

<div><div>3DMNSL 3-DIMENSIONAL MICRO-NANO STRUCTURES LABORATORY</div><div>3D Micro-Nano Structures Laboratory</div></div>	<div>Contact information</div> <div>Professor: Nanofab Center 513 (E19) TEL :042-350-3476</div> <div>Lab.: Nanofab Center 523 (E19) TEL :042-350-5476</div> <div>Website: http://MEMS.kr/</div>
<div>Current state of the Lab. (in 2025 Spring Semester)</div> <div>Post-doc: 1 PhD Students: 7 Master's Student: 4</div>	
<div>Research Areas</div> <div>▷ We focus on the high-performance 3-dimensional micro/nano-electro-mechanical systems (M/NEMS).</div> <div>▷ We research on unique device-design, fabrication, and demonstration technologies.</div> <div>▷ Based on our superior abilities in overall device-technology, we have developed the world-best electrical devices, such as nano/micro-mechanical switches (DC/RF), nano-sensor devices and optical components.</div> <div>▷ We have also widen the research-field into bio-sensor, health-care monitoring, energy harvesting devices and so on, with lab members having various undergraduate majors (EE, ME, MSE, Chemistry, etc.)</div> <div><div>Nano/micro-switch for DC & RF applications -----</div><div>Utilizing micro/nano-mechanical switches, we achieve zero leakage current and infinite sub-threshold swing. We're advancing high-performance switches to address CMOS transistor limitations, aiming to enhance <u>autonomous driving and space industry memory, advanced back end of line (BEOL) interconnects, circulator for quantum computing, and DC & RF applications</u></div><div><div>Fig. 1 NEMS Switch</div></div></div> <div><div>Commercial-Grade Reliable High-Performance Nano Devices -----</div><div>Utilizing our advanced large-area, high-resolution nano-fabrication techniques, we uncover groundbreaking phenomena, leading to the creation of high-performance <u>gas (chemical) sensors, pressure, strain and temperature (physical) sensors</u>, as well as <u>bolometer (optical)</u> pivotal for Industry 4.0.</div><div><div>Fig. 2 Nano-structured Sensor</div></div></div> <div><div>Soft Electronics for Next-Generation Devices (Health Care, Human-Machine Interaction) ----</div><div>Leveraging the advantages of nanostructures, we develop high-performance and highly reliable physical sensors, including <u>pressure, strain and temperature sensors</u>. By integrating circuitry, communication, and AI technologies, we design systems for applications in health monitoring and human-machine interaction.</div><div><div>Fig. 3 Nano-structured Sensor</div></div></div>	
<div>Recommended courses & Career after graduation</div> <div>Semiconductor devices, integrated circuit devices, and MEMS in EE perspective are recommended.</div> <div>So far, 26 PhDs and 48 MS degrees have been conferred. Many of our graduates have pursued careers in global industry leaders such as <u>Samsung, SAIT, Broadcom, SK Hynix, and LG</u>. Additionally, some have gone on to conduct postdoctoral research at esteemed institutions like <u>Northwestern, MIT, Purdue Johns Hopkins, and NIH</u>, and later secured positions at national research institutes (<u>KIST, ADD, KIMM, NIH</u>) and as professors (<u>Hanyang, Pusan National, SKKU, Chonnam National University</u>).</div>	<div>Introduction to other activities besides research</div> <div><div><div>2023 Summer workshop</div></div><div><div>2023 Homecoming day @ Japan</div></div></div> <div><div>Quarterly Workshop :</div><div>- Summer: Pension</div><div>- Winter: Ski Resort</div><div>- Research Direction sharing</div><div>Annual Homecoming Day :</div><div>- Last homecoming day @ Japan ski resort</div><div>Leisure Activity :</div><div>- Enjoy sports regularly (Soccer, Bowling, running)</div></div>
<div>Recent research achievements ('22~'24)</div> <div>- In total, 114 international journals, 110 international conference, 38 international and 102 domestic patents. (Journals : Nature Nanotechnology, Nature Communications, Advanced Materials, ACS Nano, Small etc.)</div> <div>- Awarded for our researches from IEEE, Samsung Electronics, Society of Micro and Nano Systems, and KAIST.</div> <div>- Professor Jun-Bo Yoon won 2023 KAIST Educator Award (윤준보 교수님 '2023 KAIST 교육자상' 수상).</div> <div>- Selected as a 'Healthy Laboratory' by the Ministry of Science and ICT in 2021 (2021 건강한 연구실 선정)</div>	