

Kundo Park

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Staff Engineer @ Samsung Electronics, AI Center, AI R&D team

Google Scholar: <https://scholar.google.com/citations?user=IjtToM8AAAAJ&hl=en>

RESEARCH INTERESTS: AI+X

고체역학/CAE + AI	물리 기반 모델링 지식과 고체역학 도메인 지식을 AI와 결합하여 고성능 소재-구조 설계를 가속화
반도체 + AI	차세대 반도체 (HBM4 탑재 DRAM 반도체) 양산의 기술적 난제 극복을 위한 AI 솔루션 연구
LLM + ML algorithm	Agentic AI를 활용하여 기존의 머신러닝 기반 최적화 알고리즘을 추가 고도화 (i.e. LLM-powered Bayesian Optimization)
Fatigue prediction	기존 피로시험을 대체할 수 있는 SHM 기반 차세대 고속 피로시험 기법 개발
3D Bioprinting + AI	AI 기반 최적화 방법론을 활용하여 바이오프린팅 분야의 기술적 제약을 해소 (i.e. 3D Micro-vascularization)

APPOINTMENTS

Staff Engineer 2025.12-Current	삼성전자 DS부문 (AI센터 AI개발실 Vertical AI1팀) Role: AI 활용을 통한 차세대 반도체 (D1c DRAM) 제조 공정 최적화 및 수율 개선
Postdoc 2024.03-2025.08	Mechanical Engineering, UC Berkeley Advisor: Grace X. Gu Research topic: AI-based Optimization of Composite materials, and Bioprinting process.
Postdoc 2025.09-2025.12	PRISM-AI center, InnoCORE Postdoctoral fellowship program, KAIST Advisor: Seunghwa Ryu Research topic: Development of Agentic AI-assisted Multi-objective Bayesian optimization.

EDUCATION

PhD 2019.09-2024.02	Mechanical Engineering, KAIST Advisor: Seunghwa Ryu Thesis: Analysis and optimization of non-linear mechanical properties of structural composite materials using machine learning-based algorithms.
MS 2017.03-2019.08	Mechanical Engineering, KAIST Advisor: Seunghwa Ryu
MS 2017.03-2019.08	Mechanical Engineering, Politecnico di Milano Advisor: Flavia Libonati
BS 2012.09-2017.02	Mechanical Engineering, KAIST Advisor: Hyung-Soon Park

PUBLICATIONS

First author publications	P1	Coupled health monitoring system for CNT-doped self-sensing composites Park, K. , Scaccabarozzi, D., Sbarufatti, C., Jimenez-Suarez, A., Ureña, A., Ryu, S., & Libonati, F.* Carbon (IF: 11.6), 2020
	P2	Damage detection of composite materials via IR thermography and electrical resistance measurement: A review Park, K. , Lee, J., & Ryu, S.* Structural Engineering and Mechanics (IF: 3.0), 2021
	P3	Designing staggered platelet composite structure with Gaussian process regression-based Bayesian optimization Park, K. , Kim, Y., Kim, M., Song, C., Park, J., & Ryu, S.* Composites Science and Technology (IF: 9.8), 2022
	P4	Multi-objective Bayesian optimization for the designing of nacre-inspired composites: optimizing and understanding the biomimetics through AI Park, K. , Song, C., Park, J., & Ryu, S.* Materials Horizons (IF: 10.7), 2023
	P5	Laminate-inspired high strength piezoelectric self-powered sensing yarns via multi-objective Bayesian optimization Yang, Z., Park, K. (co-first author) , Nam, J., Cho, J., Kim, Y., Kim, H., Ryu, S., & Kim, M.* Advanced Science (IF: 14.1), 2024
	P6	Innovative 3D printing of mechanoluminescent composites: Vat photopolymerization meets machine learning Jo, J., Park, K. (co-first author) , Song, H., & Ryu, S.* Additive Manufacturing (IF: 11.1), 2024
	P7	Strength through curvature: Engineering multi-phase materials based on chiral aperiodic monotile patterns Jung, J., Park, K. (co-first author) , & Gu, G. X*

