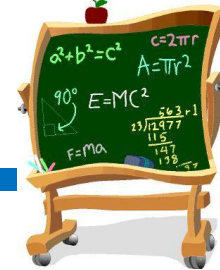


Department of Optics and Mechatronics Engineering



Electrical/Nano Optics

Mechanical/Nano Optics

Mechanical/Nano Fab

Electrical/Laser Optics

Physics/Nano Optics

Physics/Nano Solid State

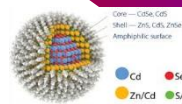
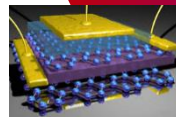
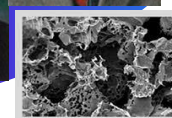
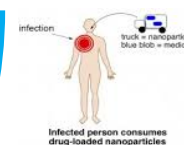
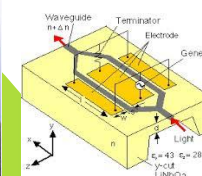
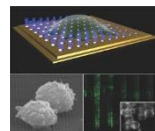
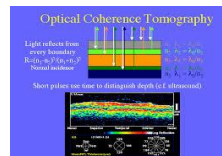
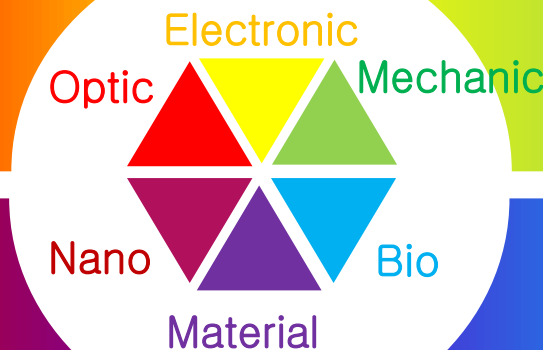
Material/Nano Device

Chemistry/Bioanalytical BioChemistry/BioMaterial

Mechanical/Optic Fab

Medicine/NanoMedicine

Biology/Immunology



Prof. Myung Yung Jeong



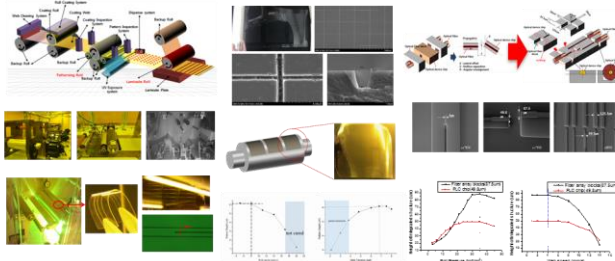
- Professor
- Department of Cogno-mechatronics Engineering
- Major
 - Nanofabrication
 - Nano-optomechanics
 - Cogno-optomechatronics

R&D summaries

■ Roll to Roll Nanomprint Lithography

➤ Roll to Roll Imprint Litho.

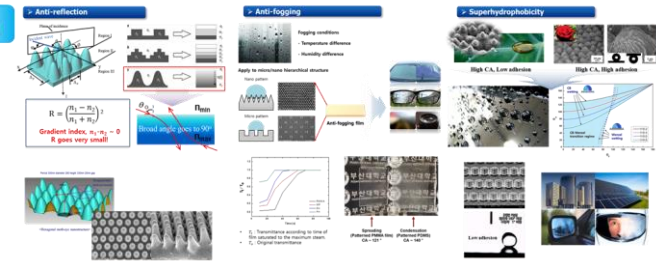
- Development of roll master
- Manufacturing for Fine size design
- Fabrication for Nano-micro structure
- Control technology of web transport
- Resist thickness & uniformity
- High Pattern fidelity, large area



■ Nanosurface Engineering

➤ Nanosurface engineering

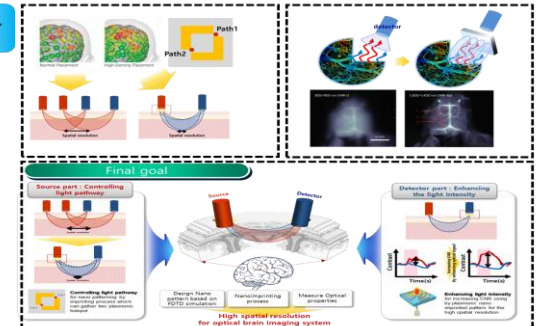
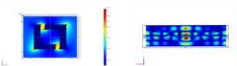
- Design of nano pattern for anti-reflection, anti-fogging, superhydrophobic functional film.
- Fabrication of micro/nano pattern by using nanoimprint lithography.



■ Cogno-optomechatronics Engineering

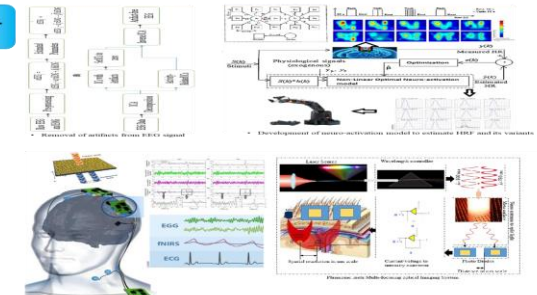
➤ Cogno-Optomechatronics Engineering. -Optical brain imaging

- To control the light pathway by using the plasmonic hotspot nanopattern
- Develop Plasmonic nano pattern for enhancing the optical signal
- By imprinting process, make the nano size plasmonic pattern



➤ Cogno-Optomechatronics Engineering. Cogno-BCI engineering

- Development of state-of-the-art methodology for interpreting fNIRS, EEG and Bi o-signals simultaneously.
- Development of a novel methodology to improve spatial resolution of optical imaging.
- Improvement of classification accuracy in BCI-application.



