

**Innovative University
Changing,**

**The World Through
Convergence**

2027 GRADUATE SCHOOL ADMISSION GUIDE

DGIST

DGIST

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DGIST

**2027 Graduate School
Admission Guide**



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I

2027 Admissions Guidelines

Admission Schedule

Procedures	Spring 1st	Spring 2nd	Spring 3rd	Fall
Online Application	'26.6.25.(Thu) ~7.9.(Thu)	'26.8.27.(Thu) ~9.10.(Thu)	'26.11.5.(Thu) ~11.19.(Thu)	'27.4.8.(Thu) ~4.22.(Thu)
Document Screening Results	'26.7.28.(Tue) 14:00	'26.10.6.(Tue) 14:00	'26.12.8.(Tue) 14:00	'27.5.18.(Tue) 14:00
Interview	'26.8.3.(Mon) ~8.10.(Mon)	'26.10.19.(Mon) ~10.23.(Fri)	'26.12.14.(Mon) ~12.21.(Mon)	'27.5.24.(Mon) ~5.31.(Mon)
Final Results	'26.8.25.(Tue) 14:00	'26.11.5.(Thu) 14:00	'27.1.12.(Tue) 14:00	'27.6.15.(Tue) 14:00

※ Spring: March-June/Fall : September-December.
※ All dates are based on Korean Standard Time(KST).
※ The above information is subject to change depending on the academic year.

Eligibility

Course	Eligibility
Master's	· Applicants who have acquired or are expected to acquire a Bachelor's degree by February 2027(for Spring 2027 intake) or by August 2027(for Fall 2027 intake)
Integrated MS & Ph.D.	
M.E.P.	
Ph.D.	· Applicants who have acquired or are expected to acquire a Master's degree by February 2027(for Spring 2027 intake) or by August 2027(for Fall 2027 intake)

[Department-Specific Additional Eligibility Requirements]

Department	Category	Additional Eligibility Requirements
Department of New Biology	-	· Official English test score obtained within 4 years from the application deadline(no minimum score requirement).
Interdisciplinary Studies, Biomedical Science & Engineering	MD-PhD Program	· Integrated Master's and Doctoral Program : Applicants who have obtained(or are expected to obtain) a bachelor's degree or higher and who hold(or are expected to obtain) a medical license, dental license, or Korean medicine license. · Doctoral Program : Applicants who have obtained(or are expected to obtain) a master's degree or higher and who hold(or are expected to obtain) a medical license, dental license, or Korean medicine license. ※ The Master's program is not available for this track.
	Graduate Program in Biomedical Science and Engineering	· No additional eligibility requirements. ※ Eligibility requirements are identical to those for Government Scholarship Students, DGIST Scholarship Students, and General Scholarship Students applying to the Master's, Integrated Master's-Doctoral, and Doctoral programs.
Department of Technology Management	AIMS Track	· Official English test score obtained within 4 years from the application deadline(minimum score requirement applies). ※ Minimum scores : TOEFL iBT 60, IELTS 5.5, TOEIC 700, G-TELP Level 2(64), TOEIC Speaking 120, OPIC IM2, NEW TEPS 300

Departments and Programs

Department	Major	Available Scholarship	Available Program
Physics and Chemistry		Government General	Master's Doctoral Integrated MS & Ph.D.
Electrical Engineering and Computer Science			
Robotics and Mechatronics Engineering			
Energy Science and Engineering			
Brain Sciences			
New Biology			
Interdisciplinary Studies	Interdisciplinary Engineering	DGIST	
	Artificial Intelligence	Government General DGIST	
	Biomedical Science&Engineering		
	Quantum Information Science		
Department of Advanced Technology	Graduate School of Engineering Practice	General	M.E.P.
Department of Technology and Innovation Management	Graduate School of Technology and Innovation Management	General DGIST	M.E.P.

※ Applicants to the Integrated MS & Ph.D. program may be considered for admission to the Master's program depending on the department's assessment.
※ All classes of DGIST Graduate School are delivered in English language.
※ Employed applicants have to apply for 'General Scholarship'. Applicants who are currently employed can apply 'Government Scholarship' or 'DGIST Scholarship' only if they retire before admissions.

※ Applicants who fail to upload the required documents within the designated period will be excluded from the evaluation due to incomplete application materials.

