

2020 Spring Semester Admission Guide for International Graduate Students (Industrial Technology Advance)



ITA majors

- Artificial Intelligence
- Biomedical Convergence Science & Technology
- Hydrogen & Renewable Energy
- Robot and Smart System Engineering

ABOUT KYUNGPOOK NATIONAL UNIVERSITY

History

1. 1946. 5. College of Education, Medicine and Agriculture in Daegu were upgraded to National Colleges
2. 1951. 10. College of Education, Medicine and Agriculture, Liberal Arts and Sciences, Law and Political Sciences were combined to create Kyungpook National University
3. 1953. 5. First graduate school was established
4. 2019. Kyungpook National University is comprised of 17 colleges, 68 majors, 11 graduate schools and 124 research Centers

Numbers

1. 4 Campuses (3 in Daegu, 1 in Sangju)
2. 37,322 students in total, 30,719 undergraduate students, 6,603 graduate students, 1,821 international students
3. 1,180 full-time faculty members, 1,194 administrative staffs, 235,003 graduates cumulative



Main Campus



Sang-ju Campus



Medical Town



Medical Campus

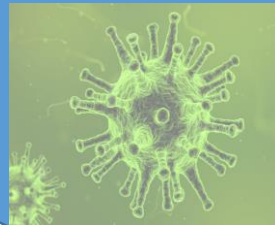
ABOUT ITA (Industrial Technology Advance) Departments

In order to foster creative convergence talent and our university's representative research brand to lead the 4th Industrial Revolution era, ITA Convergence Graduate School is established in September 2019. Four majors are established with Artificial Intelligence, Biomedical Convergence Science & Technology, Robot and Smart System Engineering, Hydrogen & Renewable Energy to train core personnel of the 4th Industrial Revolution.

Artificial Intelligence



Biomedical Convergence Science & Technology



Hydrogen & Renewable Energy



Robot and Smart System Engineering



Introduction of ITA Departments

Department of Artificial Intelligence

It aims to secure world's top technological competitiveness in AI field, a key source technology that leads the fourth industrial revolution, and foster talented people who will lead AI-based innovation.

Department of Biomedical Convergence Science & Technology

It aims to foster convergence research personnel and professional leaders who can understand the academic disciplines necessary for diagnosing/preventing/treatment of diseases and develop new medical biotechnology technologies through creative convergence research covering various fields such as natural science, engineering, medicine, and pharmacology.

Department of Hydrogen & Renewable Energy

By maximizing synergy effect through fusion and composite research with new and renewable energy technologies, which emerge as core technologies in the 4th Industrial Revolution era, the government aims to foster creative convergence talent that is a key leader in science, technology and industry of the 4th Industrial Revolution.

Department of Robot and Smart System Engineering

Aiming to grow into a hardware-oriented leading robot research group, it aims to become one of the nation's best robot education and research institutes in name and reality to compete with global robot research groups by conducting convergence education and convergence research in various fields, including AI, medical, construction and manufacturing.

Department of Artificial Intelligence

The Department of AI

Vision

**Cultivating Core Convergence
Technology and Advanced Talented
engineers for Next-Generation AI**

Medical, brain science/cognition,
electronic computers, and automotive
+
AI

AI-based Technology Innovation

- AI+ Next Generation AI Models
- AI+ X Applications

Development of Advanced AI Engineers

- Advanced AI Engineers
- Application AI Engineers
- ICT Convergence AI Engineers

Technology and Innovation Foundations

- Open SW, Open API
- Research-oriented AI Brain Lab
- Open Research Environment

Programs

Advanced AI

Fundamentals of AI,
Intensive major courses,
Interdisciplinary joint
education

Expert AI

Intensive education and
research programs for
specialized fields

Medical

Vehicles

Electronics,
Computers

Brain Science,
Cognition

1. Joint Subjects between AI Convergence
2. AI Convergence Courses
3. Mandatory internships at home and abroad (Expert-level)
4. Cooperative research programs between subjects
5. AI convergence research programs

Curriculum

Flexibility in Education

Flexible student selection and AI education through certification system for credits from other departments

- Flexible operation of credit certification system for AI-related education completion
→ Students in 3rd or 4th grade can participate in 2 + 2 curriculum

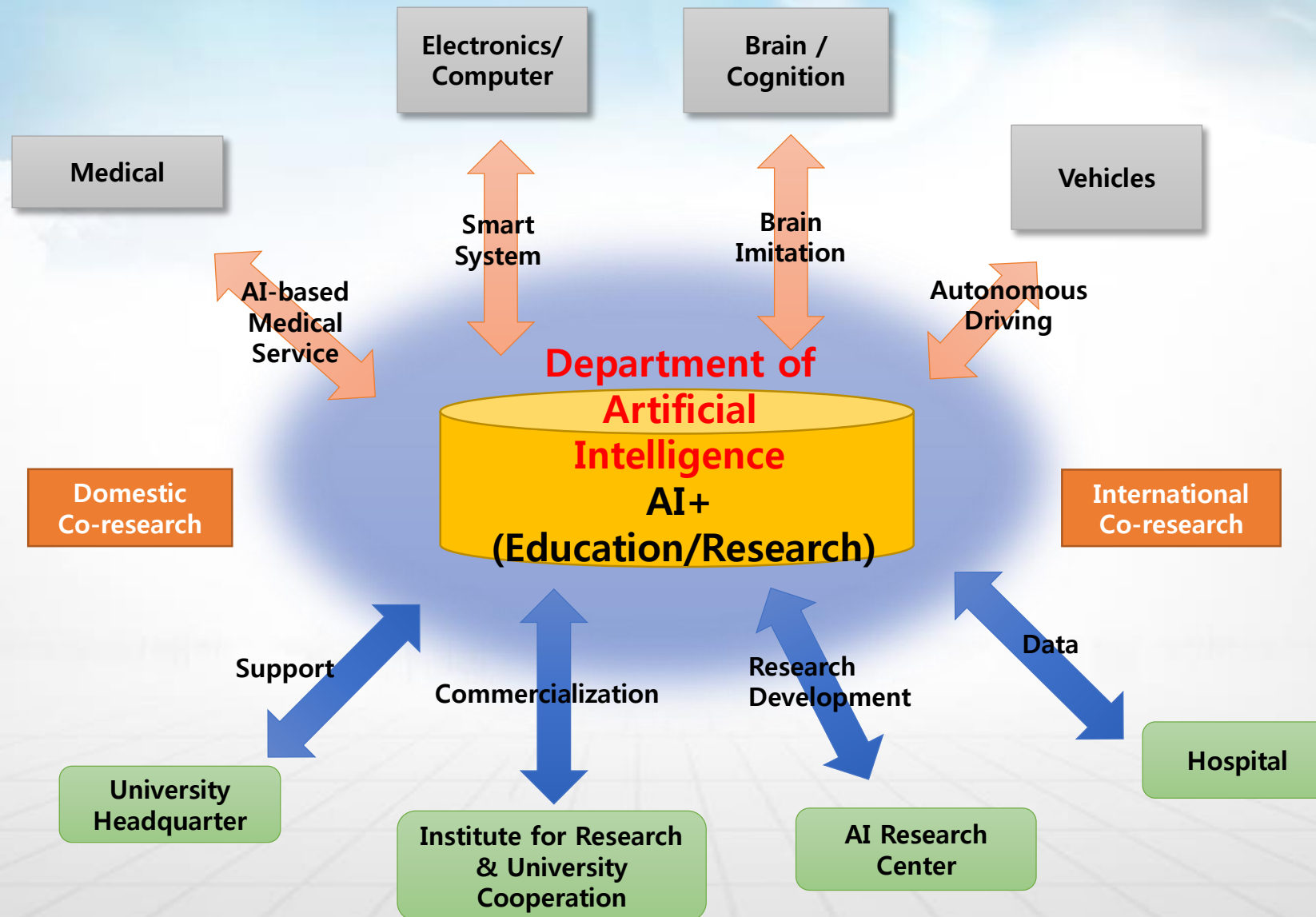
Active promotion of common completion of AI and other subjects Open Classroom / Laboratory