Prof. Byung Hak Jhun

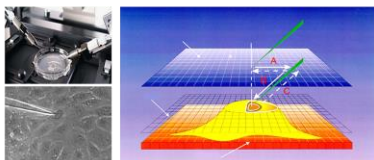


- Professor
- Department of Cogno-Mechatronics Engineering
- Major
 - Nanomedicine
 - Genomics & Cell Signaling
 - Biochip & microRNA analysis

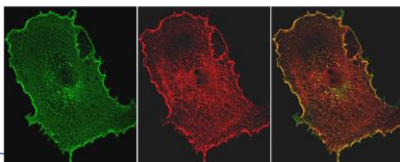
R&D summaries

■ Single Cell Microinjection Analysis

세포 미세주사장치



Confocal microscopy를 이용한 유전자 조사

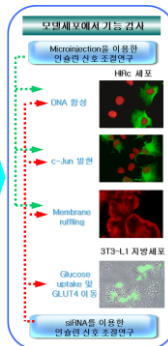


단세포단기전사체(GSEA) 분석

Gene Set	ES	유전자 수
OXPPOS_HG-U1	6811887	107개
human_mitoDB_E	6481734	503개
mitochondr_HG-	6362866	517개
c5_U133_probes	4768967	
c9_U133_probes	4688284	
c20_U133_probes	4584803	
c18_U133_probes	4417435	
c10_U133_probes	4388957	

DNA chip 검출에서 각 유전자 발현 증감 분석

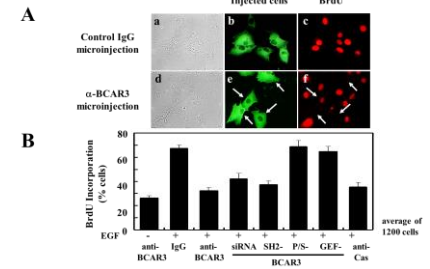
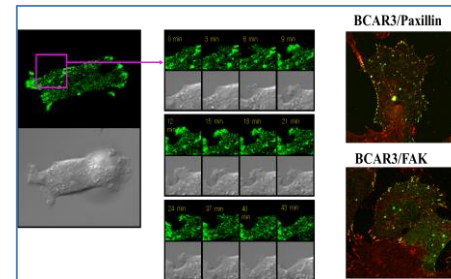
미토콘드리아 유전자 발현 분석



■ DNA Chip Analysis of Diabetes

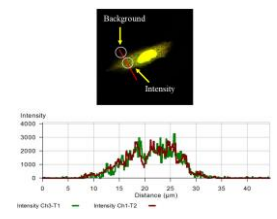
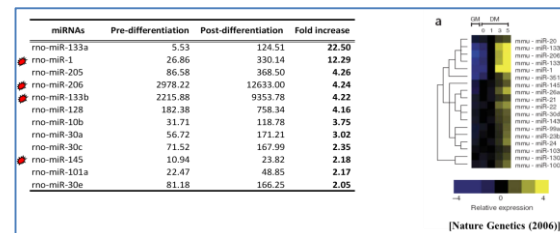


■ Breast Cancer Drug Resistance Mechanism



BCAR3 is involved in EGF-induced DNA synthesis through the SH2 domain in MCF-12A cells.

■ microRNA Analysis of Muscle



Prof. Se-Young Jeong

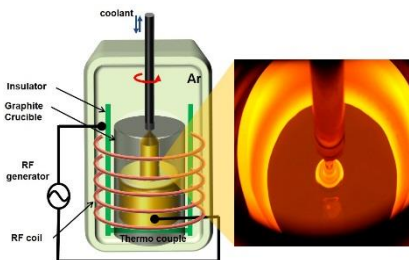


- Professor
- Department of Cogno-Mechatronics Engineering
- Major
 - Condensed Matter Physics
 - Magnetic Semiconductor
 - Properties Single crystal metal

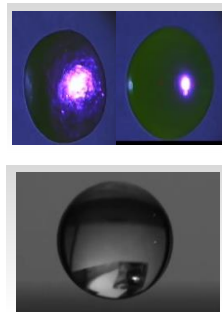
R&D summaries

1. Single crystal growth

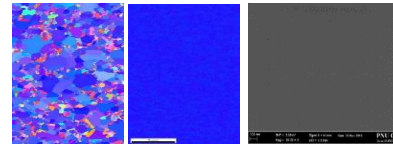
a. Czochralski method



b. Levitation method

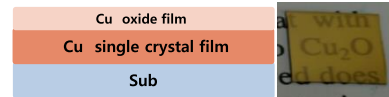


2. Single crystal metal thin films

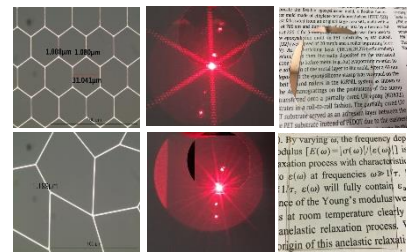


→ Wafer scale Single Crystal metal thin films

a. Metal oxidized thin film



c. Transparent Conductive Electrode

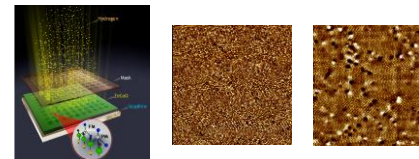


b. Free-standing Metal thin film



3. Spintronics

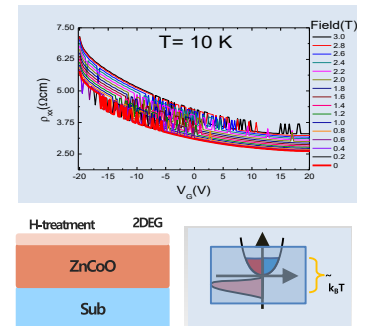
a. Self patterning by Hydrogen Lithography



Nano-magnetic domains with a size of 200 nm induced by selective hydrogen injection via hydrogen plasma treatment using anodic-aluminum oxide(AAO) mask.