Required Documents

Compulsory	Application Form	- Must be filled out on the online application website. - Must be written in Korean or English language. - Interdisciplinary Engineering · It is necessary to contact a faculty member in the field of interest before submitting the online application. - Robotics and Mechatronics Engineering ※ Ph.D. applicants only · It is necessary to contact a faculty member in the field of interest before submitting the online application. · It is necessary to state the name of lab you wish to join on the Statement of Purpose(SoP). - Electrical Engineering and Computer Science · It is necessary to mention one to three research areas that you are interested in, on the SoP. - Energy Science and Engineering · It is necessary to mention one to three research areas that you are interested in, on the SoP. - Brain Science · It is necessary to contact a prospective advisor before submitting application documents. · The desired laboratory must be clearly stated in the Statement of Purpose(SoP).
	Statement of Purpose (SoP)	

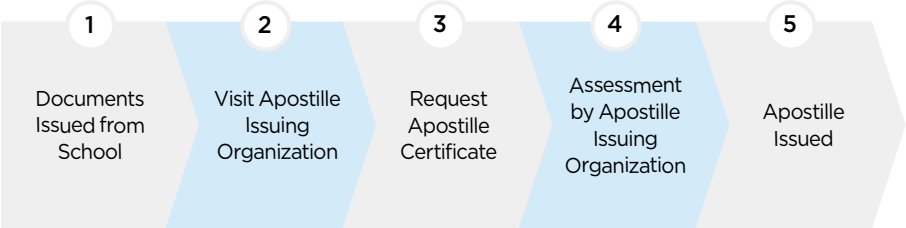
Required Documents

Compulsory	(Expected) Graduation Certificate	- Both Graduation Certificate and Official Transcripts must be in ENGLISH or accompanied by a NOTARIZED ENGLISH TRANSLATION, and uploaded through the online application. - Both Graduation Certificate and Official Transcripts must be NOTARIZED BY the KOREAN CONSULATE in your country or APOSTILLED. - While an Expected Graduation Certificate is acceptable, it is mandatory to submit the Graduation Certificate before the admission date. ※ Applicants who attended or graduate from schools in China must submit Verification Report on Education and Degree issued by the Chinese Ministry of Education(CHSI - 学信网)
	Academic Transcripts	- Master's and Integrated applicants · Undergraduate Graduation Certificate · Undergraduate Academic Transcripts - Doctoral applicants · Both Undergraduate and Graduate Graduation Certificate · Both Undergraduate and Graduate Academic Transcripts - New Biology Include your class rank in Academic Transcripts(if possible)
Optional	English Proficiency Certificate	- New Biology and Department of Technology and Innovation Management AIMS track Mandatory to submit English language test report · New Biology Official English test score obtained within 4 years from the application deadline(no minimum score requirement). · Department of Technology and Innovation Management AIMS track Official English test score obtained within 4 years from the application deadline(minimum score requirement applies). ※ Minimum scores : TOEFL iBT 60, IELTS 5.5, TOEIC 700, G-TELP Level 2(64), TOEIC Speaking 120, OPIC IM2, NEW TEPS 300 - Optional for applicants except for those applying to New Biology and Department of Technology and Innovation Management AIMS track · Only official certificates are accepted (TOEIC, TOEFL IBT, TOEFL CBT, TOEFL PBT, IELTS, TEPS and etc.) · No minimum score required - Exemption · Applicants who have completed their degree program in the majority native English speaking countries Antigua and Barbuda, Australia, The Bahamas, Barbados, Belize, Canada, Dominica, Grenada, Guyana, Ireland, Jamaica, Malta, New Zealand, St Kitts and Nevis, St Vincent and the Grenadines, Trinidad and Tobago, United Kingdom, United States - Applicants who have completed their degree program in the countries where English is the official language - Applicants who have been admitted to DGIST Graduate School before.
	Letter of Recommendation	- Must be sent directly by the recommender using the designated form from the recommender's official institutional email address(admission@dgist.ac.kr). - Written on the prescribed form(available on the DGIST Graduate Admissions website) - No limitation of the number of recommendation letters - Must be written in Korean or English language. - Only recommendation letters received by DGIST within the application period will be accepted. Recommendation letters submitted after the application deadline will not be accepted under any circumstances.
	Other Certificates	- Any other certificates demonstrating the competencies and potential.

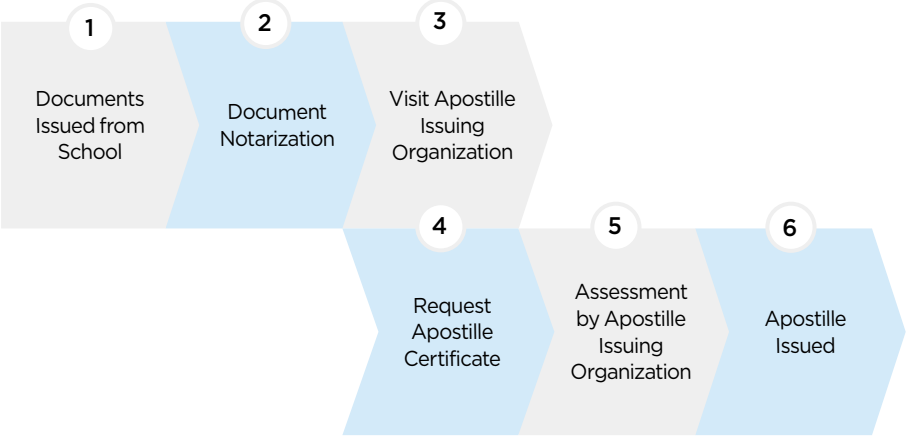
Document Notarization

Apostille Certification

- Official public documents (from state or public schools)



- Private documents (from private schools)



Visa(D-2) Issuance

Consular Authentication

- Korean Embassy and Consulate in the country where the university (or college) is located in



1. Admission results are released on DGIST International Graduate Admissions website.
2. Submit the original copies of Graduation Certificate and Academic Transcripts (consular notarized or apostilled) to DGIST Admissions Team.
3. Certificate of Admission(CoA) issued by DGIST Admissions Team.
4. Receive your CoA via email and the Welcome Packet via post.
5. Apply for a visa at the Korean consulate and embassy in your country.