- We highly promote credit exchanges among other subjects
→ Opening various AI courses targeting for students in other departments
- Encouraging students in the AI department to take courses in other departments

Flexibility in department management

- | | |
|---------------------------------------|---|
| ● Modular Curriculum | ● Convergence Major and Major Selection |
| ● Internship Credit System | ● Intensive Course |
| ● Online and Flipped Learning Classes | ● Flexible Credit System |

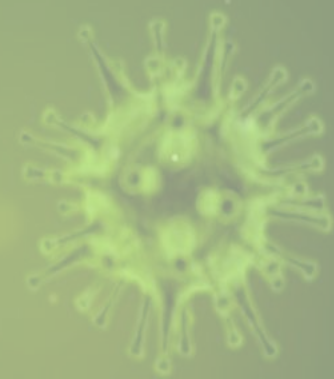
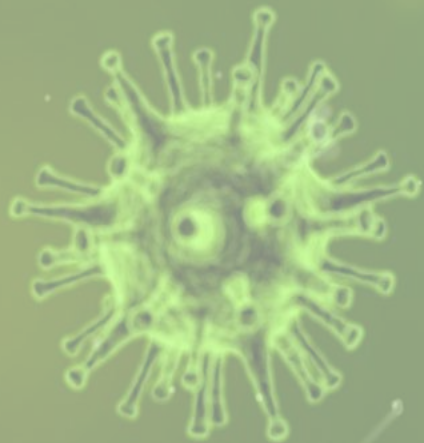
Research Areas



Faculty Research Areas

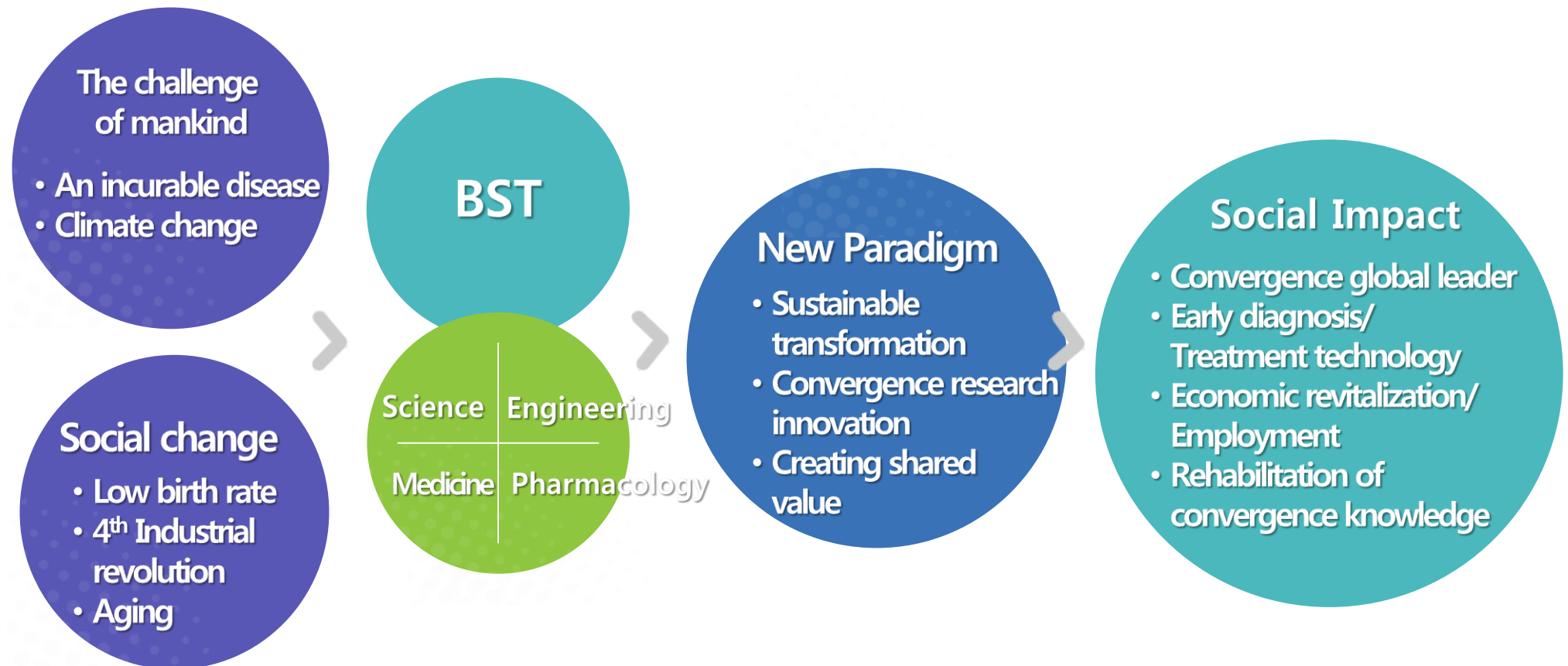
Professor	Research Areas	E-Mail
Minho Lee	Deep Learning, Neural Networks, Brain Informatics	mholee@gmail.com
Dong Seog Han	Machine Learning Applications, Intelligent Vehicles	dshan@knu.ac.kr
Min Young Kim	Robotic Visual Intelligence, Embedded System and Control	minykim@knu.ac.kr
Gil-Jin Jang	Machine Learning, Speech Processing	gjang@knu.ac.kr
Mallipeddi Rammohan	Evolutionary Computations, Intelligent Systems	mallipeddi@knu.ac.kr
Hyeyoung Park	Brain Computing, Machine Intelligence	hyepark@knu.ac.kr
Jaeil Kim	Machine Learning, Medical Image Processing,	jaeilkim@knu.ac.kr
Seokin Hong	Computer Architecture and Systems	seokin@knu.ac.kr
Young-Tae Kim	Neuromorphic Computing, VLSI CAD	yongtae@knu.ac.kr
Chobok Kim	Cognitive Neuroscience, Cognitive Psychology	ckim@knu.ac.kr
Yong Rim Kim	Renal Medicine	ylkim@knu.ac.kr
Jae Chan Park	Cerebrovascular disease	jparkneurosurgery@gmail.com
Kyung Ho Seok	Neuroimmune Pharmacology	ksuk@knu.ac.kr
Young Ran Yoon	Clinical pharmacology	yry@knu.ac.kr
Jae-Mo Kang	Deep Learning, Information Security, Blockchain Networks	jmkang@knu.ac.kr
Heechul Jung	Deep Learning, Computer Vision	heechul@knu.ac.kr
Hoyoung Jung	NLP, Speech and Language Information Processing	hoyjung@knu.ac.kr

