

2018 POSTECH Summer Program

List of Participating Professors & Research Topics

1. Dept. of Creative IT Engineering
2. Dept. of Mechanical Engineering
3. Dept. of Industrial & Management Engineering
4. Dept. of Life Sciences
5. Division of Integrative Biosciences and Biotechnology (IBB)
6. Dept. of Chemical Engineering
7. Dept. of Computer Science & Engineering
8. Dept. of Chemistry

International Relations



※ List of Participating Professors: 2018 POSTECH Summer Program

Dept.	Name	Email	Laboratory	Research Topic	Capacity	Remarks
CiTE	Prof. Sung-Min PARK	sungminpark@postech.ac.kr	Innovative Medical Solution Lab	Therapeutic stimulation system development	2	Circuit theory and signal processing
CiTE	Prof. Chulhong KIM	chulhong@postech.ac.kr	Bio Optics and Acoustic Lab	<ul style="list-style-type: none"> · Biomedical imaging · Photoacoustic imaging · Beamforming 	2	Personal laptop required
ME	Prof. Dong Sung KIM	smkds@postech.ac.kr	Materials processing & Integrated Biosystems Lab	<ol style="list-style-type: none"> 1) Polymer nanomanufacturing for advanced cell culture platforms 2) Discrete liquid-solid contact electrification and triboelectric nanogenerators 3) Polymer micromanufacturing for functional surfaces and microfluidic devices 	2	
ME	Prof. Seong Jin PARK	sjpark87@postech.ac.kr	Micro-Manufacturing and Multiscale Simulation	Analysis of Athletic Activities based on Mechanics and Artificial Intelligence	1	
ME	Prof. Hyungyu JIN	hgjin@postech.ac.kr	Thermal & Energy Lab	Fabrication of Thermoelectric cooler / power generator demo device	1	Hands-on research
IME	Prof. Byung-In KIM	bkim@postech.ac.kr	Logistics Lab	Vehicle routing problems, Optimization	1	Linear Programming, Computer Programming
Life	Prof. Sanguk KIM	sukim@postech.ac.kr	Structural Bioinformatics Lab	Computational biology and medical informatics for healthcare information	1	
Life	Prof. Joung-Hun KIM	joungkim@postech.ac.kr	Molecular Neuroscience Lab	Neurobiological elucidation of emotional memories	1	
Life	Prof. Kunyoo SHIN	kunyoos@postech.ac.kr	Stem Cell & Cancer Biology lab.	Cancer/stem cell	2	
IBB	Prof. Inhwan HWANG	ihhwang@postech.ac.kr	Cellular Systems Biology	Plant Biotech	2	
CE	Prof. In Seok KANG	iskang@postech.ac.kr	CFD (Computational Fluid Dynamics)	Nanoscale Transport Phenomena Modeling	2	- Physical chemistry - Transport phenomena
CSE	Prof. James Won-Ki HONG	jwkhong@postech.ac.kr	Distributed Processing and Network Management (DPNM) Lab	<ol style="list-style-type: none"> 1. IoT App/Server Development 2. Blockchain and Cryptocurrencies 	10	
Chem.	Prof. Young-Tae CHANG	ytchang@postech.ac.kr	Sensor & Molecular Bioimaging Lab	Fluorescent sensor and imaging probe development	2	
Chem.	Prof. Kyo Han AHN	ahn@postech.ac.kr	Organic and Biomaterials Lab	Development of molecular probes for biomedical applications	1	
8 Departments - 14 Professors					30	



Professor

Sung-Min Park

E-mail : sungminpark@postech.ac.kr

Creative IT Engineering Associate Professor

2016 Samsung Electronic, Health R&D Director

2014 Medtronic, R&D Engineering Manager

2006 Purdue University Ph.D.

Research Area

Medical Device and Digital Healthcare Development

Advisor	Prof. Sung-Min PARK
Laboratory	Innovative Medical Solution Laboratory
Web	https://postechimslab.wixsite.com/citeimslab
Email	sungminpark@postech.ac.kr
Research Topic	Therapeutic stimulation system development
Capacity	2
Remarks	Circuit theory and signal processing



Kim, Chulhong / 김철홍

Education 2009: Ph.D., Washington University
2004: B.S, Kyungpook National University

E-mail chulhong@postech.ac.kr
Homepage <http://www.boa-lab.com/>

Major Research Achievements

- Clinical photoacoustic imaging scanner
- Molecular photoacoustic imaging
- Multimodal optical imaging

Research Interests

- Photoacoustic, Acousto-optic, and Optical coherence tomography
- Ultrasound imaging and fluorescence imaging
- Monte Carlo simulation of photon migration in tissues

