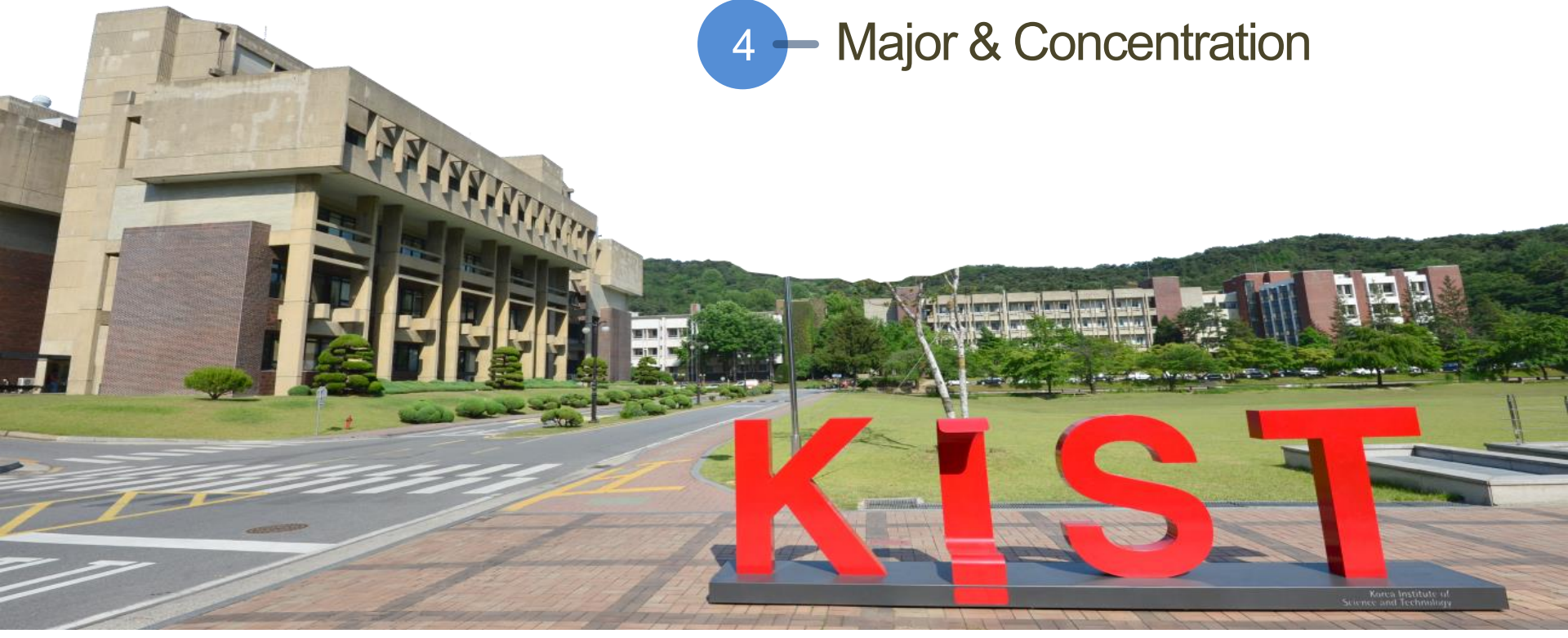


KIST School Scholarship Program



- 1 — KIST at a Glance
- 2 — KIST School
- 3 — Scholarship Program
- 4 — Major & Concentration



CHAPTER : 01

KIST at a Glance





FROM
CATCH-UP
TO INNOVATION

KIST PROGRESSED
FAST TO CLAIM
TECHNOLOGY
LEADERSHIP

1966 ~

Developed key
industrial technologies

1980 ~

Adopted and modified
imported advanced
technologies

1990 ~

Conducted original
research in advanced
technologies

2000 ~

Research innovative,
cutting-edge technologies

THE LEADING CONTRIBUTOR IN SCIENCE AND TECHNOLOGY IN KOREA

Seoul Headquarters



- Established in 1966
- Multidisciplinary research institute of science and technology in Seoul
- Land area: 271,527 m²

KIST Gangneung



KIST Europe (Germany)