Biomedical Convergence Science & Technology



Biomedical Convergence Science & Technology @ Industrial Technology Advance

Development of convergence researcher and professional leaders who can understand the academic needs for diagnosis/prevention/treatment of diseases and develop new medical biotechnology through creative convergence research spanning various fields such as science, engineering, medicine and pharmacology



Faculty



Prof. Moon-Chang Baek (Chair)

- Protein biochemistry/molecular biology, Diagnosis & treatment based on exosome
- e-mail: mcbaek@knu.ac.kr



Prof. Seong Ho Kong

- Intelligent MEMS sensors
- MEMS devices fabrication
- e-mail: shkong@knu.ac.kr



Prof. Moon Kyu Kwak

- Micro/nano fabrication & applications
- Biomimetics
- e-mail: mkkwak@knu.ac.kr



Prof. Kyung-Jin Kim

- Structural molecular biology
- e-mail: kkim@knu.ac.kr



Prof. Gyu Man Kim

- Nano/micro systems
- e-mail: gyuman.kim@knu.ac.kr



Prof. Sung-Wook Nam

- Nano-bio devices
- Nanomaterials & Nanofabrications
- e-mail: nams@knu.ac.kr



Prof. Younghae Do

- Nonlinear Dynamics
- Mathematics science in Medical
- e-mail: yhdo@knu.ac.kr



Prof. Kyoung-Ik Min

- Microfluidics, Microchemical process
- Self assembly of peptides
- e-mail: minwing8055@knu.ac.kr



Prof. Jonghoo Park

- NEMS/MEMS sensor
- Electro optical sensor
- e-mail: jonghoopark@knu.ac.kr



Prof. Hongsik Park

- Integrated CMOS/Si-photonic chips
- Multifunctional integrated smart sensor technology
- e-mail: hpark@ee.knu.ac.kr



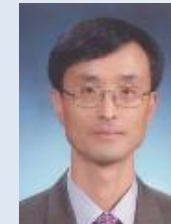
Prof. Jae-Sung Bae

- Physiology/neurology
- Alzheimer's disease technique & treatment
- e-mail: jsbae@knu.ac.kr



Prof. Jae-Ho Shin

- Molecular microbiology, bioinformatics
- Next Generation Sequencing & Omics
- e-mail: jhshin@knu.ac.kr



Prof. Byung-Heon Lee

- Molecular imaging and targeted drug delivery using phage display-identified peptides
- e-mail: leebh@knu.ac.kr



Prof. Sang-Han Lee

- Enzymes in Food Biotechnology
- e-mail: sang@knu.ac.kr



Prof. In-Kyu Lee

- Diabetes/Diabetic complications
- Vascular proliferative disease
- e-mail: leei@knu.ac.kr

Faculty



Prof. Jae Man Lee

- Endocrine biochemistry
- Metabolic diseases
- e-mail: jaemanlee@knu.ac.kr



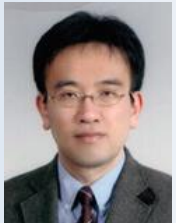
Prof. Jeong Ho Chang

- Molecular biology
- Protein structure & function analysis
- e-mail: jhcbio@knu.ac.kr



Prof. Young Hun Jeong

- Biomaterials and tissue engineering
- 3D printing and bioapplications
- Precision machining
- e-mail: yhjeong@knu.ac.kr



Prof. Jun-Goo Jee

- Physical Biochemistry & Pharmacy
- e-mail: jjee@knu.ac.kr



Prof. Je-Yong Choi

- Bone constancy
- e-mail: jechoi@knu.ac.kr



Prof. Young Ki Hahn

- Microfluidics, BioMEMS
- Biosensors for disease diagnosis
- e-mail: hahnv@knu.ac.kr