Research Keywords

Photoacoustic tomography and microscopy, acousto-optic tomography, ultrasound imaging, Molecular imaging and multimodal imaging

Advisor	Prof. Chulhong KIM
Laboratory	Bio Optics and Acoustic Laboratory
Web	http://www.boa-lab.com/index.html
Email	chulhong@postech.ac.kr
Research Topic	· Biomedical imaging · Photoacoustic imaging · Beamforming
Capacity	2
Remarks	Personal laptop required



Kim, Dong Sung / 김동성

Education 2005: POSTECH
2001: POSTECH
1999: POSTECH

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Major Research Achievements

- Development of disposable microfluidic lab-on-a-chip for point-of-care blood typing
- Development of various types of chaotic micromixers
- Development of polymer nanopillar arrays for biomimetic gecko's foot-hair
- Anodic aluminum oxide stamp and re

Research Interests

- Polymer micro/nano processing
- Tissue engineering
- Microfluidics
- Micro/Nano surface modification
- Bio application

Research Keywords

Multiscale materials processing, Polymer micro/nano molding, Microfluidics, Lab on a chip, Biosystem

Advisor	Prof. Dong Sung KIM
Laboratory	Materials processing & Integrated Biosystems Lab.
Email	smkds@postech.ac.kr
Research Topic	1) Polymer nanomanufacturing for advanced cell culture platforms 2) Discrete liquid-solid contact electrification and triboelectric nanogenerators 3) Polymer micromanufacturing for functional surfaces and microfluidic devices
Capacity	2
Remarks	



Park, Seong Jin / 박성진

Education 1996: Ph.D., POSTECH
1993: M.S., POSTECH
1991: B.S., POSTECH

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Homepage <http://m3s.postech.ac.kr/>

Major Research Achievements

- Development of material characterization, modeling, and multiscale simulation in powder processing (die compaction, powder injection molding, and sintering) of nanoscale powders (tungsten, tungsten heavy alloy, tungsten carbide, silicon carbide, etc.)

Research Interests

- micro-Manufacturing (μ -manufacturing) – micro Power Injection Molding (μ -PIM)
- Multiscale Modeling and Simulation (MMS)
- Bio-Inspired Design (BID)

Research Keywords

Prediction/Simulation Technology, Biological Materials Technology, Powder Processing Technology, Rheological Processing Technology

Advisor	Prof. Seong Jin PARK
Laboratory	Micro-Manufacturing and Multiscale Simulation Lab.
Web	http://m3s.postech.ac.kr/
Email	sjpark87@postech.ac.kr
Research Topic	Analysis of Athletic Activities based on Mechanics and Artificial Intelligence
Capacity	1
Remarks	



Hyungyu Jin, Ph.D.

Assistant Professor

Department of Mechanical Engineering
Pohang University of Science and Technology (POSTECH)
77 Cheongam-Ro, Nam-Gu, Pohang, Gyeongbuk, South Korea (37673)

Email : hgjin@postech.ac.kr

Tel : +82-54-279-2180

Education

- Ph.D. in Mechanical Engineering, The Ohio State University (Advisor: Joseph P. Heremans)
- B.E. in Mechanical Engineering, Korea University

Professional Career

- Assistant Professor, Department of Mechanical Engineering, POSTECH (2016 - current)
- Postdoctoral Research Fellow, Mechanical Engineering, Stanford University (2015 – 2016)
(Supervisor: Arun Majumdar)
- Postdoctoral Researcher, Mechanical Engineering, The Ohio State University (2014 – 2015)
(Supervisor: Joseph P. Heremans)
- Research Associate, Cognitive Robotics Research Center,
Korea Institute of Science and Technology (KIST) (2007 – 2008)

Research Interest

- Energy conversion materials / devices / systems with emphasis on renewable thermal energy
- Thermoelectric energy conversion
- Hydrogen production & CO2 reduction
- Interactions between heat and magnetization
- Thermal, electrical, & magnetic properties of solids

Advisor	Prof. Hyungyu JIN
Laboratory	Thermal & Energy Laboratory
Web	http://telab.postech.ac.kr/web/
Email	hgjin@postech.ac.kr
Research Topic	Fabrication of Thermoelectric cooler / power generator demo device
Capacity	1
Remarks	Hands-on research

3. Dept. of Industrial & Management Engineering: Prof. Byung-In KIM



Kim, Byung-In / 김병인

Education 2002: Ph.D., Rensselaer Polytechnic Institute
1994: M.S., POSTECH
1991: B.S., POSTECH