→ Suggesting that oxide-based high density magnetic logic device

b. Quantum tunneling effect



Prof. Young-Hwa Chung

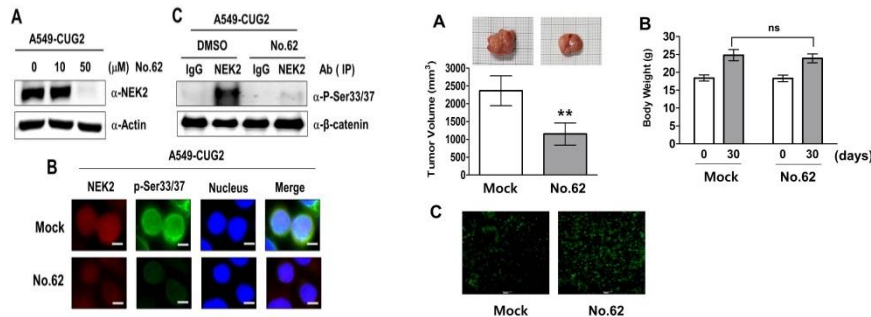


- Professor
- Department of Cogno-Mechatronics Engineering
- Major
 - Molecular Cell Biology
 - Viral Immunology
 - Oncology Therapy

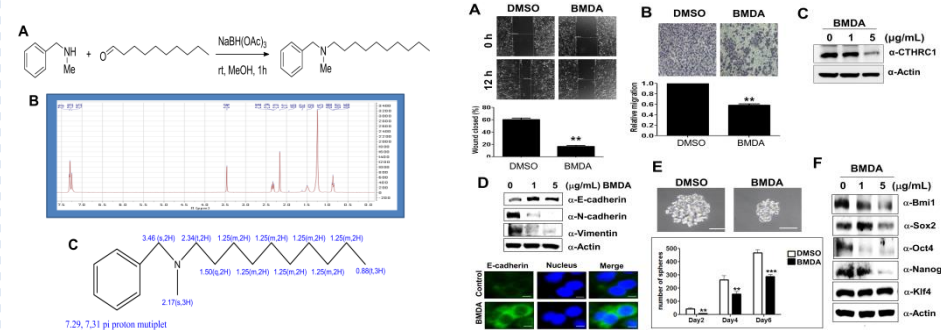
R&D summaries

■ Cancer Treatment with Small Molecules

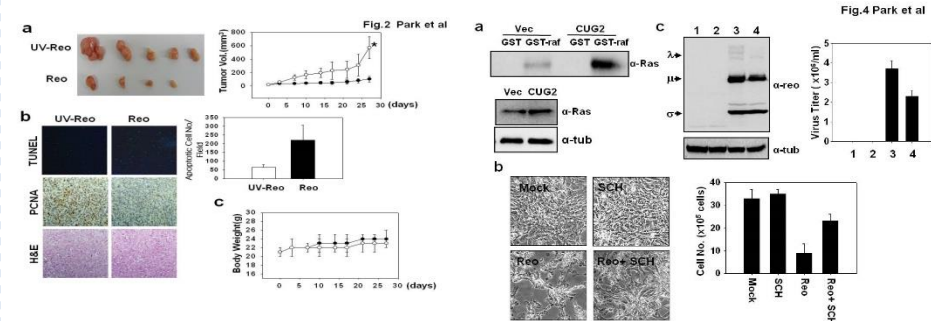
CGK062-mediated Cancer Treatment *in vitro* and *in vivo*



