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Micro and Nano Transducers (MINT) Laboratory
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POSITION

KAIST ENDOWED CHAIR PROFESSOR & FULL PROFESSOR / VICE-HEAD OF DEPARTMENT

Affiliation: Department of Mechanical Engineering / School of Mechanical, Aerospace & Systems Engineering

Co-affiliation: KAIST Institute for the NanoCentury (KINC) / Mobile Sensor and IT Convergence (MOSAIC) Center

Korea Advanced Institute of Science and Technology (KAIST)

EDUCATION BACKGROUND

PH.D. IN MECHANICAL ENGINEERING (Dec 2007), University of California, Berkeley, USA

Dissertation Title: "Nanowire sensor for real-time chemical and biological detection"

MS IN MECHANICAL ENGINEERING (Aug 2003), University of Illinois, Urbana-Champaign, USA

Thesis Title: "Study of thermal oxidation of tantalum thin film and its protection by Ta₂O₅ and Al₂O₃ thin film layers for microscale chemical reactors"

BS IN MECHANICAL ENGINEERING (Feb 1998), KAIST, Daejeon, Republic of Korea

Graduation with *Summa Cum Laude* (Rank: 1/88)

SELECTED AWARDS & HONORS

- Top 10 Nanotechnology Award, Ministry of Science and ICT, Sep 2023
- NanoKorea 2023 Research Innovation Award (Minister Award), Ministry of Science and ICT, Jul 2023
- Grand Prize, KAIST Research Innovation Award, Dec 2019
- Outstanding Researcher Award, The Society of Micro and Nano Systems of Korea, Aug 2020
- KAIST Endowed Chair Professorship, Mar 2017
- Best Paper Award, IEEE NANO '2010 Conference, Aug 2010
- HP Open Innovation Research Award, Hewlett Packard (HP) Company (USA), 2009-2012
- Summa Cum Laude (1st of 88 Graduates in Mechanical Engineering Department), KAIST, Spring 1998

SELECTED PROFESSIONAL EXPERIENCE

FULL PROFESSOR (Mar 2019-Present); KAIST ENDOWED CHAIR PROFESSOR (Mar 2017-Present); ASSOCIATE & ASSISTANT PROFESSOR (Jan 2009-Feb 2019)

Department of Mechanical Engineering, KAIST

TECHNICAL ADVISORY PROFESSOR (Jul 2019-Sep 2020), Samsung Electronics, Device Solution Division

VISITING PROFESSOR (Feb 2014-Feb 2015)

Department of Mechanical and Aerospace Engineering, University of California at San Diego, CA

CO-FOUNDER AND CHIEF TECHNOLOGY OFFICER (Jan 2008-Jan 2009)

nPrint Solutions, San Jose, CA, USA (<http://www.nprintsolutions.com>)

RESEARCH SPECIALIST (Dec 2007-Nov 2008)

Berkeley Sensor and Actuator Center (BSAC), University of California, Berkeley, USA

VISITING RESEARCHER (May 2005-Nov 2008)

Quantum Science Research (QSR) Group, Hewlett-Packard Laboratory, Palo Alto, CA, USA

RESEARCH ACHIEVEMENT AND INTERESTS

- Total number of SCI papers = 175 (*Nature Communications*, *Science Advances*, *Advanced Science*, *Advanced Materials*, *PNAS*, *Advanced Functional Materials*, *Advanced Energy Materials*, *ACS Nano*, *Light: Science & Applications*, *Nano Letters*, *Nano Energy*, etc.); Total citations = 15249; h-index=55 (Google); 31 cover articles
- Main research areas: nanofabrication and nanomanufacturing; smart sensors; nanomaterial-based sensors and flexible & wearable electronics; IoT sensors for environmental monitoring, healthcare, and biomedical applications; functional nanomaterials and nanostructures for low-power, high-performance sensors

KEY RESEARCH PROJECTS (~1.2M USD/year)