Composite Structures (IF: 7.1), 2025

- Co-author publications
- P8 Exploring the mechanical properties of aperiodic monotile composite family through Gaussian process regression
Jung, J., **Park, K.**, & Gu, G. X.*
Extreme Mechanics Letters (IF: 4.5), 2025
- P9 Towards the automation of plate forming process for shipbuilding: A DNN-based multi-start convex optimization framework for the prompt inverse design of line heating patterns
Moon, H., **Park, K.**, Lee, J., Lee, D., & Ryu, S.*
Extreme Mechanics Letters (IF: 4.5), 2025
- P10 Comparative Study of Multi-objective Bayesian Optimization and NSGA-III based Approaches for Injection Molding Process
Jung, J., **Park, K.**, Lee, H., Cho, B., & Ryu, S.*
Advanced Theory and Simulation (IF: 2.9), 2024
- P11 Electrode Placement Optimization for Electrical Impedance Tomography using Active Learning
Lee, J., **Park, K.**, Park, K., Kim, Y., Kim, J., & Ryu, S.*
Advanced Engineering Materials (IF: 3.3), 2024
- P12 Integrating Hierarchical DNNs and Genetic Algorithms for Grid Composite Configuration Optimization for High Toughness
Lee, J., Park, D., **Park, K.**, Song, H., Kim, T., & Ryu, S.*
Materials & Design (IF: 7.9), 2024
- P13 Designing directional adhesive pillar using deep learning-based optimization, 3D printing, and testing
Kim, Y., Yeo, J., **Park, K.**, Destree, A., Qin, Z., & Ryu, S.*
Mechanics of Materials (IF: 4.1), 2023
- P14 Optimization of injection molding process using multi-objective Bayesian optimization and constrained generative inverse design networks
Jung, J., **Park, K.**, Cho, B., Park, J., & Ryu, S.*
Journal of Intelligent Manufacturing (IF: 7.4), 2023
- P15 HGNet: A Hierarchical Multi-Task Learning Approach for Accelerated Composite Material Design and Discovery
Park, D., Lee, J., **Park, K.**, & Ryu, S.*
Advanced Engineering Materials (IF: 3.3), 2023
- P16 Machine learning-based inverse design methods considering data characteristics and design space size in materials design and manufacturing: a review
Lee, J., Park, D., Lee, H., **Park, K.**, & Ryu, S.*
Materials Horizons (IF: 10.7), 2023
- P17 Isotropic 3D printing using material extrusion of thin shell and post-casting of reinforcement core
Son, J., Yun, S., **Park, K.**, Ryu, S., & Kim, S.*
Additive Manufacturing (IF: 11.1), 2022
- P18 Deep learning framework for material design space exploration using active transfer learning and data augmentation
Kim, Y., Kim, Y., Yang, C., **Park, K.**, Gu, G. X., & Ryu, S.*
npj Computational Materials (IF: 11.9), 2021

ONGOING RESEARCH

(Abstract & Figures: <https://drive.google.com/drive/folders/1O0SJoarOPmx-Fv2bHnqrmwP4H8-rEPKM?usp=sharing>)

- P1 Accelerated Determination of the S-N Curve for Fiber-reinforced Composites Using a Tri-modal Tensile Test System
Park, K., Libonati, F., Garcia, A., Urena, A., Gu, G., & Ryu, S.* - status: research complete / manuscript ready
- P2 Inverse Design of Nacre-Inspired Composites with Multi-Physics Constraints via Diffusion Model
Byun, J., Park, D., **Park, K.** (co-first author), & Ryu, S.* - status: research complete / manuscript ready
- P3 Agentic AI-powered Multi-objective Bayesian Optimization
Park, K., Kim, Y., Kim, M., Song, C., Park, J., & Ryu, S.* - status: in progress
- P4 AI-based Optimization of Scaffold Structure and Bioprinting Process Parameters for 3D Vascularization
Park, K., Ryu, S., & Gu, X. G.* - status: in progress

PATENT

- IP1 Method and Device for Process Optimization
Ryu, S., Jung, J., & **Park, K.** (KR-10-2814800, Patent registered: 2025.05.26)
- IP2 Method and Apparatus for Optimization of Cathod Material Design using Multi-objective Bayesian Optimization
Ryu, S., Lee, J., & **Park, K.** (KR-10-2024-0083839, Patent pending: 2024.06.12)

FUNDING AND GRANTS

- 2025 InnoCORE Postdoctoral Fellowship
- Research: Agentic AI-powered Multi-objective Bayesian Optimization
- The Ministry of Science and ICT, Receives a KRW 30,000,000 research grant
- 2024 세종과학펠로우십 국외연수트랙
- Research: 혈관화된 3D 생체 조직 구현을 위한 머신러닝 기반 스키펴드 구조 및 바이오프린팅 공정변수 최적화
- 한국연구재단 (NRF), Received a KRW 70,000,000 research grant