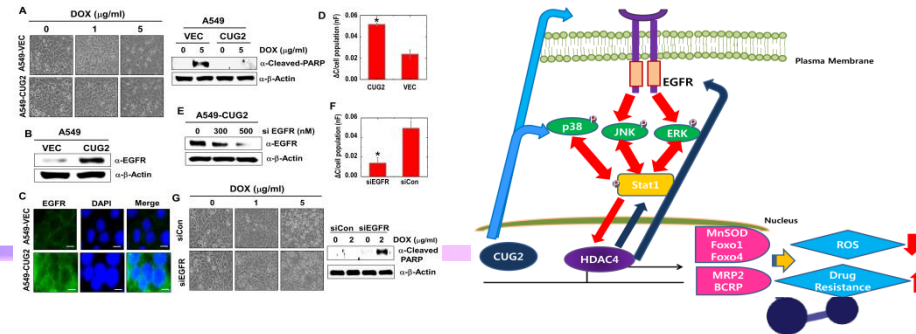
Cancer Treatment with BMDA from Garlic



■ Cancer Treatment with Oncolytic Viruses



■ Oncogene CUG2-mediated Oncogenesis



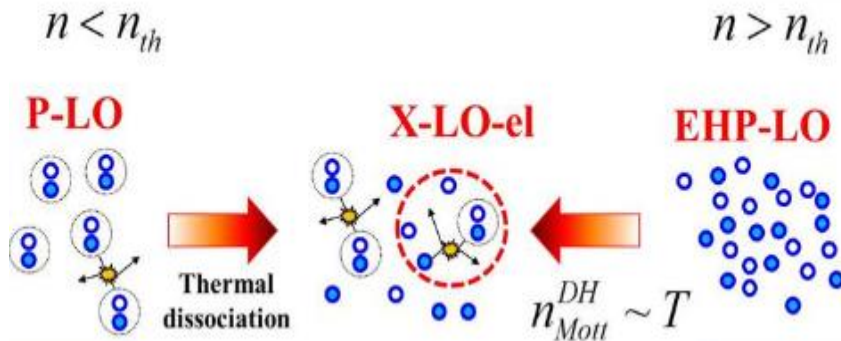
Prof. Kyhm, Kwang Seuk



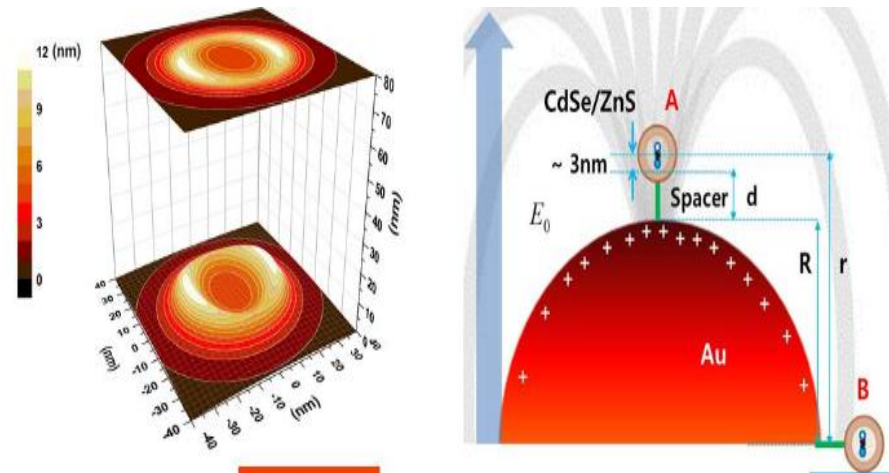
- Professor
- Department of Cogno-Mechatronics Engineering
- Major
 - Quantum Photonics
 - Ultrafast Quantum Optoelectronics

R&D summaries

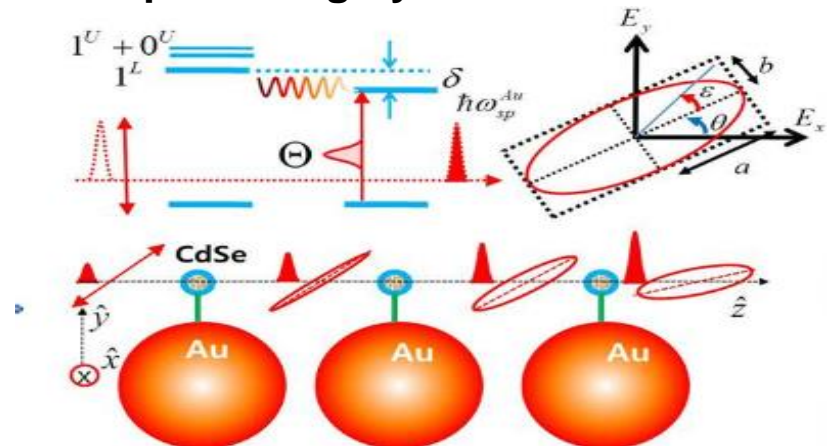
- Gain dynamics :
carrier relaxation & exciton transition



- Nobel & Hybrid Nanostructures (QR, Metal+NQD, DNA+Polymer)



- Nanopatterning by Plasmonic nanolitho.



Prof. Chang-Seok Kim

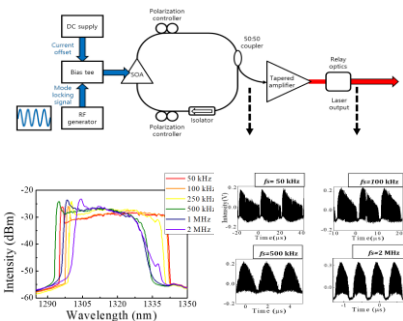


- Professor
- Department of Cogno-Mechatronics Engineering
- Major
 - Fiber Laser Fabrication
 - Biomedical Imaging
 - Optic Sensor