KIST Jeonbuk



Indo-Korea S&T Center



No. of Staff



854

Staff



587

Researchers



8

International
Visiting
Researchers



170

Post-doc.
Researchers



60%
PhDs



209
Recruited
from
Overseas



153
International
Students



1,177
Research
Students
& Trainees



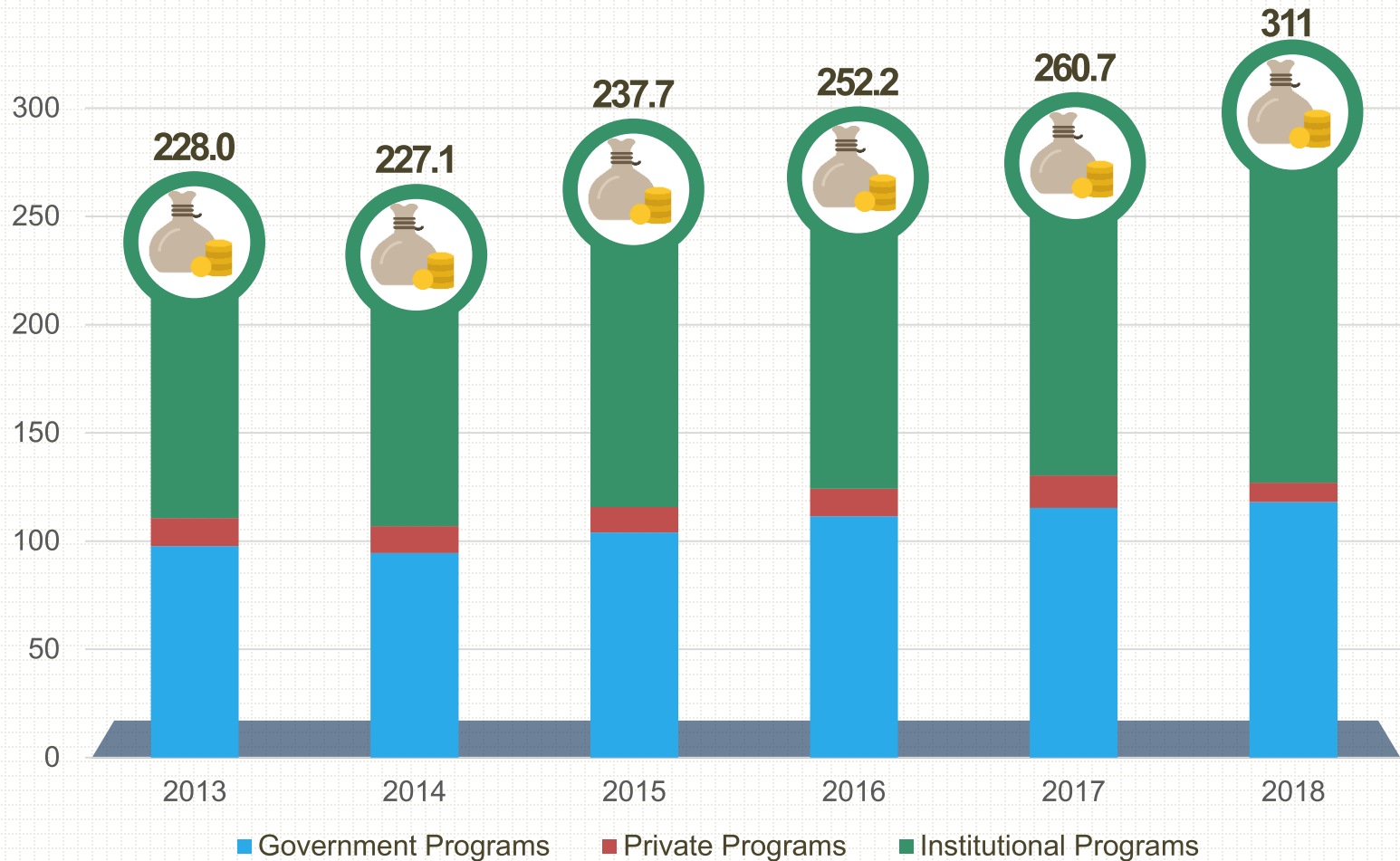
85
Temporary
Researchers



as of September, 2018

Budget Raising By Year

Unit : Million USD / as of September, 2018



Research Institute and Divisions

Brain
Science
Institute



Biomedical
Research
Institute



Green
Energy
Institute



Post-Silicon
Semiconductor
Institute



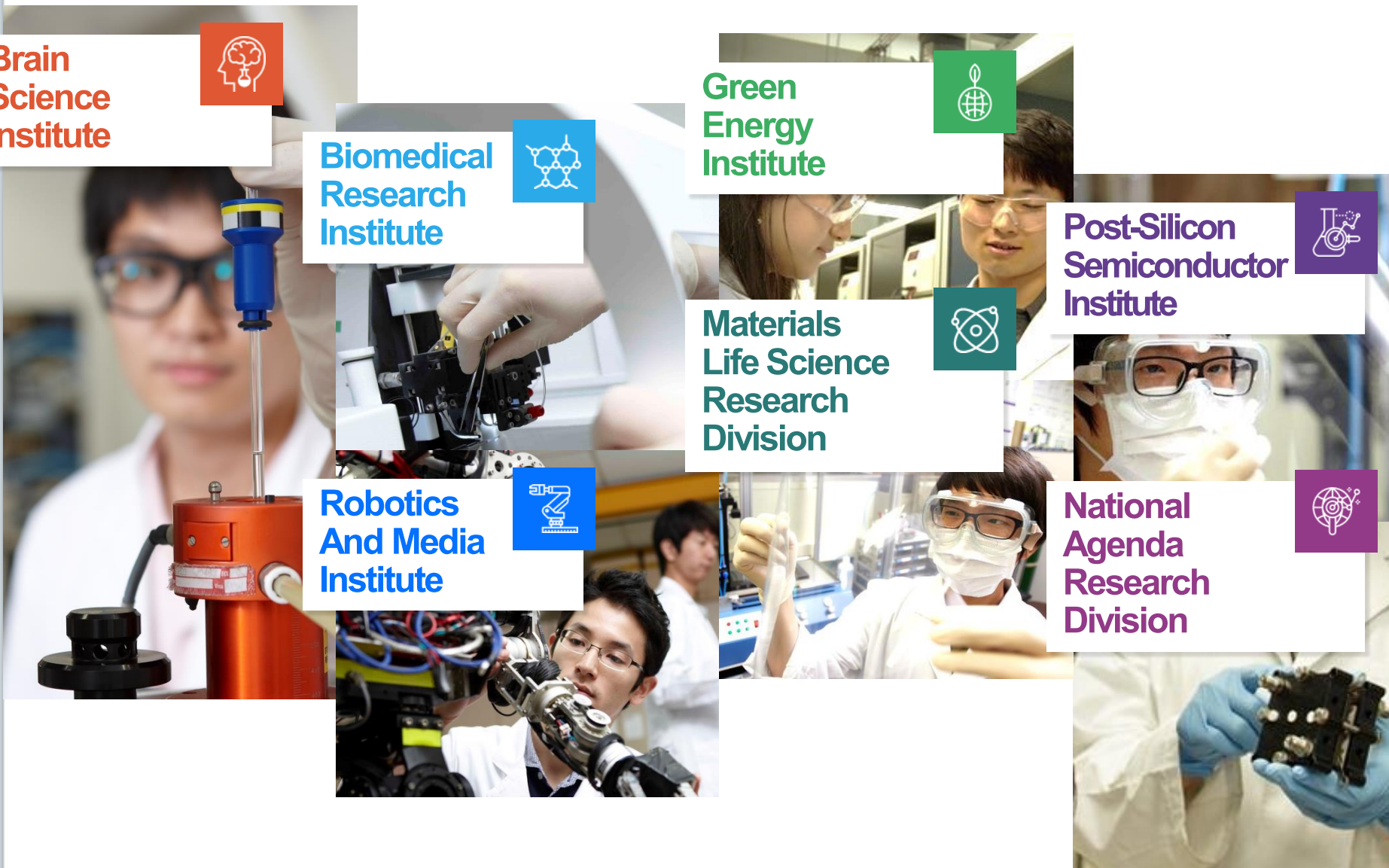
Materials
Life Science
Research
Division



Robotics
And Media
Institute



National
Agenda
Research
Division



Notable Research Papers

NSC 4, Others 48 (2014 – 2016)

Nature (Dr. Sim Tae Bo, Vol. 511, 2014.7)

Targeting transcription regulation in cancer with a covalent DCK7 inhibitor

Science (Dr. Hur, Wooyoung, Vol. 346, 2014.12)

Patient-derived models of acquired resistance can identify effective drug combinations for cancer

Nature (Dr. Lee So Young, Vol. 532, 2016.4)

Nanocrack-regulated self-humidifying membranes

Science (Dr. Koo Chong Min, Vol. 353, 2016.9)

Electromagnetic interference shielding with 2D transition metal carbides (MXenes)



Ratio of JCR 20% : ('13) 56% → ('16) 64%



Ranked 6th among the World's Most Innovative Research Institutions

(2016&2017, Thomson Reuters)



Top 25 Global Innovators 2017 - Government



#6 Korea Institute of Science & Technology

2016 Rankings

1	Alternative Energies and Atomic Energy Commission	FRANCE
2	Fraunhofer Society	GERMANY
3	Japan Science & Technology Agency	JAPAN
4	U.S. Department of Health & Human Services	USA
5	National Center for Scientific Research	FRANCE
6	Korea Institute of Science & Technology	SOUTH KOREA
7	National Institute of Advanced Industrial Science & Technology	JAPAN
8	U.S. Department of Energy	USA

