5, JCI = 98.7%).

[6] J. Kim*, I. U Kim*, **Z. F. Lee**, G.-D. Sim, J. S. Jeon,
"Strategic Approaches in Generation of Robust Microphysiological 3D Musculoskeletal Tissue System."
Advanced Functional Materials 34.52 (2024) 2410872. (SCIE, IF = 19.0, JCI = 96.7%).
*equal contribution.

[7] J.H. Park, Y. Park, S. Choi, **Z. F. Lee**, G.-D. Sim,
"Fatigue behavior of freestanding nickel-molybdenum-tungsten thin films with high-density planar faults."
Nanoscale 16.25 (2024) 12050-12059. (SCIE, IF = 5.1, JCI = 71.6%).

[8] H. Ryu, **Z. F. Lee**, J.-Y. Kim, S. Choi, G.-D. Sim,
"Cyclic stability in NiTi and NiTiCu thin films: Role of precipitates in low- and high-cycle regimes."
Scripta Materialia 250 (2024) 116189. (SCIE, IF = 5.6, JCI = 86.1%)

Manuscripts in preparation/ under review

[9] **Z. F. Lee**, J.-Y. Kim, K.-H. Lim, H. Ryu, G.-D. Sim,
"Phase constituent and the mechanical integrity of Ti-rich NiTi thin films."
manuscript under review.

[10] **Z. F. Lee**, Y. Park, H. Kim, G.-D. Sim,
"Acquiring Tensile Responses of Thin Films at Elevated Temperatures: A High-throughput Approach."
manuscript in preparation.

[11] **Z. F. Lee**, H. Ryu, G.-D. Sim,
"Recent advances in shape memory alloy thin film technology."
manuscript in preparation.

AWARDS AND RECOGNITIONS

2023 – present	KAIST Special Doctoral Scholarship Recipient
2017 – present	KAIST International Student Scholarship Recipient
2024	Best paper award, KSME Chungcheong 2024 Spring Meeting
2022	Young Researcher Award, 6th International Conference on Materials and Reliability (ICMR 2022)
2021 – 2022, 2025	Student ambassador, KAIST Graduate Admissions Team, https://youtu.be/AgrZ-bj5fag?si=yaZdv0YYGOcpxzsI
2022	Nominee, 2022 KAIST Global Leadership Award, volunteer category

ACADEMIC PRESENTATIONS

Domestic conferences

2025	The Society of Micro and Nano Systems 2025 Spring Meeting, *Mechanical characterization of Silicon-on-Nothing structures with nanoindentation and point-load deflection experiments*, poster presentation in Korean.
2024	Korean Society of Mechanical Engineers (KSME), Chungcheong 2024 Spring Meeting, *Membrane Deflection Characterization of Thin Films at Elevated Temperatures*, poster presentation in Korean.
2024	Korean Society of Mechanical Engineers (KSME), Division of Materials and Fracture 2024 Spring Meeting, *Membrane Deflection Characterization of Thin Films at Elevated Temperatures*, oral presentation in Korean.

2023 — Korean Society of Mechanical Engineers (KSME), Division of Materials and Fracture 2023 Spring Meeting,
Mechanical Responses of Sputter-Deposited Mo/NiTi Bilayer Thin Films,
oral presentation in English.

2023 — Korean Society of Mechanical Engineers (KSME), Chungcheong 2023 Spring Meeting,
Combinatorial Study on Nickel-Titanium Thin Films Through Membrane Deflection Experiment,
oral presentation in English.

2022 — Korean Society of Mechanical Engineers (KSME), Annual Meeting 2022,
Development of Muscle Cell Analysis System Using Micro Tensile Tester,
poster presentation in Korean.

2022 — Korean Society of Mechanical Engineers (KSME), Division of Materials and Fracture 2022 Spring Meeting,
Combinatorial study of submicron Nickel-Titanium thin films through membrane deflection experiment,
oral presentation in English.

International conferences and workshops

2025 — 2025 HKU-KAIST ME Joint Workshop,
Membrane Deflection Characterization of NiTi Thin Films at Elevated Temperatures,
oral presentation in English.

2025 — The 20th International Conference on Strength of Materials (ICSMA 20),
Membrane Deflection Characterization of NiTi Thin Films at Elevated Temperatures,
oral presentation in English.

2024 — The 26th International Conference of Theoretical and Applied Mechanics (ICTAM 2024),
Membrane Deflection Characterization of Shape Memory Alloy Thin Films at Elevated Temperatures,
oral presentation in English.

2023 — The 18th International Conference on Nano/Micro Engineered and Molecular Systems (IEEE-NEMS 2023),
Combinatorial Study on Submicron Nickel-Titanium Thin Films Through Membrane Deflection Experiments,
oral presentation in English.

2022 — 6th International Conference on Materials and Reliability (ICMR 2022),
Combinatorial Study of Submicron Nickel-Titanium Thin Films Through Membrane Deflection Experiments,
oral presentation in English.

TEACHING ASSISTANT

2024 Winter	Advanced English Reading **Lecturer:** Professor Holly Wang, School of Digital Humanities and Computational Social Science, Korea Advanced Institute of Science and Technology (KAIST).
2024 Fall	Scientific Writing, Advanced English Reading **Lecturer:** Professor Holly Wang, School of Digital Humanities and Computational Social Science, Korea Advanced Institute of Science and Technology (KAIST).
2024 Spring	Scientific Writing **Lecturer:** Professor Holly Wang, School of Digital Humanities and Computational Social Science, Korea Advanced Institute of Science and Technology (KAIST).

SPECIALIZED EQUIPMENT AND SOFTWARE OPERATION

Scanning electron microscopy operation	Hitachi SU5000, FEI Quattro S, FEI Quanta 3D FEG
Nanoindenter-based experiments	KLA, InSEM & InSEM HT
Microstructural analysis	XRD, SEM, EDS, EBSD, TEM, STEM
MEMS fabrication	Class 1000 cleanroom licensed user: exposure and alignment system, reactive ion etching, sputtering, wet etching

MATLAB, SolidWorks, AutoCAD, ANSYS, Adobe Photoshop, OriginLab, Microsoft Office

LANGUAGES

Mandarin	Native
Cantonese	Native
English	Full professional proficiency
Korean	Professional working proficiency
Malay	Professional working proficiency
Hokkien	Limited working proficiency