

Nano-Oriented Bio-Electronics Lab

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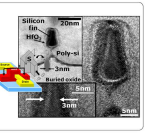
Current state of the Lab. (in 2025 Fall Semester)

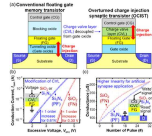
PhD Students: 15 Master's Student: 8

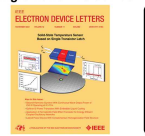
Research Areas

World Top CMOS Technology

연구실적: SCI 논문 431 편, 국제학회 129 편


Fabrication


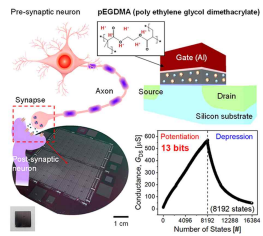
Novel structures


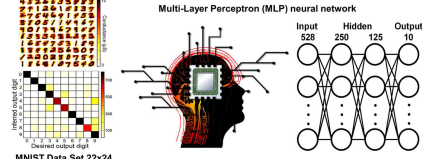
Single-nanowire device


- 3차원 MOSFET (FinFET, gate-all-around)
- 새로운 구조와 신물질 기반의 CMOS
- Gate-less & capacitor-less DRAM
- 3차원 V-NAND flash memory
- 큰 노이한 architecture를 초월한 RRAM, fabric-기반 memristor
- 보안 소자 및 자가 치유가 가능한 CMOS

Neuromorphic System for AI

Neuron devices for in-sensor computing


Synapse Device for Neuro-Inspired Architecture


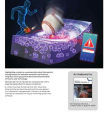
Machine/Deep Learning Algorithm


- Bio-inspired 뉴로모픽 시스템
- 뉴런 소자 및 다양한 센서와의 연계 시스템
- 고성능 시냅스 소자 개발 및 센서와의 연계
- Machine learning/Deep learning 기반 CMOS 소자 및 설계
- 하드웨어 기반의 뉴런-시냅스를 활용한 생물학적 뇌 모사
- On-chip 과 off-chip learning
- 뇌와 집의 interface 연구

Triboelectric Energy Harvesting

Mechanism: Hybrid of contact electrification and electrostatic induction. Instantaneous voltage reaches 4~20 kV level.


Human body implantable energy generator

- 정전기 기반 마찰대전 발전기 (TEG)
- Hybrid 에너지 하베스터
- 자가 발전 보안 소자 및 보안 기술
- 에너지 하베스터를 활용한 자가 발전 CMOS 시스템
- TEG 기반의 우주 탐사선용 CMOS (미국 NASA와 팀 크기의 우주선 프로젝트 진행)

Recommended courses & Career after graduation

NASA (3), SK Hynix (16), Samsung electronics (29), Professor (11), KIST (1), Intel (2), ETC.

Introduction to other activities besides research

Various social activities including sports

Introduction to the Lab. Our laboratory have friendly atmosphere with high-quality research facilities and know-hows. Students have various research field, and we try to think more creatively with deep, enthusiastic discussions.

Recent research achievements ('22~'25)

Six cover images, 71 SCI papers including high-impact journals (Science advances, Advanced materials, and etc.)