- Development of ultra-compact, low power gas sensor array based on MEMS and multi-component metal oxide nanomaterials, Ministry of Science and ICT, Korea (2017-2024)
- National Center for Optically-assisted Ultrahigh-precision Mechanical Systems, Ministry of Science and ICT, Korea (2015-2022)
- Structural innovation and deep learning-based core technology for the breakthrough of IoT physical /environmental sensors, Ministry of Science and ICT, Korea (2021-2026)

LIST OF RECENT SELECTED PUBLICATIONS (as a corresponding author)

- J. Ahn, I. Park*, et al, “Micro/Nano Hierarchical Structures Physically Engineered on Surface: Analysis and Perspectives”, *Advanced Materials*, 2300871 (2023), **Back Cover Article**
- I. Cho, I. Park*, et al, “Deep Learning-based Gas Identification by Time-Variant Illumination of a Single Micro LED-Embedded Gas Sensor”, *Light: Science & Applications*, 12, 95 (2023)
- J. Ahn, I. Park*, et al., “Nanoscale Three-Dimensional Fabrication Based on Mechanically Guided Assembly”, *Nature Communications* 14, 833 (2023)
- M.S. Kim, I. Park*, et al., “Skin-like Omnidirectional Stretchable Platform with Negative Poisson’s Ratio for Wearable Strain–Pressure Simultaneous Sensor”, *Advanced Functional Materials* 33, 2208792 (2023), **Front Cover Article**
- J. Ahn, I. Park*, et al., “All-recyclable triboelectric nanogenerator for sustainable ocean monitoring systems”, *Advanced Energy Materials* 12, 2201341 (2022), **Back Cover Article**
- J.K. Han, I. Park*, et al., “Artificial olfactory neuron for an in-sensor neuromorphic nose”, *Advanced Science* 23, 2106017 (2022), **Back Cover Article**
- Y. Jung, I. Park*, et al, “Irregular microdome structure-based sensitive pressure sensor using internal popping of microspheres”, *Advanced Functional Materials* 32, 2201147 (2022), **Back Cover Article**
- J. Choi, I. Park*, et al., “Customizable, conformal, and stretchable 3D electronics via pre-distorted pattern generation and thermoforming”, *Science Advances* 7, eabj0694 (2021)
- Y. Oh, I. Park*, et al., “Battery-free, wireless soft sensors for continuous multi-site measurements of pressure and temperature for patients at risk for pressure injuries”, *Nature Communications* 12, 5008 (2021)
- J. Park, I. Park*, et al., “Real-time internal steam popping detection during radiofrequency ablation with a radiofrequency ablation needle integrated with a temperature and pressure sensor: pre-clinical and clinical pilot tests”, *Advanced Science*, 2100725 (2021), **Frontispiece Article**
- J. Ahn, I. Park*, et al., “Morphology-controllable wrinkled hierarchical structure and its application to superhydrophobic triboelectric nanogenerator”, *Nano Energy* 85, 105978 (2021)
- Y. Jeong, I. Park*, et al., “Ultra-wide range pressure sensor based on microstructured conductive nanocomposite for wearable workout monitoring”, *Advanced Healthcare Materials* 10, 2001461 (2021), **Front Cover Article**
- Z. Zhao, I. Park*, et al, “Large-area nanogap-controlled 3D nanoarchitectures fabricated via layer-by-layer nanoimprint”, *ACS Nano* 15, 503-514 (2021)
- M. Seo, I. Park*, et al., “Chemo-mechanically operating palladium-polymer nanograting film for self-powered H₂ gas sensor”, *ACS Nano* 14, 16813-16822 (2020)
- J. Choi, I. Park*, et al., “Wearable self-powered pressure sensor by integration of piezo-transmittance microporous elastomer with organic solar cell”, *Nano Energy* 74, 104749 (2020)



- Prof. John Rogers, (Northwestern Univ.), Development of wireless wearable biomedical sensors (2018-2021)
- Prof. Zhenan Bao (Stanford Univ.), Development of wearable health monitoring devices (2021-present)

- Prof. Grace X. Gu (UC Berkeley), Machine learning based design of metamaterial-based sensors (2022-present)