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(국문/영문)기타소속:

국문 강연제목: 반도체 소자를 통한 생체 신호 감지와 페이크 데이터 탐지

영문 강연제목: Semiconductor Devices for Biosignal Monitoring and Fake Data Detection

Abstract(영문):

Emerging edge AI applications need device-level solutions that are energy-efficient, reliable, and able to handle challenges in both security and healthcare. In this talk, I will share two recent directions from our work. First, we are developing optoelectronic synaptic devices for biosignal monitoring. These photonic synapses mimic neural processing, enabling low-power and adaptive sensing of optical biosignals such as PPG and multi-wavelength physiological signals. By combining photonic sensing with neuromorphic architectures, this approach opens a pathway toward real-time, intelligent healthcare monitoring. Second, we are building custom semiconductor devices for fake media detection. Gaussian transistors use intrinsic device variability to perform analog activation and probabilistic inference, enabling robust voice authentication. Photo-spike photodetectors convert light fluctuations into asynchronous spikes, producing physical randomness that can be used for deepfake image detection and secure watermarking. These efforts show how tuning the physics of emerging devices can tackle next-generation challenges in secure AI sensing and biosignal neuromorphic processing.

Brief Biosketch (간단한 이력, 연구/대외활동 소개, 국문/영문)

Hocheon Yoo, PhD is an Associate Professor in the Department of Electronic Engineering at Hanyang University, South Korea, where he leads the We Design Devices (WeDD) Lab. His research focuses on the development of novel semiconductor devices for neuromorphic computing, secure hardware, and sensor-integrated AI systems. He pursues a material-device-application co-design approach, exploring how emerging materials and structures can directly enable new forms of intelligent behavior. He is the Korean principal investigator of a Korea-US project on foundational semiconductor technologies (NRF-NSF, 2024-2027), and also leads a Korea-Canada academia-industry collaboration with McGill University and 1-Material. His professional activities include:

- Vice Chair, Neuromorphic Device Standardization Roadmap Committee, Korea Semiconductor Industry Association (2024-present)
- Co-Chair, MEMS & Sensor Systems Division, Korean Conference on Semiconductors (KCS 2025)
- Division Chair, Bio-Semiconductor, Korean Society for Medical and Biological Engineering (2025-present)
- Secretary, Active Matrix Devices (AMD) Committee, Society for Information Display (2024-present)
- Chair, 10th TFT Short Course, SID Korea (2025)
- Focused Section Chair – Neuromorphic Devices and Systems, IEEE FLEPS 2025