Notes

- Original copies of your Graduation Certificate and Academic Transcripts with consular notarization(or apostille) must be submitted via international post to DGIST Admissions Team.
- Proof of postage(e.g. DHL invoice, etc.) must be emailed to the DGIST Admissions Team.
- Original copy of CoA is also sent to students by post as a part of Welcome Packet including Scholarship Letter and Business Registration Certificate.
- As required documents for visa issuance will be sent as scanned copies via email, it is recommended to apply for a visa with the provided soft copies.(However, please note that some countries may require original copies, so it's necessary to check this with the consulate in advance)
- Contact the Korean consulate in your country for general enquiries regarding visa issuance.

Admission Schedule

Application	- Under no circumstances may submitted information or uploaded documents be modified after the application deadline. - The application form and Statement of Purpose(SoP) must be submitted through the online application portal(UwayApply). - The accessible link to the online application will be announced on DGIST International Graduate Admissions website(https://dgist.ac.kr/iadm/). - Please ensure that all required documents are successfully uploaded to the online application. Missing documents may result in the failure of document screening process.
Documentation	- All required documents must be written in English. - All required documents, except for the application form and SoP, must be combined into a single PDF file, and uploaded to the online application before the due date. - Once documents are submitted to the Admissions Team, they will not be returned under any circumstances. - If any submitted documents are found to contain false information, the applicant's admission will be canceled. - Applicants who attended or graduate from schools in China must submit Verification Report on Education and Degree issued by the Chinese Ministry of Education.(CHSI - 学信网) · Organization: 教育部学生服务与素质发展中心 · Website : http://www.chsi.com.cn
Etc.	- Applicants are fully responsible for any disadvantages resulting from errors or omissions in the provided information. - The results for each stage of the graduate admission process are released on the DGIST International Graduate Admissions website. It is the responsibility of the applicant to check the results. - If an admitted applicant is unable to graduate from their previous school by the enrollment date, which is the starting date of the semester, their admission will be canceled.

Scholarships II

There are no additional application processes for DGIST scholarship benefits. Once applicants are accepted into the graduate program, they will automatically receive benefits based on the type of scholarship they applied for. ※ Applicants are solely responsible for any disadvantages resulting from the incorrect selection of the scholarship category during the application process. Therefore, applicants are advised to carefully select the appropriate scholarship category.

Government Scholarship

A student receiving scholarship benefits funded by the Korean government.	
Coverage	Full tuition(3.84 million KRW per semester)
Stipend	- Master's : A minimum of 9.6 million KRW annually + additional incentives - Doctoral : A minimum of 14.04 million KRW annually + additional incentives
Applicable Departments	All departments excluding Interdisciplinary Engineering of Interdisciplinary Studies, Graduate School of Engineering Practice, Advanced Technology

DGIST Scholarship

A student receiving scholarship benefits funded by DGIST funds, external donations, or research grants. Please check with the department or(prospective) academic supervisor whether you are eligible for the DGIST Scholarship.	
Coverage	-
Stipend	- Master's : A minimum of 15 million KRW annually + additional incentives - Doctoral : A minimum of 22 million KRW annually + additional incentives
Applicable Departments	Interdisciplinary Engineering of Interdisciplinary Studies, Artificial Intelligence of Interdisciplinary Studies, Biomedical Science & Engineering of Interdisciplinary Studies, Quantum Information Science of Interdisciplinary Studies, Graduate School of Technology and Innovation Management, Department of Technology and Innovation Management

General Scholarship (Currently Employed)

A student planning to study at DGIST while employed by an organization (or a company)	
Coverage	-
Stipend	-
Applicable Departments	All departments excluding Interdisciplinary Engineering of Interdisciplinary Studies

Q) Can I modify my application after submission?

Changes cannot be made under any circumstances after the application deadline. However, modifications are allowed within the application period. Applicants may directly revise uploaded documents, the Statement of Purpose, and the Study Plan through the application website. For changes to any other submitted information, applicants must contact the Admissions Team.

Q) Is it possible to view the application form, Statement of Purpose(SoP), or recommendation letter before submitting the online application?

