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

POSTECH
POHANG UNIVERSITY OF SCIENCE AND TECHNOLOGY
포항공과대학교

※ 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	· Biomedical imaging · Photoacoustic imaging · Beamforming	2	Personal laptop required
ME	**Prof. Dong Sung KIM**	smkds@postech.ac.kr	Materials processing & Integrated Biosystems Lab	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	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**	

1-1. Dept. of Creative IT Engineering: Prof. Sung-Min PARK

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**

1-2. Dept. of Creative IT Engineering: Prof. Chulhong KIM

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

Photoacoutic 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**

2-1. Dept. of Mechanical Engineering: Prof. Dong Sung KIM

Kim, Dong Sung / 김동성

Education 2005: POSTECH
2001: POSTECH
1999: POSTECH

E-mail smkds@postech.ac.kr
Homepage https://mib.postech.ac.kr/

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	

2-2. Dept. of Mechanical Engineering: Prof. Seong Jin PARK

Park, Seong Jin / 박성진

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

E-mail sjpark87@postech.ac.kr
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	

2-3. Dept. of Mechanical Engineering: Prof. Hyungyu JIN

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-protien 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	

4-2. Dept. of Life Sciences: Prof. Joung-Hun KIM

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
- Pathopsiology of Neurodegeneratve 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	

4-3. Dept. of Life Sciences: Prof. Kunyoo SHIN

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 Researche 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: HBSc., University of Western Ontario

E-mail jwkhong@postech.ac.kr
Homepage http://dpnm.postech.ac.kr/~jwkhong

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://dpnm.postech.ac.kr/home**
Email	**jwkhong@postech.ac.kr**
Research Topic	**1. IoT App/Server Development 2. Blockchain and Cryptocurrencies**
Capacity	**10**
Remarks	

8-1. Dept. of Chemistry: Prof. Young-Tae CHANG

장영태
Professor
Ph.D., '97, POSTECH
Sensor & Molecular Bioimaging
054-279-2101

HOMEPAGE
E-Mail

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	

8-2. Dept. of Chemistry: Prof. Kyo Han AHN

Ahn, Kyo Han / 안교한

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

E-mail ahn@postech.ac.kr

Homepage http://www.ahn-postech.com/

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 discriminatio

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-functionalmaterials, 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	