2017 Rankings

1	Health & Human Services Laboratories	USA
2	Alternative Energies and Atomic Energy Commission	FRANCE
3	Fraunhofer Society	GERMANY
4	Japan Science & Technology Agency	JAPAN
5	National Center for Scientific Research	JAPAN
6	Korea Institute of Science & Technology	SOUTH KOREA
7	Medical Research Council	UK
8	National Center for Scientific Research	FRANCE

CHAPTER : 02

KIST School



History

2017.3

Making a new leap forward as KIST School

2011

10th Anniversary International Conference

2003

UST was established

2001~

KIST-IRDA inaugurated with 21 students

Mission

- To educate globalized leaders in S&T research
- To train R&D human resource for industries
- To build advanced education system, improve teaching competency and strengthen student abilities

Participating in National R&D Projects

Over 90% of KIST R&D budget is from government program and institutional program \$302 million (December, 2018)

Excellent faculty

Selected 150 professors among 330 Ph.D researchers in KIST

KIST School

Utilization of National Research Institute Infrastructure

Knowledge/Technology accumulated over 50 years
Cutting-edge research equipment/facilities



Current Status

Students

By Major

Bio-Medical Science & Technology	Energy & Environment Technology	Nano & Information Technology	Total
138	75	75	288

By Nationality (25 Countries)

Korea	Vietnam	Ukraine	Indonesia	Pakistan	Bangladesh /Belarus	Mongolia	Turkey
153	23	16	14	12	9	8	7
India	Kazakhstan/ Egypt/Iran	China/ Ethiopia/ Uzbekistan	USA	Brazil/Canada/Myanmar/ Philippines/Romania/ Singapore/Spain/Uganda	Total		
6	4	3	2	1	288		

Professors

Bio-Medical Science & Technology	Energy & Environment Technology	Nano & Information Technology	Total
56	36	52	144

as of September 2020

International Cooperation



- Thailand, Asian Institute of Technology (AIT) ('00)
- Ukraine, Nat'l Tech. U. of Ukraine Kiev Polytech Institute (NTUU-KPI) ('01)
- China, Lanzhou University ('04)
- Russia, Novosibirsk State Tech University ('07)
- China, Peking University ('07)
- Belarus, Belarusian National Technical University ('13)
- Ukraine, National Technical University Kharkiv Polytechnic Institute ('15)
- Czech Republic, Czech Technical University ('15)
- Germany, Saarland University ('16)
- Czech Republic, Charles University ('16)
- Uruguay, National Research And Innovation Agency ('16)
- Japan, Tohoku University ('16)
- Indonesia, Universitas Indonesia ('16)
- Belarus, National Academy of Science of Belarus ('17)
- Mongolia, Mongolian Academy of Science ('17)
- Ukraine, Ministry of Education and Science of Ukraine ('19)
- Kazakhstan, Ministry of Education and Science of the Republic of Kazakhstan, CIP ('19)

Alumni

By Nationality (28 Countries), Total 523

Yoon Bo-Eun ('12, Ph.D)



Affiliation & Position

Dankuk University, Korea
Department of Nano-biomedical
Science, Assistant Professor

Research Fields

Publication for "Science"('10),
"Journal of physiology"('14)

Devianto Hary ('05, Ph.D)



Affiliation & Position

Institute of Technology Bandung,
Assistant Professor

Affiliation & Position

Publication for "International Journal
of Hydrogen Energy"('10)
"Journal of Nanoscience and Nanotechnology"('15)

Research Performance

Dr. Shahzad Faisal



- '17 Ph.D. graduate (Pakistan)
- Science(2016) 34.661/3.17% (IF/JCR)



Electromagnetic interference shielding with 2D transition metal carbides (MXenes)

Science, Vol 353, Issue 6304, 09 September 2016

Dr. Bo-Eun Yoon



- KIST School '12 Ph.D. graduate
- Science (2010) 31.364/3.39% (IF/JCR)



Title_ Channel-Mediated Tonic GABA Release from Glia

Science, Vol. 330, Issue. 6005, 15 October 2010

Dr. Dongho Woo



- KIST School '12 Ph.D. graduate
- Cell (2012) 32.403/0.55%(IF/JCR)



Title_ TREK-1 and Best1 channels mediate fast and slow glutamate release in astrocytes upon GPCR activation

Cell 151, 25-40, 28 September 2012

Students Benefits

Full Scholarship

▶ The highest level of financial support in Korea

To help students focus on their study and research

- Amount for a Ph.D. students : a Minimum of USD 1,500 / Mon.
- Amount for a M.S. students : a Minimum of USD 1,100 / Mon.
- Amount for a Bachelor students : a Minimum of USD 900 / Mon.