Prof. Keun Hur

- Cancer translational research
- e-mail: KeunHur@knu.ac.kr

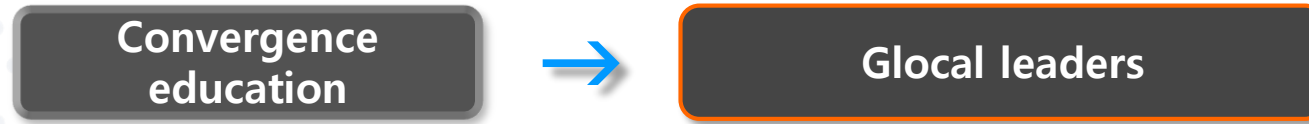


Prof. Ui-wook Hwang

- Mitome, Chlome
- Endangered Species
- Marine invertebrates
- e-mail: uwhwang@knu.ac.kr

Objectives & visions in BCST department

- **Education: Training of glocal(global+local) leaders with hybrid knowledge in biomedical field**



- **Research: Development of early diagnosis/treatment of incurable and degenerative diseases through convergence technology**



- **Industrial-Academic Cooperation: Excavation of stronghold enterprises & improvement of human/material pre-circulation structure**



- **Service: Rehabilitation of knowledge of convergence complex technology for well-being/silver society**

Directions & specialized programs

Convergence & Translational research

- Translational research based on the technologies developed in the laboratory
- Implementation by the commercialization & collaboration with the hospital

Specialized degree program

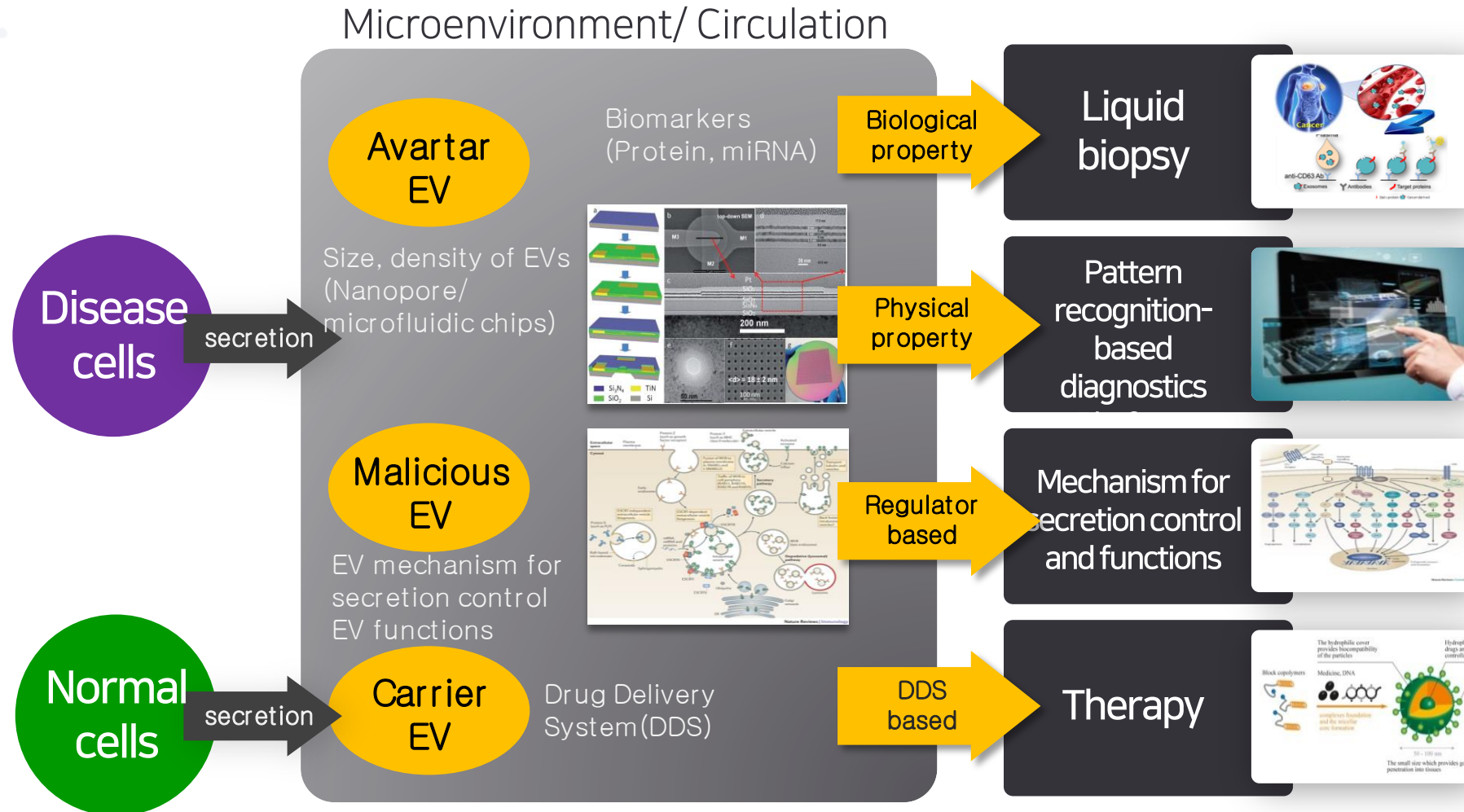
- Training human resources who create new problems, methods and results in the convergence research
- Creating a new field of convergence through interdisciplinary research in science, engineering, medicine, and medicine

Expected career paths after graduation

- Academic, research institute related to biomedical field (government-funded and corporate), hospital, pharmaceutical company, biotechnology company, post-doctoral researcher (leading universities abroad), etc
- A variety of careers as experts who can commercialize bio-convergence technologies

Key research fields

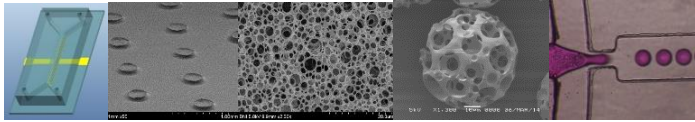
Development of fundamental convergence technology for the early diagnosis and treatment based on extracellular vesicles



Key research fields

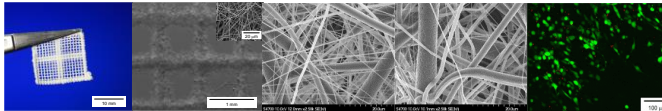
1) Functional 3D structure/support

- Fabrication of a porous polymer Structure using micro template
- Fabrication of the integral vascular mimicked structures



