

	■ Contact information Professor : syoo.ee@kaist.edu TEL : 042-350-3483/8083 Lab. : tpwls04044@kaist.ac.kr TEL : 042-350-5483 Website : https://www.ioel.kaist.ac.kr/
■ Current state of the Lab. (as of 2025 Spring Semester) PhD Students: 12 Integrated MS/PhD Students: 2 Master's Student: 10	
■ Research Areas Organic Light-Emitting Diodes (OLED) We develop novel device architectures for OLEDs to unlock their full potential in efficiency as well as in versatile form factors, realizing highly efficient flexible, stretchable, and transparent OLED displays and body-attachable light sources for phototherapy. <ul style="list-style-type: none">Highly efficient flexible and stretchable OLEDs  <ul style="list-style-type: none">OLEDs for phototherapeutics applications 	Organic solar cells and flexible electronic devices  Significant advances are being made for object-integrated solar cells by developing flexible and semi-transparent solar cells. Other areas of interest include but are not limited to low-cost wearable/ large-area electronic devices made of organic and other emerging materials. Wearable health-monitoring sensors State-of-the-art applications for future electronics including wearable/ patched devices require not only various functions but also diverse form factors.  Pulse oximetry sensors Real-time CO ₂ monitoring sensors
■ Recommended courses <ul style="list-style-type: none">Introduction to Physical Electronics (EE211)Semiconductor Devices (EE362)Organic Electronics (EE568)Display Engineering (EE563) <p>Plus, any courses on optics and photonics will be of help, as researches at IOEL deal with many optical phenomena and engineering.</p>	■ Introduction to other activities besides research <ul style="list-style-type: none">IOEL encourages good interpersonal relationship through regular lab workshops, strawberry party, and sports days, etc.  ■ Career after graduation <ul style="list-style-type: none">Various R&D fields in academia, government institutes, and industry.
■ Introduction to the Lab. Integrated Organic Electronics Lab (IOEL) focuses on developing novel device architectures and processes based on organic and other emerging semiconductors in the following areas: display & lighting, energy, and flexible low-cost electronics. Recent research trends no longer centralize on device performance enhancement, but focus more on the realization of various functionalities. For students with knowledge in electronics and great interest in interdisciplinary fields, we hope you will join IOEL and seize the chance to apply your electrical engineering skills to various areas.	
■ Recent research achievements ('23~'25) [1] Jee Hoon Sim et al., "Wireless Organic Light-Emitting Diode Contact Lenses for On-Eye Wearable Light Sources", <i>ACS Nano</i> , 2025 [2] Min Jae Kim and Dongho Choi et al., "Ultralow-power carbon dioxide sensor for real-time breath monitoring", <i>Device</i> , 2025 [3] Dongho Choi and Seunghee Lee et al., "Vertically stacked all-organic ring-shaped pulse oximetry sensor ...", <i>npj Flexible Electronics</i> , 2025 [4] Hyung Suk Kim, et al., "Advancing efficiency in deep-blue OLEDs: Exploring a machine learning-driven ...", <i>Science Advances</i> , 2025 [5] Su-Bon Kim, et al., "3D height-alternant island arrays for stretchable OLEDs ...", <i>Nature Communications</i> , 2024 [6] Donggyun Lee, et al., "Stretchable OLEDs based on a hidden active area ...", <i>Nature Communications</i> , 2024 [7] Hyung Suk Kim, et al., "Understanding of complex spin up-conversion processes ...", <i>Nature Communications</i> , 2024 [8] Haechang Lee, et al., "Gradual Electrical-Double-Layer Modulation in Ion-Polymer Networks for Flexible Pressure Sensors...", <i>Advanced Functional Materials</i> , 2024 [9] Jee Hoon Sim et al., "OLED catheters for inner-body phototherapy: A case of type 2 diabetes mellitus ...", <i>Science Advances</i> , 2023 [10] Junho Kim, et al., "Toward Near-Foldable Surface Light Sources with Ultimate Efficiency: Ultrathin Substrates ...", <i>ACS Photonics</i> , 2023	