Student Welfare

▶ Delicate and complete care for student well-being

- Diverse academic/cultural events
- Discounted condominium rates at many major tourist destinations
- First-rate dormitory facilities for 120 USD / Mon.
- Comprehensive insurance, Medical Check

Korean Language Class

▶ Communication-based curriculum of professional instructors from excellent university

- Support to learning Korean language
- Various on-line and off-line classes are provided for student's adjustment in Korea and for academic life



Festival



Rafting



Cultural Event



가나다

Access to Analytical Support

Electron Microscope Team

TEM - CM30

Specifications

- Manufacturer: Philips
- Accelerating voltage: 50~300kV
- Image resolution: < 0.2nm
- Electron probe size: < 0.2 nm
- Magnification: 25 ~ 1,030,000X
- Specimen double tilt: < 40° / ± 20°

Applications

- General TEM
- EDF/DF
- EDX spectrum
- Diffraction pattern

Application examples

- General TEM imaging
- Diffraction pattern
- EDX spectrum

Application examples: General TEM imaging, Diffraction pattern, EDX spectrum, 2D Nano-Scan Diffraction, S4D/Selected Area Diffraction.

Contact: 최기훈, 연락처: 5970, Room: L5117A

Cryo-TEM

Specifications

- Manufacturer: FEI (Cryo Tecna F20 G2)
- Accelerating voltage: 50~200kV
- Image resolution: < 0.25nm
- Electron probe size: < 0.3 nm
- Magnification: 25 ~ 630,000X
- Specimen double tilt: < 40° / ± 20°
- Tomography holder: ± 80°
- EELS: Tridem 866

Applications

- BF/DF/HAADF-STEM
- High resolution structure analysis
- In-situ heating analysis
- Electron tomography
- Cryo-specimen analysis
- Chemical analysis - EELS

Application examples

- Cryo-transfer system
- Cryo-TEM analysis of soluble nanoparticles
- 3D analysis of cellular structure: Focused ion beam tomography
- Protein structure analysis
- Structural analysis of biological specimens
- In-situ Fracture Analysis / mapping & spectra
- Chemical state identification

Contact: 김태현, 연락처: 5967, Room: L5117B

Structure and Surface Characterization Team

PHI-700 Scanning AES Nanoprobe

Specifications

- Base pressure: < 5 x 10⁻¹⁰ Torr
- SEM resolution: < 70 Å (20 kV, 1 nA)
- Energy resolution: < 1.0 eV
- Current sensitivity: < 780 kcps (10 kV, 10 nA)
- S/N ratio: > 700 (10 kV, 10 nA)
- Shadowing during imaging: No shadowing
- Analyzer Type: CMA
- Compositional Z-Map depth profiling: Yes

Applications

- SEM imaging
- Elemental identification (Z ≥ 3, ≈ 0.1 atomic %)
- Quantification (< 10 % ΔC)
- Depth profiling with ion beam sputtering
- Chemical state identification

Application examples

- Auger Image
- Depth Profile
- Mapping
- In-situ Fracture Analysis / mapping & spectra
- Chemical state identification

Contact: 최기훈, 연락처: 5974, Room: L5113C

KIST-USANS (ultra small angle neutron scattering)

Specifications

- Resolution: 0mm ~ 3x10⁻⁵ Å⁻¹
- Wavelength: λ = 4 Å
- Focusing: HOPO(002) (dhw=0.4±0.1°)
- Neutron Flux: < 1.2 x10¹⁶ #/cm²/sec
- Monochromator and Analyzer: Si (111)
- (Measurable Size) submicron to ~ 20 μm
- (Signal/Noise) ~ 10⁴

Applications

- Samples: liquids, solids, gels...
- Soft matters: biomaterials, polymers...
- Hard matters: Alloys, ceramics
- Structures: lamellar, sphere, fractals, hierarchy, interface, clusters, dispersion
- Volume fraction, size & its distribution, SV
- Green Technology: Fuel cells, Solar cell, Food packaging membranes...
- Modified Al₂O₃ Powder
- Focused materials (Open-pore or Closed Pore)