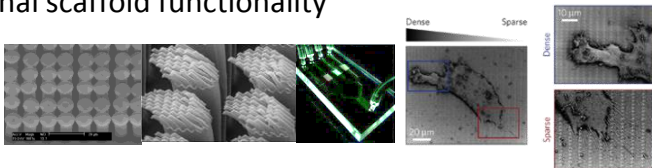
2) Porous membrane

- Fabrication technology of PDMS film for nano porous fiber
- Nanofiber thin film fabrication technology for mimicking functional thin film with multiple tissue layers

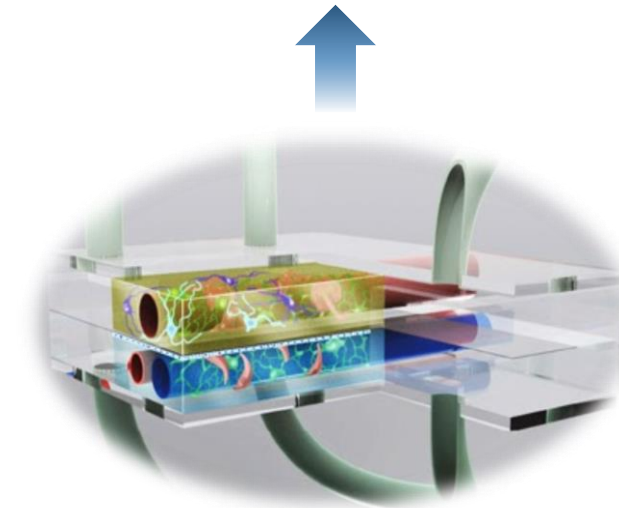


3) Nano/micro chip

- Fabrication of chips with nano/microfluidic channels
- Nano/micro-structure formation technology for multi-dimensional scaffold functionality



Generation of in vitro cell/tissue culture environment for EV isolation/extraction



In vitro test environment alternative to animal testing for disease diagnosis and drug evaluation

Department of Hydrogen & Renewable Energy

I

Hydrogen & Renewable Energy

II

Programs

III

Faculty Research Area

IV

Financial Aid

I. Department of Hydrogen and Renewable Energy

Multidisciplinary Convergence Group Study

Energy Production

- Physics
- Chemistry
- Biology

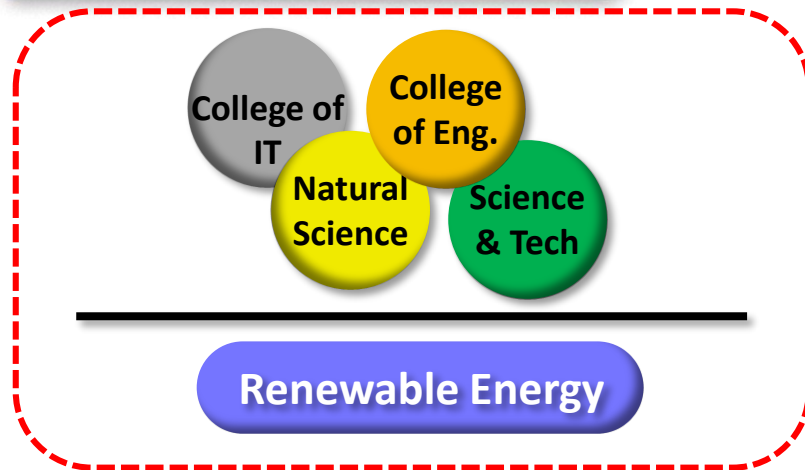
Energy Storage

- Applied Chemical Eng.
- Advanced Materials Eng.
- Energy Eng.

Energy Application & Saving Tech.

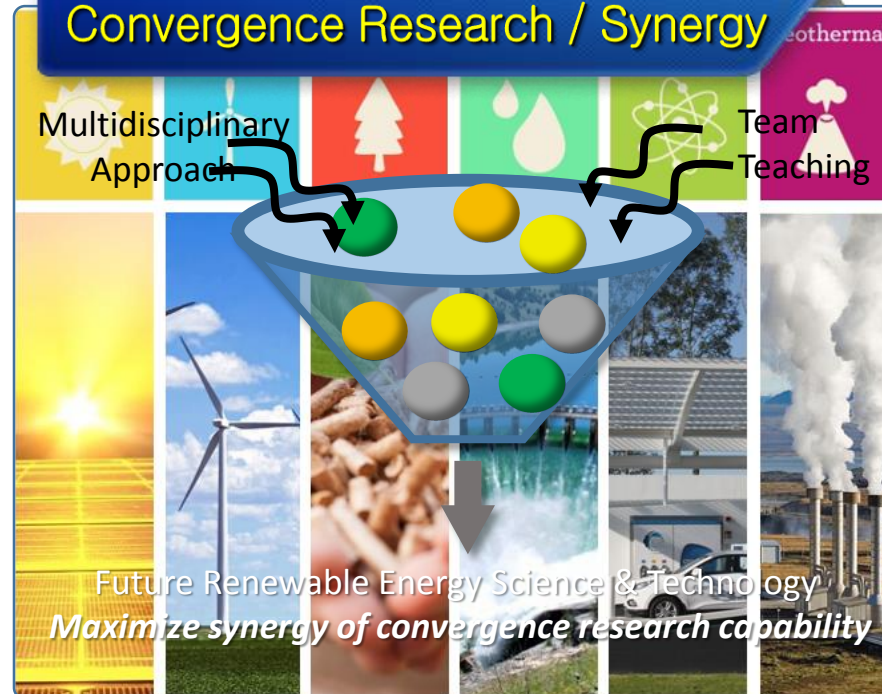
- Advanced Materials Eng.
- IT Electrical Eng.
- Architecture Eng.

Information Sharing Platform



➔ Various Networks between Professors
Cooperation / Convergence Research by
Sharing Research Equipment

Convergence Research / Synergy



II. Programs

☐ Department Program

Energy Production

- Solar
- Bio-Energy
- Hydrogen Production
- Energy Harvesting

Energy Storage

- Battery
- Hydrogen Storage
- Bio-Energy Conversion
- ESS (Energy Storage Syst.)