INVITED TALKS & PRESENTATIONS

- 2025 KISTI (Korea Institute of Science and Technology Information), Invited seminar by Division of National Supercomputing 'Introduction to LLM API and its application: LLM-powered Bayesian Optimization'
- 2025 KISTI (Korea Institute of Science and Technology Information), Invited seminar by Division of National Supercomputing 'Designing Structural Composite Materials with Bayesian Optimization'
- 2025 TMS Annual Meeting & Exhibition (Las Vegas), Poster presentation, '3D printing of Mechanically Reinforced Hydrogels Based on Ketoenamine-crosslinked Polyrotaxane Network'
- 2023 Computational Structural Engineering Institute of Korea - Annual Conference, 'Multi-objective Bayesian optimization for the designing of bioinspired composites: optimizing and understanding the biomimetics through AI'
- 2022 The Korean Society of Mechanical Engineers - Spring conference, Oral presentation, 'Designing Staggered platelet composite structure with Gaussian process regression-based Bayesian optimization'
- 2022 WCCM - Annual conference (Yokohama), Oral presentation, 'Designing Staggered platelet composite structure with Gaussian process regression-based Bayesian optimization'
- 2022 International Conference on Electronic Materials and Nanotechnology for Green Environment, Poster presentation, 'Designing staggered platelet composite structure with Gaussian process regression-based Bayesian optimization'
- 2021 The Korean Society of Mechanical Engineers - Fall conference, Oral presentation, 'Designing staggered platelet composite structure with Gaussian process regression-based Bayesian optimization'
- 2020 The Korean Society for Composite Materials - Spring conference, Oral presentation, 'Coupled health monitoring system for CNT-doped self-sensing composites'
- 2019 MRS - Fall Meeting (Boston), Oral presentation, 'Damage assessment of CNT-doped composites through IR-thermography and electrical resistance measurement'
- 2019 The Korean Society of Mechanical Engineers - Spring conference, Oral presentation, 'Coupled CNT network and IR thermography monitoring for analysis of damage and fatigue property in composite materials'

CONTRIBUTED RESEARCH PROJECTS

- 2024.03-2025.09 NSF USA - Designing Materials to Revolutionize and Engineer our Future (DMREF) project, 'Closed-loop design of polymers with adaptive networks for extreme mechanics'
- 2023.04-2023.12 HD현대 - 산학협력 연구과제, '열간성형 배면가열선 자동생성을 위한 시가반 알고리즘 개발'
- 2022.03-2023.12 NRF Korea - 중견후속 연구과제, '미래모빌리티를 위한 3D 프린팅 복합재 최적설계기법 개발'
- 2020.09-2021.09 현대자동차 - 미래기술연구과제, 'UAM 및 고성능자동차의 경량화와 안전성 증대를 위한 탄소기반 자가진단 복합재 연구'
- 2019.03-2021.12 NRF Korea - 중견 연구과제, '3D 프린팅 복합재의 최적설계기법 및 피로수명 예측기법 개발'
- 2019.03-2021.12 NRF Korea - 글로벌 특이점 연구사업 (PREP), '머신러닝을 이용한 3D 프린팅 복합재 최적화 기법 개발'

AWARDS AND HONORS

- 2024 KAIST 기계공학과 박사 우수 졸업생/기계동문회장상
- 2024 우수 박사학위논문상 - 대한기계학회 (CAE and Applied Mechanics Division)
- 2020 최우수발표상 - 대한복합재료학회, Spring Conference
- 2016 장려상 - KAIST, Undergraduate Research Program

TEACHING AND MENTORING

- Teaching Assistant ME330 - 응력해석기초 (KAIST, Department of Mechanical Engineering) - Fall 2020, Fall 2021
- Mentoring Ph.D Student - Grace Qian (UC Berkeley), Research Mentor for AI+Bioprinting Project - Fall 2024
- Mentoring High school Student - Heewoong Park (한국과학기술한림원), 청소년과학영재사사 멘토링 - Fall 2022

SKILLS

- AI Bayesian optimization, DNN, PINN, Diffusion model, Large Language Model, Agentic AI
- Solid Mechanics Micromechanics, Structural mechanics, Fracture mechanics, Fatigue, Computational mechanics
- FEM Mechanical and multi-physical Finite Element Method (ABAQUS user subroutine, COMSOL, ANSYS)
- Programming Python, MATLAB, Fortran
- 3D Printing FDM, DLP, SLA, PolyJet, CFF, and Bioprinters (DIW-based printer, DLP-based printer)
- Experimental Fabrication of FRP composite via molding, Tensile test, Fatigue test, Compression test, Impact test, Electrical measurement, IR thermography, SEM
- 3D Modeling Solidworks, CATIA, Blender
- Language English - iBT TOEFL (Score: 110/120)