The forms are available in the Archive section of DGIST International Graduate Admissions website(<https://dgist.ac.kr/iadm/>). However, applicants are required to submit the application form and Statement of Purpose(SoP) through the online application portal(UwayApply) for admission. Also, the recommendation letter must be submitted directly by the evaluator and within the online application period.

Q) If I am unable to submit a graduation certificate for the online application, what alternatives are available?

A certificate of enrollment can temporarily replace the graduation certificate for the online application, but the graduation certificate must be submitted after admission to DGIST.

Q) What should I do if my transcript does not include the grades of my last semester which I am currently in?

You can submit the most recent transcript, which should include the grades for all courses completed before your last semester.

Q) Are documents in languages other than English acceptable for the online application?

No, DGIST only accepts documents written in English. However, if your institution is unable to issue documents in English due to its policy, you may submit them in Korean instead.

Q) Does DGIST limit the number of students admitted for each Spring 1st, 2nd, 3rd, and Fall term?

There is no specific limitation or quota for the number of admitted students for each admission period. However, if the total number of students exceeds the maximum capacity for the academic year, we may close admission for Spring 2nd, 3rd, or Fall term.

Q) Are there any minimum academic eligibility requirements for graduate admission?

There are no specific minimum requirements for academic eligibility for graduate admission. Even if your undergraduate(or graduate) major differs from the one you are applying for, your diverse background can be an advantage for convergence research.

Q) Is it necessary to contact a faculty member in the field of my interest before applying?

It is not mandatory, but if requested by a specific department, you may proceed separately. It is recommended to reach out to a faculty member in your field of interest to inquire about the capacity of the lab and the possibility of conducting research of your interest in advance. You can find information about each lab on DGIST International Graduate missions website.

Q) Can I change the application process(Master, Integration, Ph.D.) after submitting the application?

You can contact the admission team to change your application process during the application period. However, changes are not allowed once the application period has ended.

Q) Do I need to submit a graduation certificate from the university I attended before transferring?

You only need to submit an official academic transcript(in English) from your previous university.

III

Programs for International Students

Buddy Program

- Before arrival in Korea, a DGIST enrolled student, known as a DGIST Buddy, will be paired with each new international student. The Buddy will assist the new student in adapting to life at DGIST by picking them up at the Dong-Daegu station, assisting with dormitory check-in, and being a friend for the semester.

Korean Language Class

- DGIST provides Korean language classes not only for international students, but also for other international members such as faculty, researchers, staff, and long-term visitors, as well as their families. Two different levels of classes, one for beginners and the other for post-beginners, are offered each semester. International students can take the courses after registration at DGIST, while other members and their families can audit the courses.
 - ※ International students must take at least one Korean Language course to meet the requirements for graduation. Students who achieve TOPIK level 3 or higher, or receive recognition of their proficiency from the professor of the Korean Language course, may be exempted from taking the course.
 - ※ Auditors can take the courses for free of charge, and textbooks are provided.

Cultural Events

- The International Affairs Team provides cultural field trips to cultural and historical sites in Korea for all international members, aimed at enhancing their understanding of Korean business, culture, and history. These events are held once a semester, typically in May and October.



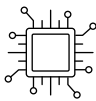
IV

Research Infrastructure

Institute of Next-generation
Semiconductor Convergence Technology

“The best semiconductor research facilities at the university level in Korea”

*on a 26-year basis

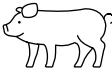
MaterialAnalysis	Device Cleanroom	MachiningLab	Measurement & Simulation
			
MA 72	DC 93	ML 38	MS 17

- Through the CMOS module process infrastructure that only three universities (Seoul National University, KAIST and DGIST) have, it is possible to conduct semiconductor material verification and analysis in a single process.
- Users can conveniently check equipment availability and make reservations online at any time.
- The institute provides regular equipment and facility usage education program for students.

Laboratory
Animal Resource Center

“Provision of ethical, systematic management and technical support for animal experiments”

*on a 26-year basis

AdvancedBio-analysis					
					
AB 35	Mice 35,000	Rat 300	Guinea Pig 50	Rabbit 24	Mini Pig 10

- The center provides experimental support for research in life sciences as well as biomedical engineering.
- In 2019, the Ministry of Food and Drug Safety in Korea qualified the center as the very first Korea Excellent Laboratory Animal Facility in Daegu.
- Variety of facility education programs are offered for both internal and external users.