Contact: 김태현, 연락처: 5885, mgr@hokim@kist.ac.kr

Ion Beam Accelerator & Mass Spectrometry Team

KIST ion beam facility

Accelerators @ KIST

- 6 MV Tandatron
- 2 MV Pelletron
- 400 kV Implanter

Principal specifications

Type	Beam Current	Beam Size	Beam Energy	Spot Size	Beam Diameter	Beam Diameter	Beam Diameter
6 MV Tandatron	10 μA	2 mm	6 MeV	1 mm	100 μm	100 μm	100 μm
2 MV Pelletron	100 μA	2 mm	2 MeV	1 mm	100 μm	100 μm	100 μm
400 kV Implanter	100 μA	2 mm	400 keV	1 mm	100 μm	100 μm	100 μm

Applications

- Ion beam analysis (IBA)
- Accelerator mass spectrometry (AMS)
- Age dating
- Human microdosimetry
- Ion beam material modification (IBMM)

Contact: 최기훈, 연락처: 02-958-5995, R55@kist.ac.kr

AMS

Specifications

- 6MV Tandem Accelerator
- AMS ion sources
- Sample medium: Solid CO₂
- Sample capacity: ~50samples
- Carousal exchange time: ~20min
- Target exchange time: ~20sec.
- AMS magnet
- 500 Isotope/Atom: 50mm 5.8 AMU MeV
- FE 50° magnet 1500mm, 45mm, 155AMU MeV
- HE37 magnet (vertical, 1500mm, 45mm, 155AMU MeV)
- HC⁺, HBe⁺, He⁺, Cl⁺, Ca⁺, I⁺ measurement
- ¹³C/¹²C Isotope ratio <10⁻¹³

Applications

- 전통 유기농산물 (Agriculture)
- 의학 생물 표지 (Biomedical AMS)
- 지구 과학 (GeoScience)
- 환경 과학 (Environmental Science)

Application Examples

- Biochemical AMS (H, C, N, O, Ca, I)⁺ 관측
- 우주 생물: 우주선 방사선에 의해 생성된 유기화합물 (AMU) 측정 (AMU 500 이하의 유기화합물 분석을 위한 추가적인 방사선 조사 필요)
- Genotoxicity: H⁺, He⁺, H²⁺, H³⁺ 측정
- 우주 방사선 측정: 우주 방사선 측정 (우주 방사선 측정)
- 우주 방사선 측정: 우주 방사선 측정 (우주 방사선 측정)
- 우주 방사선 측정: 우주 방사선 측정 (우주 방사선 측정)

Contact: 최기훈, 연락처: 8376, Room: L19-2019

NMR Team

900MHz FT NMR spectroscopy

Specifications

- Model: Varian INOVA 900
- Location: KIST Advanced Analysis Center (L3100)
- Installation: 2006. 12. 29
- Magnet
- Filed Strength: 21.14 Tesla
- Operating temperature: 2.2 K
- Helium refill interval: ~ 60 days
- Cryostat Helium refill volume: 576 L
- S/N: 7000:1
- Probes
- ¹H/¹³C NMR with ¹H decoupling 5 mm Z-gradient triple resonance probe (X)
- Cryogenically cooled probe, 5 mm, triple inverse-Z-gradient probe (X)

Application examples

- Protein - RNA structure analysis
- Protein - Ligand interaction (fragment based drug design)
- Molecular dynamics studies
- Structural analyses macromolecules
- Disease-related protein structures
- Gene-expression related nucleic acids structures
- Protein - nucleic acid complex structures
- Protein - ligand, RNA - ligand structural analysis
- Natural product analysis
- Molecular dynamics studies on macromolecules (ns to sec)
- Structure based drug developments
- Nucleic acids structure determination
- Nucleic acid-protein interaction

Contact: 최기훈, 연락처: 8996, Room: L2304



Best Environment for R&D and Education

Alumni Meeting

Vietnam, Hanoi



Indonesia, Bandung



Alumni Benefits

▶ KIST School Partnership Project

To stay connected, to maintain continuous and close relationship with the alumni, and to support their research activities

○ Eligibility

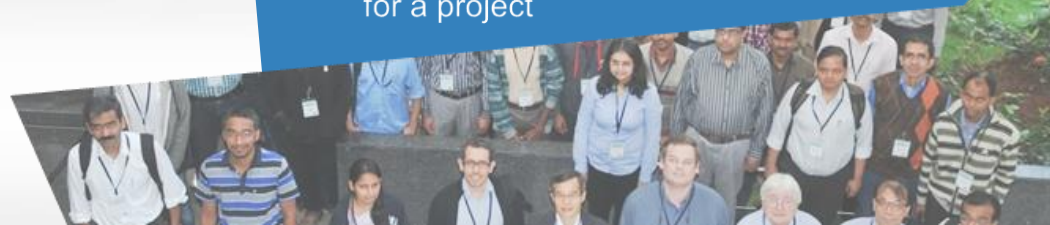
Should be KIST School alumni members, who are incumbent university faculty members or national/public institute researchers

○ Period

Begins from September, the funding term should be 12 months.