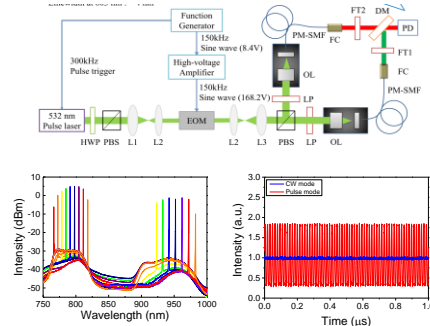
R&D summaries

■ Fiber Laser Fabrication

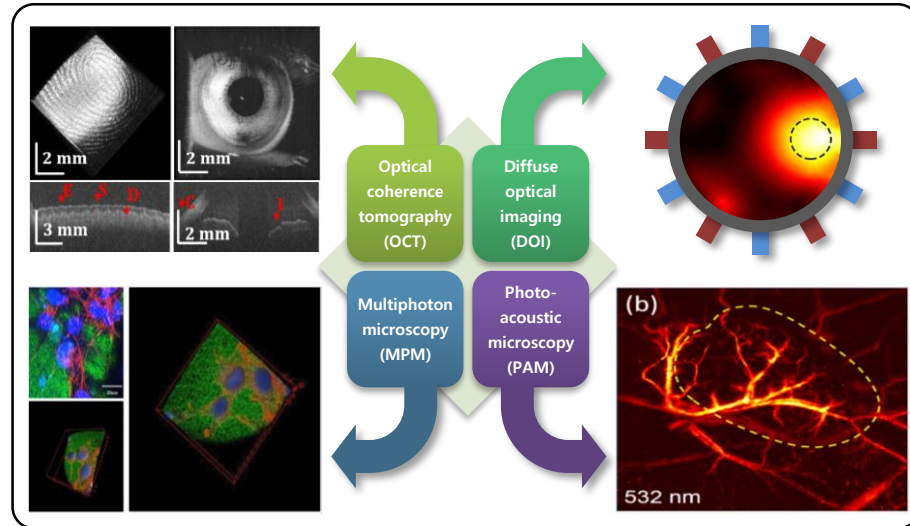
➢ Ultrafast swept source laser



➢ Multispectral functional laser



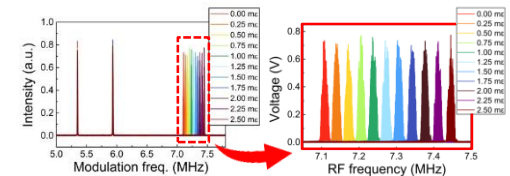
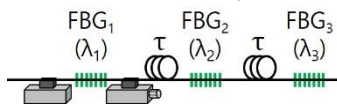
■ Biomedical Imaging



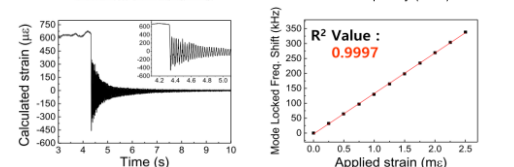
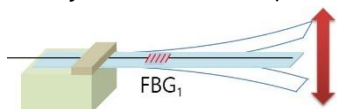
■ Optic Sensor

➢ Distributed fiber Bragg grating interrogation system

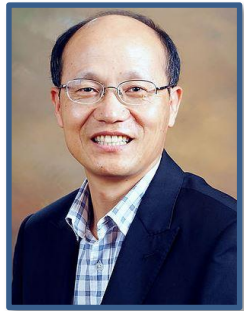
❖ Static strain response



❖ Dynamic strain response



Prof. Shin, Bo Sung



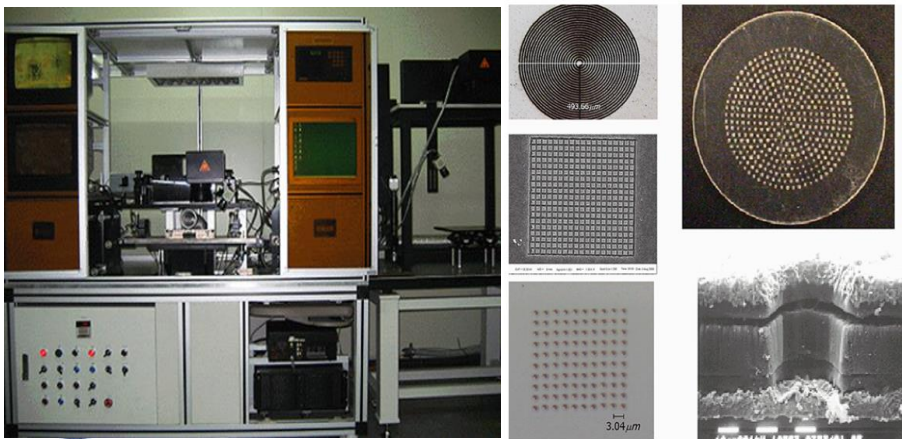
- Professor
- Department of Cogno-Mechatronics Engineering

■ Major

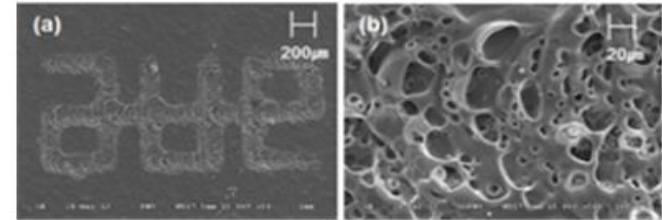
- Laser based 3D Printing
- Laser micro processing Technology
- Micro Rapid Prototyping

R&D summaries

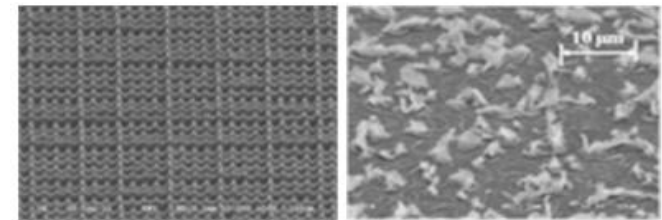
■ Micro Laser Processing



■ Microporous Patterning



[미세 다공구조 패터닝]



[대면적 레이저 패턴 및 표면개질]

■ Micro Rapid Prototyping Technique



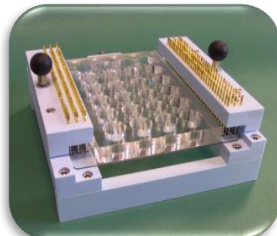
Prof. Chang, Seung-Cheol



- Professor
- Department of Cogno-Mechatronics Engineering
- Major
 - Integrated Biosensor Systems
 - Bio/Nano Materials for Biosensors
 - Biosensors for Clinical Diagnostics