Supercomputing AI Education
and Research Center

“Pursuing the development of converged science and technology based on supercomputing and big data”

- Development of DGIST’s unique creative convergence education programs utilizing supercomputing
- Research and development of globally competitive computational science and technology
- Support for supercomputing R&D for external organizations, including research institutions and companies
- Expansion of supercomputing-related human networks and ICT convergence culture
- Development of AI and software(SW) educational programs and workforce training
- Establishment and dissemination of industry-academia cooperation in AI and SW fields

Departments
and Majors

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I Physics and Chemistry

02

Departments and Majors

D & M

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Introduction to the Department



Materials science is a discipline that explains natural phenomena through an understanding of the structure and properties of matter and has provided a foundation for the advancement of modern science and technology. In this context, physics has played a central role in elucidating the fundamental principles and behavior of matter, while chemistry has enabled the design and synthesis of materials with tailored properties and functions, ranging from simple structures to highly complex chemical architectures. The Department of Physics and Chemistry at DGIST integrates these complementary perspectives to advance materials research with both scientific and societal impact. Through the convergence of physics, chemistry, biology, and materials science, the department conducts broad research on quantum and condensed matter, electronic and optoelectronic materials and devices, bio-, energy-, and environment-related materials, and pharmaceutical-related molecules, thereby contributing to the advancement of both basic science and technology.

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I

Physics and Chemistry

PC

Vision

- (1) Advancing new concepts in physics and chemistry and translating them into impactful applications
- (2) Educating creative and interdisciplinary scientists across physics, chemistry, biology, and materials science
- (3) Leading internationally competitive research in both fundamental and applied sciences

Key Areas of Research

- (1) **Physical Perspective :**
Our research delves into advanced physical systems such as quantum materials, strongly correlated systems, topological matter, and superconductors, leveraging quantum mechanical approaches. We investigate optical and electronic behaviors in equilibrium and non-equilibrium states using ultrafast spectroscopy and electronic structure theory, uncovering new physical phenomena. This work also supports the development of quantum computing and quantum information science platforms.
 - **Focus Areas :** Condensed matter physics, quantum materials and devices, electronic structure theory, surface physics, spintronics, next-generation semiconductor physics, quantum computing and sensing, ultrafast spectroscopy and time-resolved experiments, AI-driven materials research
- (2) **Chemical Perspective :**
Our research aims to control the structure and properties of matter through precise molecular-level design and synthesis, with the goal of developing molecular and polymeric functional materials and energy-, environment-, and bio-related materials. Drawing on design and synthetic strategies across a wide range of chemical systems such as organic and inorganic molecules, porous materials, organometallic compounds, nanoparticles, polymers, and proteins, we investigate approaches to materials design and functional control. Advanced spectroscopic techniques, including time- and space-resolved spectroscopy and X-ray scattering, are employed to probe structural and optoelectronic properties and to elucidate reaction mechanisms.
 - **Focus Areas :** Asymmetric organic synthesis, organometallic chemistry, supramolecular chemistry, next-generation catalysis, protein chemistry and chemical biology, porous materials, energy and environmental materials, bioinspired materials, and reaction and structural dynamics

Education and Research Focus

- (1) Multidisciplinary education and research combining advanced theories, experimental methods, and computational approaches in physics and chemistry for advanced materials and their applications.
- (2) Exploration of quantum materials, spintronics, next-generation semiconductors, quantum information science, organic and inorganic synthesis, catalysis, materials chemistry, chemical biology, and ultrafast spectroscopy, alongside the discovery of new physical and chemical phenomena.
- (3) Development of expertise to advance theories and experiments in physics and chemistry, driving innovation in future materials, energy and environmental technologies, and quantum computing.

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Career Paths

- (1) **Government-funded research institutes and corporate R&D centers** : Korea Research Institute of Chemical Technology, Korea Research Institute of Standards and Science, Korea Institute of Energy Research, Electronics and Telecommunications Research Institute, Korea Research Institute of Bioscience & Biotechnology, Korea Atomic Energy Research Institute, etc
- (2) **Industry** : Petrochemical companies(LG, SK, Lotte Chemical etc.); electronics companies(Samsung, LG, etc.); semiconductor companies(Samsung, SK, etc.); pharmaceutical companies(Daewoong, Hanmi, Kwangdong, Chong Kun Dang, etc.); cosmetics companies(Amorepacific, LG Household & Health Care, Kolmar Korea, etc.)
- (3) **Post-doctoral research** : Universities and research institutes in Korea, the U.S., and other countries

The Interview Process

- (1) Evaluation of applicants' basic and applied knowledge in physics and chemistry, scientific aptitude, personal qualities as a scientist, and future vision.
- (2) **Oral presentation** : Applicants for the master's and combined master's-PhD programs are required to give an oral presentation on either their undergraduate research experience or key concepts learned during their bachelor's studies(English PowerPoint presentation, not exceeding 7 minutes). Applicants for the PhD program are required to present their master's research and proposed doctoral research plans(English PowerPoint presentation, not exceeding 10 minutes).
- (3) Applicants residing abroad and unable to attend the interview in person may be interviewed remotely.

What Topics are Studied in the Department of Physics and Chemistry?

Q) Materials science for the era of semiconductors and artificial intelligence.