○ Funding

The selected alumni may request a budget of up to USD 18,000 for a project



CHAPTER : 03

Scholarship Program

- UST Degree
- Dual Degree
- Internship



UST Degree Program

✔ **To nurture S&T professionals creating future values with Gov. funded research institutes**

✔ Eligibility

- ▶ Doctoral Program: Must have a Master's degree, or be expected to receive one
- ▶ Intg. Program & M.S. Program: Must have a Bachelor's degree, or be expected to receive one
- ▶ The required language is English. Students who have a TOEFL score of CBT 213 or higher or other equivalent scores such as IELTS or TOEIC will be considered qualified

✔ Period

- ▶ Spring Semester: September of the Previous Year
- ▶ Fall Semester: March

✔ Application **All aspects of the admission process will be dealt through**

- ▶ Application at <http://apply.ust.ac.kr> → **Apply for KIST School**

UST
Headquarter

(Korea University Science & Technology)

The Korea University of Science and Technology (UST), established in 2003, is the only university associated with national research institutes, including KIST, that foster top S&T talents in national strategic sectors.



KIST & the Partner University

- ✔ **Providing real research and development experience through intensive graduate Lv. education**
- ✔ Eligibility
 - ▶ Applicants who have fulfilled their coursework requirements from Partner University with a cumulative GPA of at least 4.0 out of 5.0, will be entitled to enroll in the equivalent M.S. or Ph.D. degree program at KIST School
 - ▶ The required language is English. Students who have a TOEFL score of CBT 213 or higher or other equivalent scores such as IELTS or TOEIC will be considered qualified
- ✔ Period
 - ▶ Spring Semester begins in March, Fall Semester begins in September.
 - ▶ Students should study at KIST for at least one year for an M.S. or M.E. degree and two years for a Ph.D. degree

NOW



Enrolled
Students

11



Graduate
Students

30



Degree
Program

4

Dual Degree Program with International Organizations

- (✓) KIST-NTUUlgor Silkorsky Kyiv Polytechnic Institute / NTU Kharkiv Polytechnic Institute Dual Degree Program
 - ▶ 2~5 Master students per semester
 - ▶ Full Scholarship: Tuition and monthly stipend
 - ▶ Program: Earn Univ. credit by taking part in KIST research projects for 2 years
- (✓) KIST-PASET (Partnership for Skills in Applied Sciences, Engineering and Technology) Scholarship Program
 - Funded by World Bank
 - ▶ 10 Ph.D. students studying energy and ICT in Sub-Saharan Africa / per year
 - ▶ Full Scholarship: Tuition and monthly stipend
 - ▶ Program: Earn Univ. credit by taking part in KIST research projects for 2 years
- (✓) KIST-ANII (Uruguayan National Agency for Research and Innovation) Scholarship Program
 - ▶ Funded by the Inter-American Development Bank 2 Uruguayan Ph.D.-level S&T students and 2 Uruguayan interns / per year
 - ▶ Scholarship: Total 60 mil. KRW for 3 years / per Ph.D. student

Dual Degree Program

Student's story from Dual Degree to Degree



Pre-KIST School Program

- ✔ **6-month-long Internship by taking part in research lab with Korean and English lang. courses**
- ✔ Eligibility
 - ▶ Must have a bachelor's or master's degree, or be expected to receive one
 - ▶ Must get an official recommendation from the government agency in MoU with the KIST
- ✔ Period
 - ▶ Runs two times a year , Begins in January and July

Partners

- Belarus



National Academy of Science of Belarus (NSB)

- Ukraine



Ministry of Education and Science of Ukraine

- Kazakhstan



Ministry of Education and Science of the Republic of Kazakhstan, CIP

- Mongolia



Mongolian Academy of Science (MAS)

- Turkey



Scientific and Technological Research Council of Turkey (TUBITAK)

CHAPTER : 04

Major & Concentration

- Division of Bio-Medical Science & Technology
- Division of Energy & Environment Technology
- Division of Nano & Information Technology