Energy Application

- Fuel Cell
- DC-AC Conversion
- ESS Operation

☐ Double Degree Program

- Two Master's degrees from KNU and Nantes, France in two years
- Up to 5 students will be selected each year
- International collaboration with leading universities in France



☐ New Zealand Wintech University & Institute Internship

- Overseas research internship and language program
- 19 persons were selected and dispatched in the last 3 years



III. Faculty Research Areas

☐ Professors, Major, Contacts

Professor	Major	Telephone	e-mail
Ho Sung Yoon (Dean)	Plant Molecular Physiology	053-950-5348	hsy@knu.ac.kr
Junyeob Yeo	Nano Optical Experiment	053-950-7360	junyeob@knu.ac.kr
Sang-Il Choi	Nanochemistry/Electrochemistry	053-950-7369	sichoi@knu.ac.kr
Sekyung Han	Power System	053-950-7230	skhan@knu.ac.kr
Joon-Hyung Lee	Electronic Ceramic Property Research	053-950-7512	joonlee@knu.ac.kr
Yeon Uk Jeong	Energy and Functional Materials Research	053-950-7586	jeong@knu.ac.kr
Young-woo Heo	Electronic Materials / Elements	053-950-7587	ywheo@knu.ac.kr
Sangwook Lee	Nano / Energy	053-950-5632	wook2@knu.ac.kr
Ho Seong Lee	Thermoelectronic Materials / Electron Microscopy	053-950-7583	hs.lee@knu.ac.kr
Sang-Eun Chun	Electrochemical / Electrochemical Energy Storage Laboratory	053-950-5566	sangeun@knu.ac.kr
Sungjin Jo	Solar cell	053-950-8971	sungjin@knu.ac.kr
In Woo Cheong	Nano Materials Chemistry	053-950-7590	inwoo@knu.ac.kr
Jin Joo	Inorganic Nano Materials	053-950-5585	joojin@knu.ac.kr
Kyuchul Shin	Energy system	053-950-5587	kyuchul.shin@knu.ac.kr
Young Kyoo Kim	Organic Nano Electronics	053-950-5616	ykimm@knu.ac.kr
Soo Hwan Jeong	Nano Materials	053-950-7597	shjeong@knu.ac.kr
Won-Hwa Hong	Urban environment and equipment	053-950-7010	hongwh@knu.ac.kr
Jong-wook roh	Nano Materials and Devices	054-530-1414	jw.roh@knu.ac.kr
Byoung-Seong Jeong	Semiconductor and Display Devices / Materials	053-950-2336	gatorever@knu.ac.kr

IV. Financial Aid

- ☐ Research / Teaching Assistantships
- ☐ Students who have outstanding research achievements are sent to foreign universities for one semester to support overseas joint research

**Department of
Robot and Smart System Engineering**



Research Purposes for ITA Robot

Development of **HEART**(**H**ardware **A**imed **R**obot **T**echnology) & Creative human resource

Robotic technology, the core of
the 4th Industrial revolution era

- Robot is the core technology of the fourth industrial revolution.
- **Robot** is one of the 17 new growth engines of Korea and of the **8 Daegu/Gyeongbuk future industries**.
- Needs for robot-related technologies and applications continue to increase.



Development of
robust & creative Human resource

- Among **THE top 20 Asian universities**, 2 undergraduate (Hanyang & Yeungnam Univ.) & 4 graduate schools of robotics (**Gyeongbuk National University**, KAIST, Korea & Sungkyunkwan Univ.)
- **First undergraduate & graduate schools of Robotics in Korea, Kyungpook National University**
- The interest in robots of young students is rapidly increasing



One-stop Warehouse
for Robot convergence research

- The robotics design, fabrication and application require **multidisciplinary convergence research groups**.
- **KAIST Hubo** is the only Korean university **research-brand** with **hardware robots**.
- **One-Stop Warehouse** Convergence Robot Research Group is needed **for leading Korean hardware-based robot technology**.





ITA Robot Research Future Direction

KNU KYUNGPOOK UNIVERSITY

Participating faculty

Mechanical Engineering (8)

Sang Ryong Lee, Namchel Kang,
Bo Yeong Kang, Yong Rae Roh,
Ho Lee, Clare C. Byeon,
Yong Joong Lee,
Chang Soon Hwang

Electronics Engineering (4)

Hyun-Deok Kim, Soon-Yong Park,
Yun-Jung Lee, Sang-Moon Lee

Electrical Engineering (1)

Joonwoo Lee

Architecture (1)

Dong-Eun Lee

Robot & Smart System Engineering (1)

Jung-wook Suh

External participants (2)

Kwon Oh-Won (KIMM)
Choi Hongsoo (DGIST)

One-Stop Warehouse for HW-aimed convergence research

design Lab

Robot Structure and Dynamics

Namchel Kang
(ME: dynamics/vibration)

Yong Rae Roh
(ME: Sensor)

Control

Sang-Moon Lee
(EE: robot control)



building Fab

Sang Ryong Lee
(ME: robot design/control)
Bo Yeong Kang
(ME: AI)
Jung-wook Suh
(RoSE: robot mechanism)

Soon-Yong Park
(EE: Vision)

Yun-Jung Lee
(EE: robot control)



field App

Medical robot

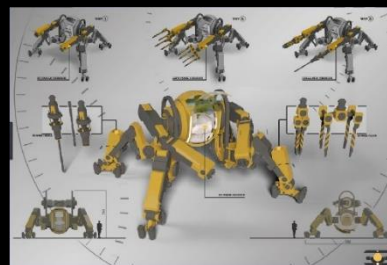
Oh-Won Kwon
(KIMM: medical machine)
Hongsoo Choi
(DGIST: bio/nano robot)

Construction robot

Dong-Eun Lee
(Architecture: automation)

Production robot

Hyun-Deok Kim
(EE: Advanced manufacturing)
Ho Lee
(ME: laser technology)



