<Professor Hoon Kim's Lab.>

PHOTONICS SYSTEMS RESEARCH LAB

■ **Contact information**
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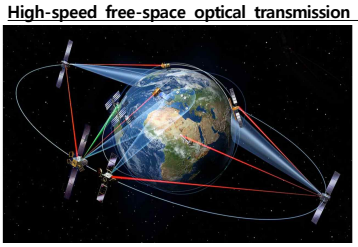
■ **Current state of the Lab. (in 2025 Spring Semester)**
Postdoctoral Fellows: 2 PhD Students: 10 Master's Student: 7

■ **Research Areas**

Our research is centered around photonic systems and related technologies, including free-space optical communications, high-capacity fiber-optic transmission systems, optical access networks, and lightwave subsystems.

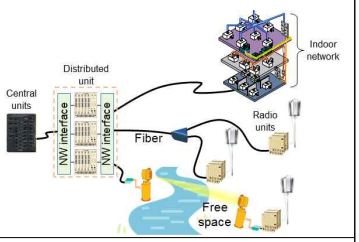
High-speed free-space optical transmission system



In an era of expanding commercial satellite networks and frequent satellite launches, it is expected that we will soon reach a point of radio frequency (RF) saturation. Furthermore, there's a growing need for instant, large-scale data transfer from satellites to ground stations, which existing RF communications struggle to meet. To address these challenges, laser optical communication emerges as a transformative solution. By harnessing light in the hundreds of terahertz range, laser optical communication enables high-speed signal transmission with minimal losses, distinguishing it from RF systems. It can achieve data transmission rates of over tens of gigabits per second, making it a promising option for space communication. Our research focuses on leveraging free-space optical communication technology for various applications.

Transmission technologies for 6G

Optical networks form the backbone of our communication systems. To enable the next generation (6G) mobile communication services, the optical network must evolve into a low-delay, high-speed network, with speeds reaching up to tens of terabits per second. Our research is focused on investigating various cost-effective technologies to achieve this goal.



■ **Recommended courses & Career after graduation**

- Recommended courses include Introduction to Optical Communication (EE441), Introduction to Optical Engineering (EE352), and Digital Signal Processing (EE432).
- Potential career paths after graduation include national research institutes, major companies, and academia.

■ **Introduction to other activities besides research**

- Every spring, we have our annual strawberry party and homecoming event.
- We plan to have a regular sports day with other lab members in KAIST working on photonics.

■ **Introduction to our Lab.**

- Welcome to the Photonics Systems Research Lab, founded in 2014 and led by Prof. Hoon Kim. Prof. Kim has accumulated 22 years of experience in photonics systems, with a career that has included positions at renowned organizations like Bell Labs, Lucent Technologies., Samsung Electronics, and National University of Singapore. Our main focus lies in exploring the fundamental limits of various photonics systems and developing practical implementation methods. Prof. Kim currently serves as the Editor of *Optics Communications* and the Senior Editor of *IEEE Photonics Technology Letters*.
- We actively engage in academic exchanges with international research institutes and universities. We also participate in prominent international conferences such as OFC and OECC.

■ **Recent research achievements ('22~'25)**

- International journal publications : 19, International conference presentations: 26.
- Best Student Paper Awards : Photonics Conference 2022, 2024 COOC 2022, 2025 SPPCom 2024.