In today's world, where semiconductor and artificial intelligence(AI) technologies are driving innovation across society, the ability to understand the structure and properties of matter at the atomic and molecular levels and translate this knowledge into functionality is a critical foundation. The Department of Physics and Chemistry integrates the fundamental physical principles governing matter and its behavior with chemistry-driven approaches to materials design and synthesis, providing a strong platform for advanced materials research. Our research spans quantum and condensed matter, electronic and optoelectronic materials, next-generation semiconductors, and AI-related technologies, alongside chemistry-driven studies of catalysis and functional materials for bio-, energy-, and environmental applications. By combining experimental, theoretical, and computational approaches, we explore structure-property-function relationships and uncover new physical and chemical phenomena. Through these interdisciplinary research experiences, students are prepared to contribute to and lead future advances in science and technology.

Q) Experts in cutting-edge research, future leaders in interdisciplinary science.

The Department of Physics and Chemistry provides an outstanding educational and research environment, equipped with state-of-the-art facilities and advanced instrumentation used in both academic and industrial settings. Students actively engage in hands-on research grounded in strong theoretical foundations, developing the experience and skills essential for addressing complex scientific challenges. With research spanning physics, chemistry, materials science, and chemical biology, students can pursue topics aligned with their individual interests. Through this rich research environment, students cultivate creative thinking and acquire practical research expertise essential for real-world applications.

Q) What do students study in the Department of Physics and Chemistry?

The Department of Physics and Chemistry offers an integrated curriculum that combines fundamental science with applied approaches, grounded in physics and chemistry. Students explore interdisciplinary areas spanning physics, chemistry, materials science, and chemical biology, focusing on a quantum-mechanical understanding of the electronic and magnetic properties of matter as a foundation for

learning functional materials design principles, data- and AI-driven analysis and prediction, and the dynamic behavior of chemical reactions and structures, which together form core components of modern science and technology.

Q) What academic background is recommended for applicants to the graduate program in the Department of Physics and Chemistry?

The Department of Physics and Chemistry conducts interdisciplinary research grounded in physics and chemistry. Accordingly, applications are welcomed not only from students with majors in physics or chemistry, but also from those with diverse academic backgrounds in science and engineering. A formal background in physics or chemistry is not mandatory, provided applicants possess a solid foundational understanding of these disciplines and a strong motivation for research. The department's faculty spans a broad range of expertise in physics, chemistry, materials science, and chemical biology, ensuring that students receive comprehensive guidance when selecting their research focus and defining their academic trajectory after admission.

Q) What career paths are available after graduation?

Graduates of the Department of Physics and Chemistry pursue careers across a wide spectrum of fields, including academia, government-funded research institutes, corporate R&D centers, and public-sector organizations, both in Korea and abroad. In recent years, student-led startups based on original research outcomes have also been actively supported through DGIST and local government initiatives, providing additional pathways for innovation and entrepreneurship.

Interview



Hyeon Hye Yu

Physics and Chemistry, Ph.D.

Nationality) Republic of Korea
Assigned Lab) Micro Laser Lab.
Current Position) Research Engineer, LG Display

Q) Welcome. Please introduce yourself.

Hello. My name is Yu Hyeon-Hye, and I received my doctoral degree from the Department of Physics and Chemistry at DGIST. My advisor was professor Kim Chil-Min(Retired, Chair Professor in School of Undergraduate Studies, DGIST). My area of research was non-hermitian physics in 2-dimensional microlaser resonance mode dynamics, and am currently an OLED optics research engineer in a lab under the CTO at LG Display.

Q) What were your reasons for choosing the DGIST graduate school, and your department and lab here?

I majored physics as an undergraduate and chose to continue graduate-level studies to pursue my interest in optics. Research in optics generally involves experiments exploring the interactions between light and matter. I was drawn to the fact that I could engage in both experimental and theoretical research in my lab. In particular, I was able to encounter computing science while carrying out theory-based optics simulation research. Convergence is the motto of DGIST, and there are ample opportunities for cross-lab exchange and cooperative research. I appreciated the opportunity to exploreand choose from a broad range of research areas.

Q) Please tell us about your area of research and research goals.

My lab is engaged in theoretical research on the nonhermitiancharacteristics apparent in resonance mode dynamics of 2-dimensional micro-scale resonators and quantum chaos phenomena in closed resonators(hermitian systems). Based on this research, we are developing extremely high-sensitivity bio-chemical sensors based on ultra-high Q-factor microlasers or lasers with exceptional points apparent in nonhermitian systems.

Q) Please tell us in detail about your career path after graduating from DGIST.

After graduating I sought career paths related to my research experience in optical simulation. I am currently in charge of OLED optic simulations at LG Display. Specifically, I am responsible for proposing and examining high optical extraction efficiency structures through wave and ray optical

“There are many opportunities to conduct various exchanges and collaborative research between laboratories.”

-
-
-

simulations in the structure between OLED elements and substrates. My research experience as a doctoral candidate was immensely helpful not only in my determining and adapting to my work responsibilities, and in taking on opportunities to engage in more indepth and interesting work.

Q) What sets DGIST apart from other universities?