R&D summaries

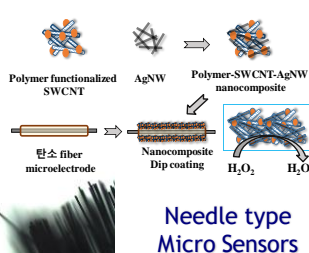
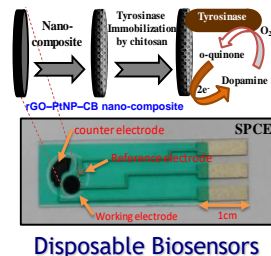
■ Integrated Biosensor Systems



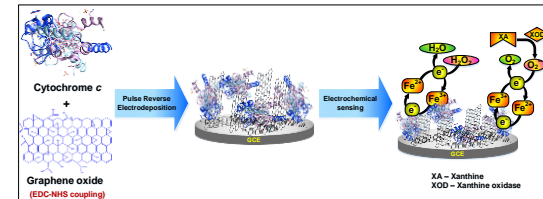
Cell-Chip Array Sensor



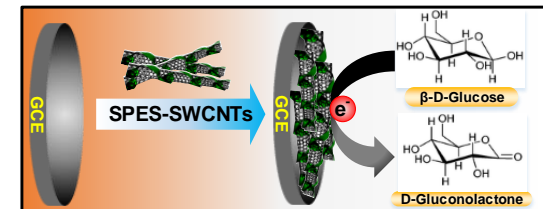
Optico-electrochemical Biosensor



■ Bio/Nano Materials for Biosensors

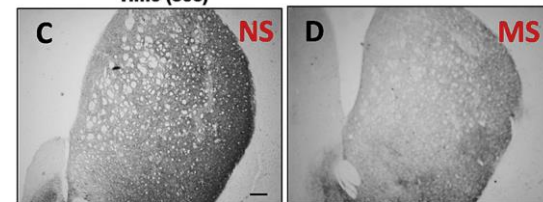
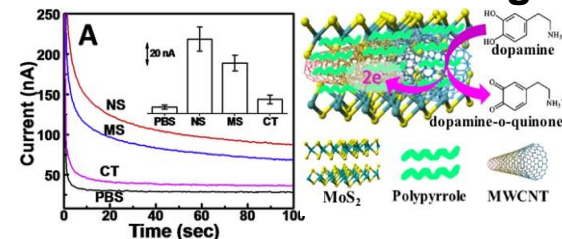


Nano-composite Modified Biosensors



Metal-Free, Non-Enzymatic Biosensors

■ - Biosensors for Clinical Diagnostics



Nanocomposite biosensor for ex-vivo detection of dopamine in mouse brain

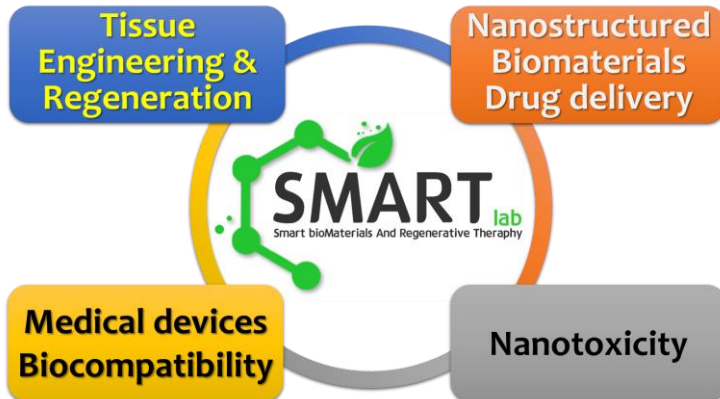
Prof. Dong-Wook Han



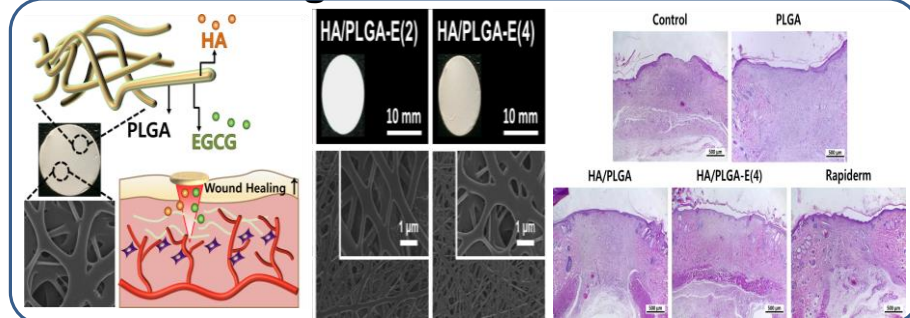
- Professor
- Department of Cogno-Mechatronics Engineering
- Major
 - Tissue Engineering/Regeneration
 - Nanostructured Biomaterials Drug delivery
 - Medical Device Biocompatibility

R&D summaries

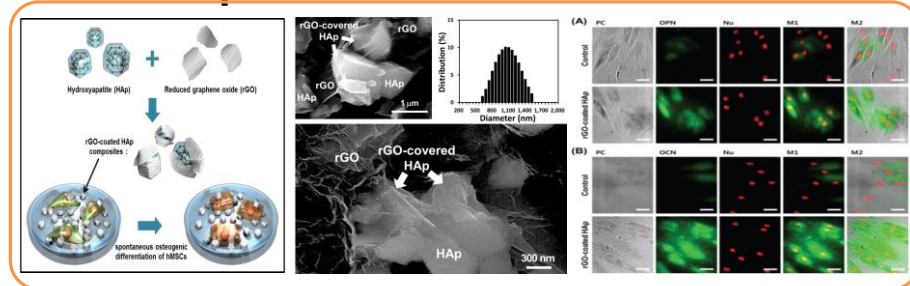
■ Smart bioMaterials And Regenerative Therapy