E-mail bkim@postech.ac.kr

Homepage <https://sites.google.com/site/logisticslaboratory/>

Major Research Achievements

- Routing Optimization for Waste Collection and School Bus Routing
- Development of Reassignment Based Vehicle Dispatching Rules
- Development of Generic Simulation Models for Semiconductor and Assembly Lines
- Development of PIOS (POSTECH Internet-bas

Research Interests

- Optimization
- Logistics
- Vehicle Routing Problems
- Automated Material Handling Systems
- Simulation
- Healthcare Optimization

Research Keywords

Optimization, Logistics, Simulation, Production Management, Algorithm

Advisor	Prof. Byung-In KIM
Laboratory	Logistics Laboratory
Web	https://sites.google.com/site/logisticslaboratory/
Email	bkim@postech.ac.kr
Research Topic	Vehicle routing problems, Optimization
Capacity	1
Remarks	Linear Programming, Computer Programming

4-1. Dept. of Life Sciences: Prof. Sanguk KIM



Kim, Sanguk / 김상욱

Education 2002: Ph.D., Florida State University
1996: M.S., Korea University
1992: B.S., Korea University

E-mail sukim@postech.ac.kr

Homepage <http://sbi.postech.ac.kr>

Major Research Achievements

- Developed effective protein structure prediction methods
- Construction of functional interaction network of the human proteome
- Improved understanding of cell signaling through protein-protein interaction network

Research Interests

- Computational structural biology and bioinformatics
- Structural and functional characterization of membrane proteins
- Development of prediction methods for protein structure and protein-protein interaction

Research Keywords

Protein Science, Systems biology, Bioinformatics, Protein localization, Network biology, Protein interaction, Membrane protein, Sequence evolution

Advisor	Prof. Sanguk KIM
Laboratory	Structural Bioinformatics Lab.
Web	https://sbi.postech.ac.kr/index.html
Email	sukim@postech.ac.kr
Research Topic	Computational biology and medical informatics for healthcare information
Capacity	1
Remarks	



Kim, Joung-Hun / 김정훈

Education 2000: Ph.D., Imperial College, University of London
 1996: M.S., Seoul National University
 1992: B.S., Seoul National University

E-mail joungkim@postech.ac.kr

Homepage <http://joungkim-lab.org/>

Major Research Achievements

- Functional roles of autism-associated proteins in mature neural circuits
- Elucidation of small GTPase mechanism to long-term memory
- Identification of structural changes of individual synapses in synaptic plasticity
- Identification of pathway-s

Research Interests

- Molecular Mechanisms of Synaptic Plasticity
- Mechanistic Study of Cell Adhesion Molecules
- Pathophysiology of Neurodegenerative and Psychiatric Diseases

Research Keywords

Synaptic Plasticity, Neurodegenerative and Psychiatric Diseases, Addiction, Neural circuits

Advisor	Prof. Joung-Hun KIM
Laboratory	Molecular Neuroscience Laboratory
Web	http://joungkim-lab.org/
Email	joungkim@postech.ac.kr
Research Topic	Neurobiological elucidation of emotional memories
Capacity	1
Remarks	



Kunyoo Shin
Principal Investigator
kunyoos@postech.ac.kr

Academic Appointments

Assistant Professor, Department of Life Sciences at Pohang University of Science and Technology (POSTECH)

Positions, Training and Education

2014 - 2016 Assistant Professor, Department of Cell, Developmental & Cancer Biology, Oregon Health and Science University (OHSU) School of Medicine

2012 - 2014 Instructor, Institute for Stem Cell Biology and Regenerative Medicine, Stanford University School of Medicine

2007 - 2012 Research Associate, Howard Hughes Medical Institute (HHMI)/Institute for Stem Cell Biology and Regenerative Medicine/Department of Biochemistry, Stanford University School of Medicine

2006 - 2007 Postdoctoral Fellow, Department of Molecular and Cellular Biology, Harvard University

2006 Ph.D., University of Michigan

Honors and Awards

2014 NIH Pathway to Independence Award (R00)

2012 NIH Pathway to Independence Award (K99)

2008 Excellent Biomedical Scientist Award, College of Medicine, Seoul National University

2006 Anthony and Lillian Lu Award on the achievement in the graduate program, University of Michigan Medical School

Advisor	Prof. Kunyoo SHIN
Laboratory	Stem Cell & Cancer Biology Laboratory
Web	https://www.shinlaboratory.net/
Email	kunyoos@postech.ac.kr
Research Topic	Cancer/stem cell
Capacity	2
Remarks	

5. Division of Integrative Biosciences and Biotechnology: Prof. Inhwan HWANG



Hwang, Inhwan / 황인환

Education 1988: Ph.D., University of North Carolina–Chapel Hill
1983: M.S., Seoul National University
1981: B.S., Seoul National University