DGIST affords students more opportunities to develop expertise in their areas of study and has a great research environment. Students also have access to various measuring equipment and well-equipped and well-staffed fabs.No tuition burden means students can focus solely on academics. There is a liberal atmosphere of exchange among labs, in which students can engage other students involved in other fields of research to broaden their horizons.

Q) Any words of advice to would-be DGIST graduates?

If you have an interest in academics and want to accumulate research experience, I strongly recommend graduate school. Ingraduate school, one learns how to carry out research in a proactive and self-initiated manner. Honing your professional skills in graduate schools will be helpful in choosing a career path that is right for you, and for adapting to your work environment. Making the most out of the methodologies available to you as you carry out your research - simulation tools and experimental/measuring equipment, for example - will increase your employment or further study opportunities after you receive your degree.



Youngkyoung Ha

Physics and Chemistry, Integrated M.S.&Ph.D.

Nationality) Republic of Korea
Assigned Lab) Semiconductor Energy Sensor Lab.
Current Position) Assistant Professor, Depart ment of Materials Science and Engineering, Myongji University

Q) Welcome. Please introduce yourself.

Hello, I am Youngkyoung Ha, who earned an integrated M.S. & Ph.D. degree in the Semiconductor Energy Sensor Lab.(Advisor : Professor Shinbuhm Lee) at the Department of Physics and Chemistry, DGIST. My research focuses on strongly correlated electron system in oxide films for transparent conductors and neuromorphic devices. Currently, I am working as an assistant professor in the Department of Materials Science and Engineering at Myongji University.

Q) What were your reasons for choosing the DGIST graduate school, and your department and lab here?

The reason I decided to pursue graduate school was that it would provide a more stable opportunity to continue my studies. Among various universities, I chose DGIST because I felt it aligned perfectly with my passion for academics and research, and I believed it would offer the ideal environment for focusing solely on research. In particular, the Semiconductor Energy and Sensor Lab focuses not only on designing thin-film materials but also on analyzing and interpreting the physical properties of thin films based on a variety of theoretical frameworks. I was confident that this approach would greatly help me develop the ability to interpret research topics in a more integrated and comprehensive manner during my graduate studies.

Q) Please tell us about your area of research and research goals.

My research goal, both now and in the future, is to conduct studies that can benefit people in various fields. To achieve this, I have been developing and designing transparent conductive materials and devices that overcome existing limitations using oxide thin films with strongly correlated electron systems. I have also conducted research on next-generation semiconductor devices, specifically neuromorphic devices, by injecting ions into oxide thin films. By analyzing the physical and material-related issues, I proposed and implemented new materials based on physical theories to overcome these limitations. Currently, I am conducting research on designing nanostructures that can overcome the limitations of thin films using oxides, with the goal of developing biosensors.

Q) Please tell us in detail about your career path aftergraduating from DGIST.

After graduating from DGIST, I immediately worked as a postdoctoral researcher at the Max Planck Institute for Solid State Research in Germany. During my preparation

“Anyone can easily access various state-of-the-art research equipment and DGIST offers extensive support to ensure that students can fully focus on both research and academics.”

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-

for postdoctoral research, I focused on identifying the expertise and skills that I needed to enhance in order to become an outstanding researcher and gain strength and competitiveness. Based on these considerations, I established criteria and decided to pursue postdoctoral research at Max Planck Institute in Germany. During that period, I was able to acquire new skills that I felt were essential. Moreover, there were many opportunities to actively share and exchange academics knowledge with students, researchers, and professors form around the world. These experiences have become invaluable assets for me, and I am now continuing my research as an assistant professor in the Department of Materials Science and Engineering at Myongji University, building on everything that I have learned.

Q) What sets DGIST apart from other universities?

DGIST makes great efforts to provide research infrastructure. Anyone can easily access various state-of-the-art research equipment through DGIST’s internal research institute. Additionally, DGIST offers extensive support to ensure that students can fully focus on both research and academics, which I find to be a significant advantage compared to other universities or institutes. Moreover, all the professors at DGIST are highly passionate about their research and are deeply dedicated to mentoring and guiding their students. I believe that all these aspects of DGIST’s research infrastructure enable researchers to enjoy their work and grow into outstanding scientists.

Q) Any words of advice to would-be DGIST graduates?

If you find that you are interested in academics and curious about research, becoming a graduate student at DGIST would be a great choice. I believe you can not only achieve academic and research accomplishments but develop the ability to solve problems proactively and independently, no matter what you pursue after graduation. I highly recommend participating in DGIST’ intership program to gain research experience. It will help you make a good decision. Also, if you are wondering, “Will I be able to do well? Is this the right path for me?” I'd like to say that it's find to try first and decide later. If it's something you are interested in, I am sure you will eventually succeed, even if it takes time. And if you feel that your choice is not the right one, it will still be a valuable experience that helps you understand yourself better. All paths are find. Don't be afraid. Lastly, I encourage you to embrace challenges and experience, including graduate school. Whatever choice or decision you make, I hope it leads you down a path that makes you happy. :)

II Electrical Engineering and Computer Science

02

Departments and Majors

D & M

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Introduction to the Department



Embracing the next generation through convergence of Electrical Engineering and Computer Science ICT industries that are dependent upon electrical engineering and computer science technology are one of the fastest growing ones in the world. For the future knowledge-based society, electrical engineering and computer science technology takes the key role in converging BioTechnology(BT), CultureTechnology(CT), EnergyTechnology(ET), NanoTechnology(NT), RobotTechnology(RT), and many more. We are seeking for ambitious, passionate, and enthusiastic students who have a vision for creative engineering research and development.