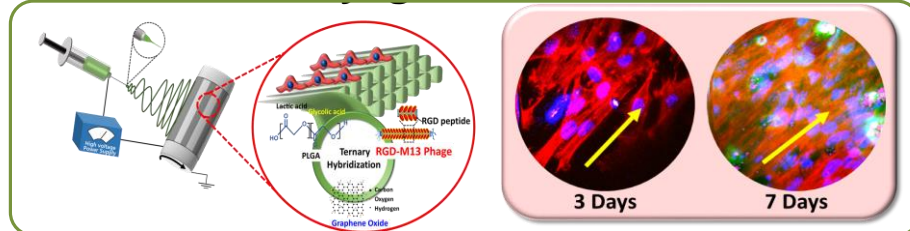
■ Core/Shell Fiber Matrices Beneficial to Diabetic Wound Healing



■ Enhanced Osteogenesis by Graphene-based Nanocomposites



■ Graphene-based Composite Scaffolds Effective for Facilitated Myogenesis



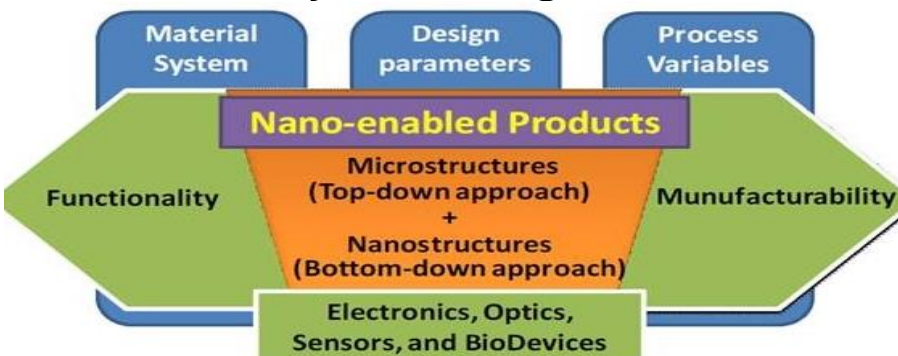
Prof. Suck Won Hong



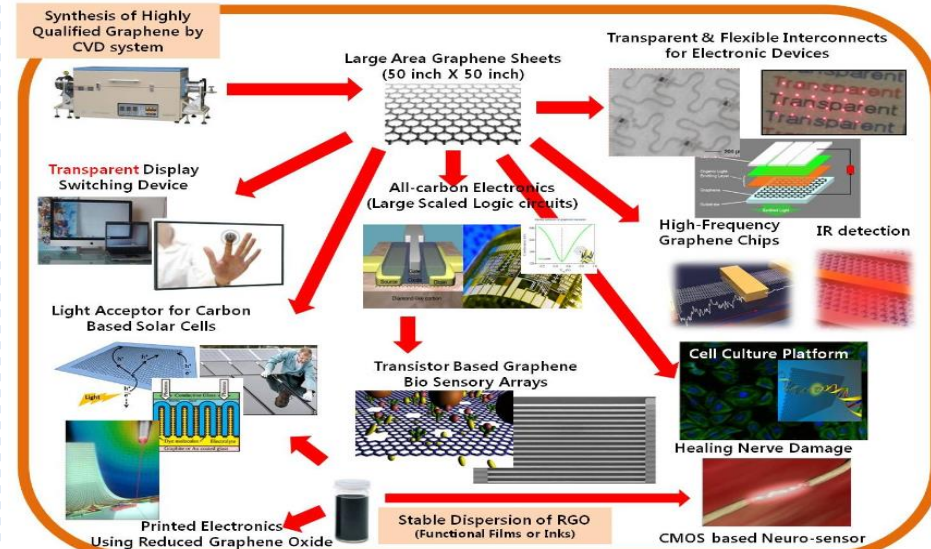
- Associate Professor
- Department of Cogno-Mechatronics Engineering
- Major
 - Nanofabrication
 - Nano/Bio Devices
 - Carbon-based Nanostructures Synthesis