Material

Electronic Engineering

Energy

BST

Mechanical Engineering

Medical Engineering

Architecture

AI

Data Science



WCT

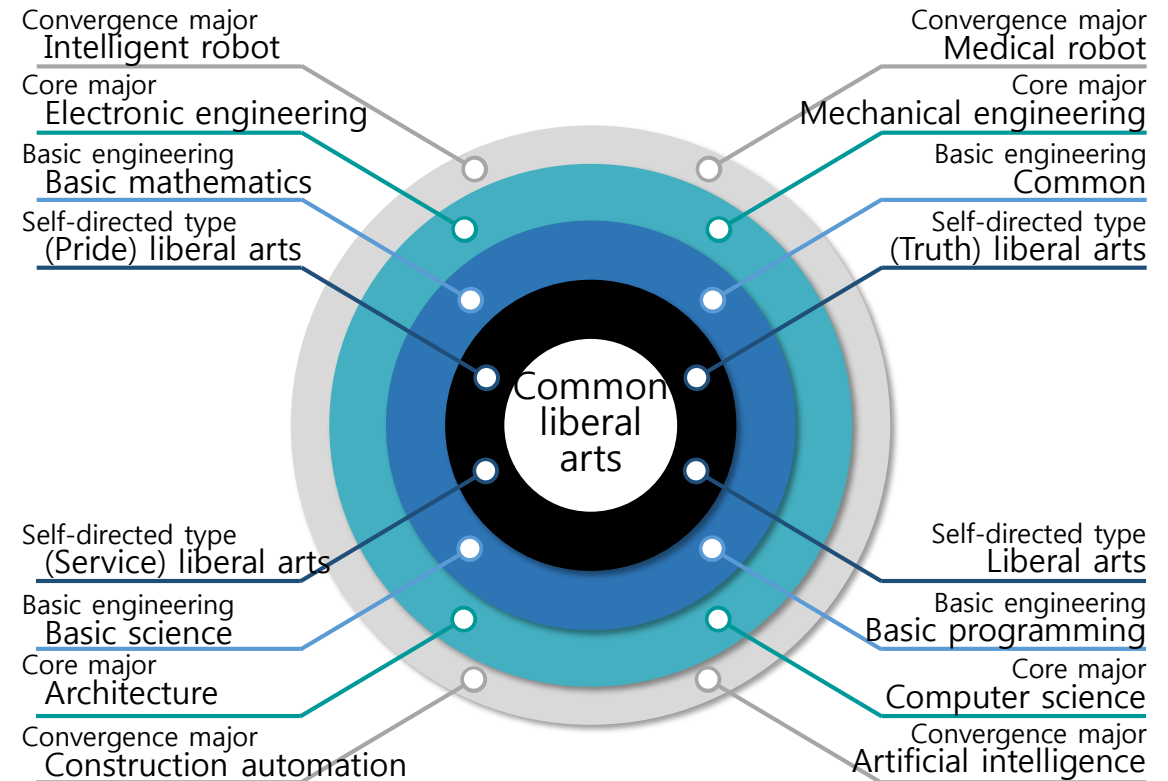
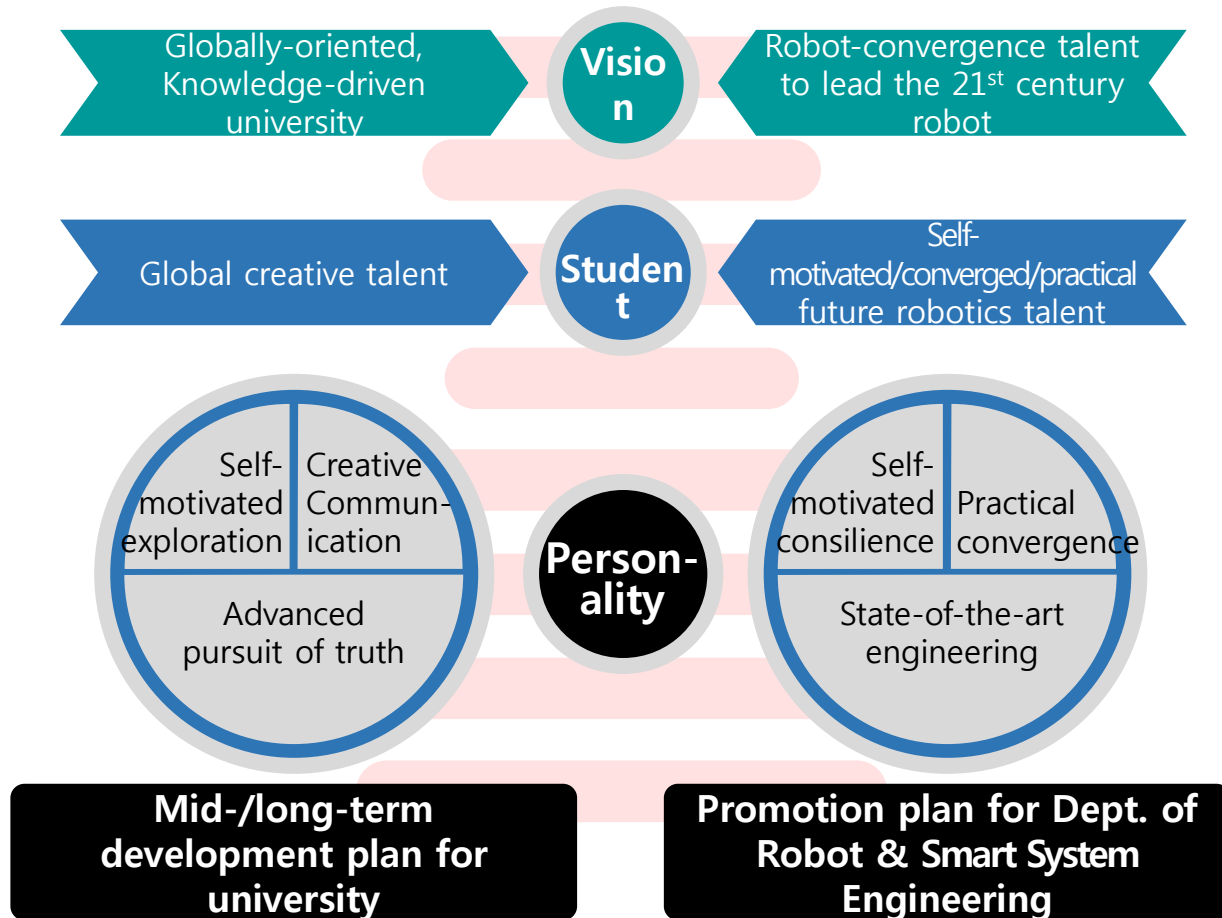
첨단정보통신융합산업기술원
Institute of Advanced Convergence Technology