E-mail ihhwang@postech.ac.kr

Homepage <http://csb.postech.ac.kr/>

Major Research Achievements

- Elucidation of protein trafficking mechanism
- Elucidation of protein targeting mechanism to chloroplasts and mitochondria
- Elucidation of molecular mechanism of ABA homeostasis
- Establishment of High level protein expression system

Research Interests

- Protein Distribution Systems in Plant Cell
- Organelle Development and Evolution of Plant Cell
- Molecular Reprogramming of Plant Cells
- Expression of Foreign Proteins in Plant cells

Research Keywords

Protein biogenesis, organelle development, protein expression, protein trafficking and targeting, phytohormone ABA, dehydration stress

Advisor	Prof. Inhwan HWANG
Laboratory	Cellular Systems Biology Laboratory
Web	http://csb.postech.ac.kr/
Email	ihhwang@postech.ac.kr
Research Topic	Plant Biotech
Capacity	2
Remarks	

6. Dept. of Chemical Engineering: Prof. In Seok KANG



Kang, In Seok / 강인석

Education 1988: Ph.D., California Institute of Technology
1980: M.S., KAIST
1978: B.S., Seoul National University

E-mail iskang@postech.ac.kr

Homepage <http://cfd.postech.ac.kr/>

Major Research Achievements

- Theoretical results for electrokinetics and electrowetting
- Theoretical results for the dynamics of free surface problems
- Numerical scheme development for free surface dynamics
- Optimization of PDE systems based on the variational principle

Research Interests

- Computational Green Sciences: Computational studies on the processes intended for minimal CO₂ production and the processes for solar energy utilization
- Microfluidics: Electrical control of nano- to pico-liter droplets for development of droplet-based

Research Keywords

Computational Green Sciences, Microfluidics, Nanofluidics, Electrokinetics, Free Surfaces

Advisor	Prof. In Seok KANG
Laboratory	CFD (Computational Fluid Dynamics)
Web	http://cfd.postech.ac.kr/
Email	iskang@postech.ac.kr
Research Topic	Nanoscale Transport Phenomena Modeling
Capacity	2
Remarks	- Physical chemistry - Transport phenomena

7. Dept. of Computer Science & Engineering: Prof. James Won-Ki HONG



Hong, James Won-Ki / 홍원기

Education 1991: Ph.D., University of Waterloo
1985: M.S., University of Western Ontario
1983: HBSoc., University of Western Ontario

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Major Research Achievements

- Autonomic Management for Personalized Handover Decisions in Heterogeneous Wireless Networks
- BGP Hijacking Detection
- Dimensioning IPTV VoD Services
- Broadband Power Line Communication Network Management System
- Characteristic Analysis & Appli

Research Interests

- Software-Defined Networking
- Network Function Virtualization
- Internet of Things
- Network Traffic Monitoring and Analysis
- Network and Systems Management
- IT Convergence Engineering
- Ubiquitous Computing (u-Healthcare, u-Environment)

Research Keywords

Network and Systems Management, Network Traffic Monitoring and Analysis, Ubiquitous Computing, IT Convergence Engineering

Advisor	Prof. James Won-Ki HONG
Laboratory	Distributed Processing and Network Management (DPNM) Lab.
Web	http://dpm.postech.ac.kr/home
Email	jwkhong@postech.ac.kr
Research Topic	Blockchain and Cryptocurrencies
Capacity	10
Remarks	



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 HOMEPAGE

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Advisor	Prof. Young-Tae CHANG
Laboratory	Sensor & Molecular Bioimaging Laboratory
Web	http://ytchang.postech.ac.kr/
Email	ytchang@postech.ac.kr
Research Topic	Fluorescent sensor and imaging probe development
Capacity	2
Remarks	



Ahn, Kyo Han / 안교한

Education 1985: Ph.D., KAIST
1982: M.S., KAIST
1980: B.S., Seoul National University

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Major Research Achievements

- Making dipolar dyes emit in aqueous media
- Two-photon dyes with suppressed autofluorescence in tissue imaging
- Reactive fluorescent probes for silver ions and nanoparticles
- Turn-on fluorescent sensing of amino-carboxylates
- Chiral discrimination

Research Interests

- Molecular probes for diagnosis and imaging of disease biomarkers
- Luminescent materials for bioimaging
- Molecular recognition and sensing

Research Keywords

molecular probes, luminescent materials, nano/bio-functional materials, bioconjugation

Advisor	Prof. Kyo Han AHN
Laboratory	Organic and Biomaterials Laboratory
Web	https://www.ahn-postech.com/
Email	ahn@postech.ac.kr
Research Topic	Development of molecular probes for biomedical applications
Capacity	1
Remarks	