Division of
Bio-Medical
Science &
Technology

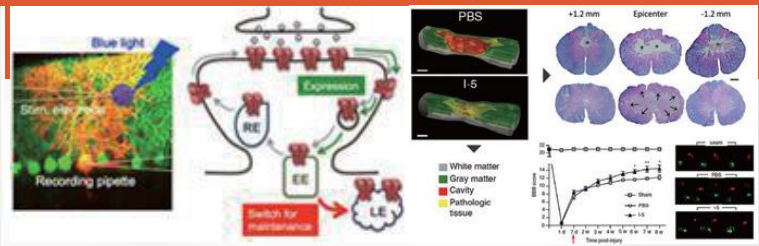


1 Concentration

- Biomedical Engineering
- Biological Chemistry
- Neuroscience

2 Main Issue

- Proteomics-based identification and validation of novel plasma biomarkers phospholipid transfer protein and mannan-binding lectin serine protease-1 in age-related macular degeneration (Scientific Report 2017)
- Timely regulated sorting from early to late endosomes is required to maintain cerebellar long-term depression (Nature Communication 2017)
- An injectable hydrogel enhances tissue repair after spinal cord injury by promoting extracellular matrix remodeling (Nature Communication 2017)



Division of
Energy &
Environment
Technology

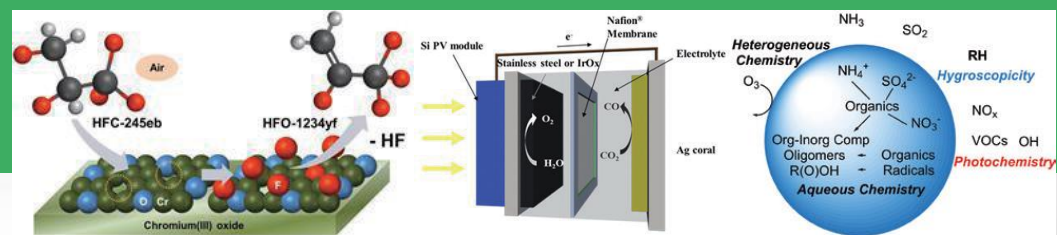


1 Concentration

- Energy Engineering
- Environment Engineering

2 Main Issue

- Effect of Molecular Orientation of Donor Polymers on Charge Generation and Photovoltaic Properties in Bulk Heterojunction All-Polymer Solar Cells (Advanced Energy Materials, 2017)
- Elimination of Microcystin-LR and Residual Mn Species using Permanganate and Powdered Activated Carbon: Oxidation Products and Pathways (Water Research, 2017)
- Insight into Electrochemical CO₂ Reduction on Surface-Molecule Mediated Ag Nanoparticles (ACS Catalysis, 2017)



Division of Nano & Information Technology

Division of
Nano &
Information
Technology

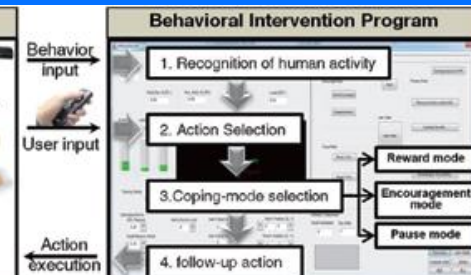
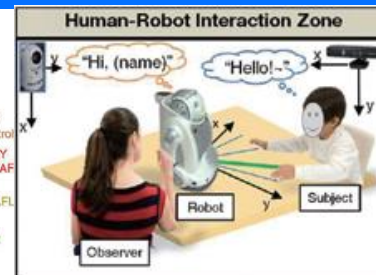
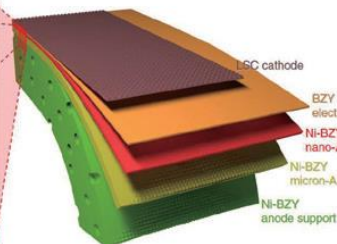
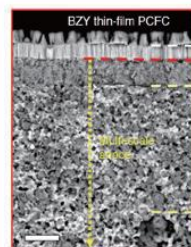
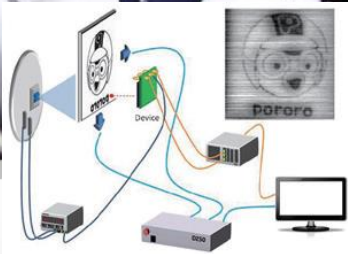


1 Concentration

- Nanomaterials Science & Engineering
- HCI & Robotics

2 Main Issue

- BMixed-Dimensional 1D ZnO–2D WSe₂ van der Waals Heterojunction Device for Photosensor (Advanced Functional Materials 2017)
- Demonstrating the potential of yttrium-doped barium zirconate electrolyte for high-performance fuel cells (Nature Communications 2017)
- Social Skills Training for Children with Autism Spectrum Disorder Using a Robotic Behavioral Intervention System (AUTISM RESEARCH 2017)



THANK YOU

KIST