ITA Robot Education Future Direction

Development of Robot-Convergence Talent to Lead the Hardware-oriented



[Lucid Pole model of the department curriculum]

Value Proposition

Increase the market competitiveness of university and students
& Contribute to improving the performance of companies and organizations

Development
of
HEART Human

Specialize

Established virtuous cycle

Selection & concentration

Enhanced execution

Reinforce
educational
competitiveness

Strengthen
research
competitiveness

Build an
optimal
education/resear
ch
infrastructure

Advanc
e
universi
ty
operatin
g
system

KNU VISION

Vision

Development of world-class HW-aimed robot technology & creative students

Graduate Inter-disciplinary Program of Robot Engineering (2009~)

Master's and Ph.D courses

HW-oriented education

Advanced Infrastructure

Department of Robot & Smart System Engineering (2019~)

Flexible course

HW education

Substantial convergence

Convergence course

Double major (50
credits)

One Man One Robot

Major in robotics

Team teaching

Convergent major (30
credits)

Graduation exhibition

Curriculum sharing

Flipped learning

Bachelor's-Master's
Course

Field-oriented
education

Undergraduate
research

New curriculum

School of
Mechanical
Engineering

School of
Electronics
Engineering

School of
Architecture &
Civil Engineering

School of
Medicine

Promotion of KNU VISION Development Plan and Spread of Performance
Reflecting the Needs of Government and Society

Demand for change
in government and
society

Govern-
ment

- Enhancement of undergraduate education
- Advancement of higher education
- Daegu city

Corpo-
rations

- Development of talent that corporations require

Univer-
sities

- Development & Spread of undergraduate education model
- Alleviation of youth unemployment

Research
Institutes

- On-the-spot training
- KIMM, DGIST
- IACT

International
cooperation

- Establishment of a cooperative system for higher education
- IIT, UCLA, etc.

Professors

Professor	Major	Telephone	E-mail
Kang, Namcheol	Machine&Human Dynamics	053) 950-7545	nckang@knu.ac.kr
Kang, Bo Yeong	Intelligence robot	053) 950-7542	kby09@knu.ac.kr
Kim, Hyun-Deok	Telecommunications	053) 950-7578	undkim@ee.knu.ac.kr
Roh, Yong Rae	Acoustic vibration	053) 950-6828	yryong@knu.ac.kr
Park, Soon-Yong	Robot vision	053) 950-7575	sypark@knu.ac.kr
Byeon, Clare C	Optics and Photonics	053) 950-7511	byeon@knu.ac.kr
Suh, Jung-wook	Robot mechanism	053) 950-4567	jwsuh@knu.ac.kr
Lee, Dong-Eun	Building Management	053) 950-7540	dolee@knu.ac.kr
Lee, Sang Ryong	Automation	053) 950-5579	srlee@knu.ac.kr
Lee, Sangmoon	Cyber Physical System	053) 950-5509	moony@knu.ac.kr
Lee, Yun-Jung	Intelligence robot	053) 950-6562	yjlee@ee.knu.ac
Lee, Yong Joong	Nano material measurement	053) 950-6574	yjlee76@knu.ac.kr
Lee, Joon-Woo	Robotics	053) 950-5602	jwl@knu.ac.kr
Lee, Ho	Laser and Bio engineering	053) 950-5572	holee@knu.ac.kr
Hwang, Chang Soon	Robot system	053) 950-7516	robot@knu.ac.kr

2020 Spring Semester Admission Guide for International Graduate Students

Admission to ITA Departments

□ Graduate School admission schedule (2020 Spring Semester)

Procedures	Time	Remarks
Online Application	October 28(Mon) to November 8(Fri), 2019 by 18:00	Refer to KNU website (http://en.knu.ac.kr)
Submission of Application Documents	October 28(Mon) to November 15(Fri), 2019 by 18:00	Office of International Affairs(Global Plaza 608), Required documents ⑤ ①~⑫
Screening Qualifications	November 18(Mon) to 25(Mon), 2019	Office of International Affairs
Department Interviews	November 27(Wed) to December 6(Fri), 2019	Departments will notice with an interview schedule
Submission of Financial Documents	December 16(Mon) to 23(Mon), 2019	Financial documents indicating funds of about USD18,000 can be submitted with the application forms
Admissions Committee Screening	By December 24(Tue), 2019	
Graduate School Council Screening	By December 27(Fri), 2019	
Notification of Admission Results	December 31(Tue), 2019 expected	(Korean) http://gp.knu.ac.kr (English) http://en.knu.ac.kr
Certificate of Admission	From middle of January, 2020	
	<ul style="list-style-type: none"> Overseas residents: EMS post with address written on application In Korea residents: Pick up by visiting the Office of International Affairs after tuition payment 	
Registration	<ul style="list-style-type: none"> 1st Chance on Late January, 2020 2nd Chance on Late February, 2020 	Tuition Invoice: Applicants can pick it up from the Office of International Affairs
Submission of Academic Verification Documents	By February 28(Fri), 2020	

Financial Support to ITA graduate students

1. Full or partial tuition fee supports for outstanding students
2. Research / Teaching Assistantships
3. Students who have outstanding research achievements are sent to foreign universities for one semester to support overseas joint research
4. Supports to Conference/Workshop paper presentation
5. Dormitory house is available for the international students

Contacts

Office of International Affairs

1. Address: Office of International Affairs, Kyungpook National University (Global Plaza, Room No. 608) 80 Daehak-ro, Buk-gu, Daegu, 41566, Republic of Korea
2. Homepage: <http://en.knu.ac.kr>
3. Person in Charge: Haejin Shin(Ms.)
4. Contact: (Tel) +82-53-950-2436, (Fax) +82-53-950-2419, (E-mail) admission@knu.ac.kr

Office of ITA Convergence Teaching

1. Address: Office of Convergence Teaching, Kyungpook National University (Techno Building, Room No. 510) 80 Daehak-ro, Buk-gu, Daegu, 41566, Republic of Korea
2. Homepage: <http://aist.knu.ac.kr/>
3. Person in Charge: Ji Hye Kwon(Ms.)
4. Contact: (Tel) +82-53-950-3883, (E-mail) kjh0412@knu.ac.kr