R&D summaries

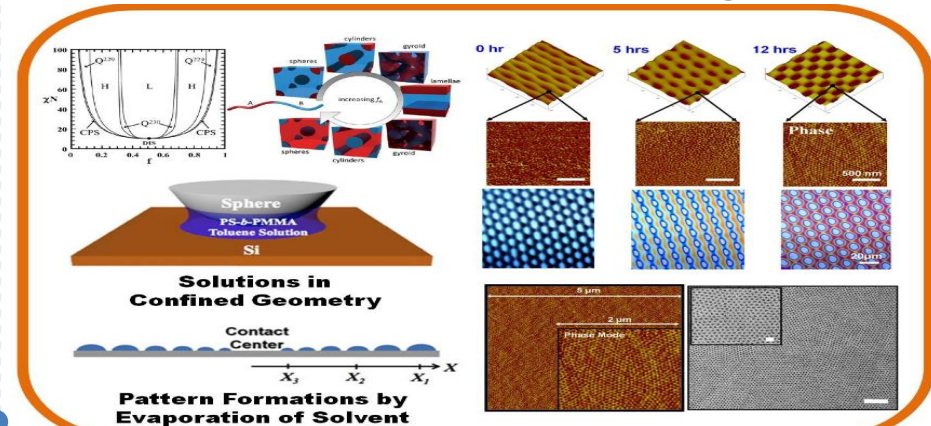
■ Multiscale System Design



■ Graphene Synthesis and Device Fabrication



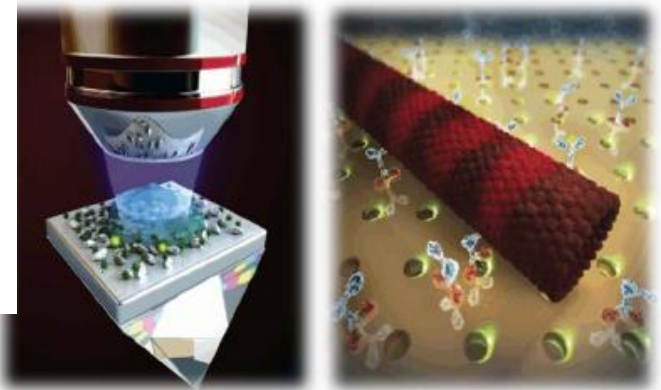
■ Nanofabrication with "coffee rings"



Nanobiophotonics Lab.



- *Research summary*
 - Plasmonic effect based super resolution imaging system
 - In-vitro optical stimulation system
 - Nanostructure based optical biosensor
 - Optical trapping

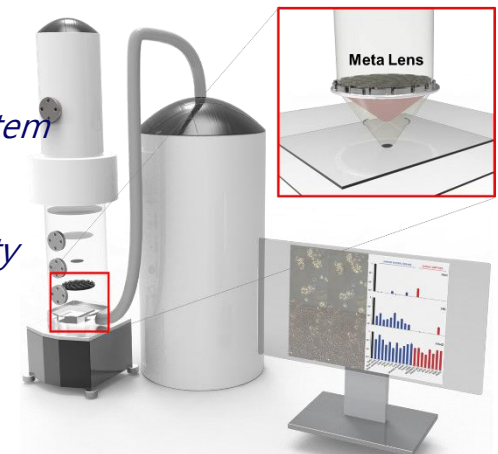


- *Research interests*

- Nanochip design for super resolution imaging system
- Design of optimized nanochip for enhanced optical performance
- Single cell position adjustment using optical trapping system
- Building nanostructure based optical biosensor system and measurement inner cellular reaction
- Subcellular reaction monitoring using super resolution imaging system
- Detection of optically stimulated biological reaction on plasmonic nanochip
- Development of high-resolution imaging system for optical property compensation on temperature difference

◆ **Contact Info.**

- Email: k.kim@pusan.ac.kr
- Webpage: sites.google.com/site/pnunbp



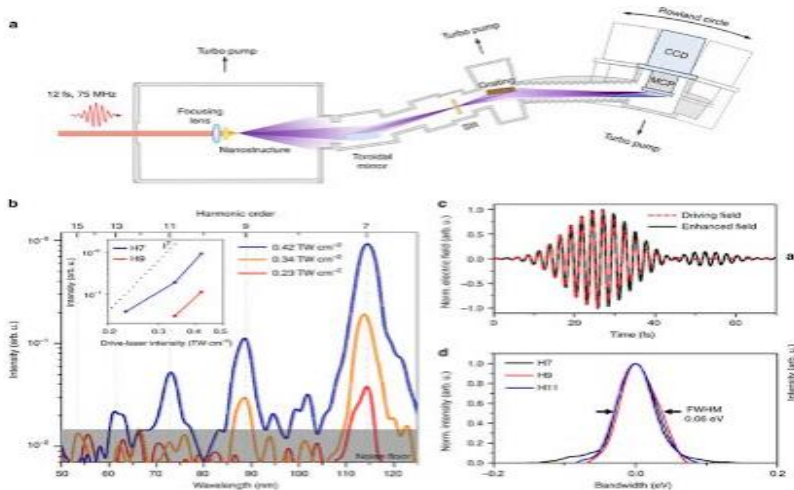
Prof. Seungchul Kim



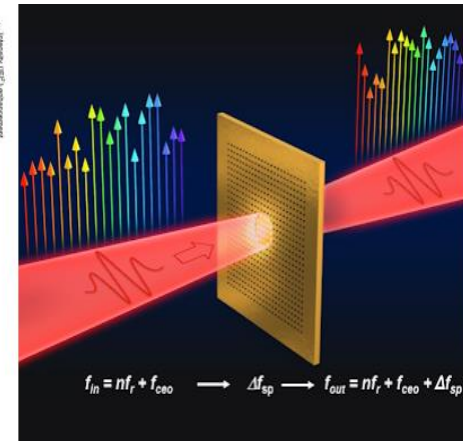
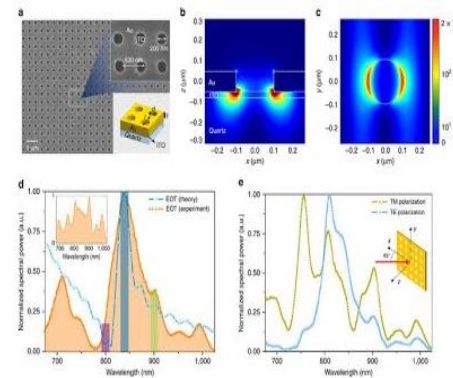
- Assistant Professor
- Department of Cogno-Mechatronics Engineering
- Major
 - Mechanical Engineering
 - Ultrafast Nano Optics

R&D summaries

- High repetition rate, ultrafast laser spectroscopy from solid



- Optical frequency comb & Nano plasmonics



- Ultrafast PEEM