The goal of Electrical Engineering and Computer Science department is to foster these students to have : 1) creativity for seeking new research and directions 2) practicality for solving real world problems 3) global networking to embrace international perspectives 4) social entrepreneurship for generating new value in existing and novel applications to advance the future industry.

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II

Electrical Engineering and Computer Science

EECS

Introduction to the Department

In the Department of Electrical Engineering and Computer Science, we offer various education and research opportunities in electrical engineering, electrical engineering systems, and computer science. We are primarily focusing on core research areas such as Intelligent Computing Systems, Connected Smart Systems, Advanced Semiconductor, Bio-Medical Systems, Cyber-Physical Systems, and Artificial Intelligence(AI) techniques. Beyond traditional information and communication engineering areas, we are actively collaborating with other departments for diverse interdisciplinary research. With innovative education and research efforts, we aim to train leaders in academia and industry who develop core technologies in the future.

Vision

- (1) Becoming the department of excellence with international academic recognition
- (2) Advancing core technologies needed for the development of future industries
- (3) Educating professionals equipped with both the ability of global research & development and the sense of technology management
- (4) Opening up new fields through information and communication convergence with other fields of study

Key Areas of Research

- (1) Select specialized major research areas and support them intensively
- (2) Cluster the related specialized major research areas as centers
- (3) Conduct convergence research between each field of information and communication and other fields of study

Specialized Research Fields

- | | |
|---|---|
| (1) Intelligent Computing Systems <ul style="list-style-type: none">- Big Data/Cloud Computer- Computer Architecture- Operating Systems- Storage Systems | (2) Connected Smart Systems <ul style="list-style-type: none">- Internet of Things- 5G Mobile Communication- Satellite Communication- Wireless Sensor Network |
| (3) Advanced Semiconductor <ul style="list-style-type: none">- Sensor Semiconductor IC- Next Generation Transistor- Neural Interface- Nano-electronic Device | (4) Bio-Medical Systems <ul style="list-style-type: none">- Brain-Machine Interface- Smart Healthcare- Bioinformatics- Bioelectronics |
| (5) Cyber-Physical Systems <ul style="list-style-type: none">- Realtime Embedded System- Resilient Transport System- Intelligent Transport System- Self-driving Car | |

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Department Cooperated Research Center

CPS Global Center

- (1) The CPS Global Center at DGIST, established in 2012, performs both fundamental research to develop new principles, models, and theories for CPS and inter-disciplinary research to apply CPS to a number of areas including automobiles and transportations.
- (2) **It is one of the biggest center in Korea dedicated to CPS research. The CPS Global Center has built a strong global research network with world-class researchers in CPS, actively collaborating with four participating institutes in USA**
: University of Virginia, University of Michigan, University of Pennsylvania, and Carnegie Mellon University.

Resilient Cyber-Physical Systems Research Center

- (1) DGIST research proposal on CPS resiliency won Korean government funding
- (2) Resilient Cyber-Physical Systems Research Center has begun 8 year journey of R&D for safe, convenient and energy-efficient future society
- (3) The center focuses on Real time Resilient Cyber-Physical Systems Software Technology that enables continuous operation despite external attacks or internal faults, reduced capacity operation if the severity of faults and attacks is too high to maintain full operation and graceful degradation if failure is inevitable
- (4) The outcome will contribute to the economic growth of local and national economy as well as technology based, safe, convenient and energy efficient society

Brain Engineering Convergence Research Center

- (1) Selected by the Ministry of Science and ICT for the Biomedical Technology Development Project
- (2) The Center has developed a medical device source technology for treating various brain diseases such as Parkinson's disease, dementia, and cognitive disorders

Research Center for Extreme Exploitation of Dark Data(EEDD)

- (1) Selected as an Engineering Research Centers(ERC) of the Ministry of Science and ICT and the Korea

Research Foundation(KRF) in 2018

- (1) The center is doing research about the nation-wide next generation information platform that can extremely exploit dark data in the entire process of collection, storage, management, and analysis

International Workshop on Cyber-Physical Systems(IWCPS) : For developing collaboration research with the highest levels of national and international research institutions, CPS Global Center hosts annual workshop with the theme of the Cyber-Physical Systems.

- (1) **EECS Student Conference** : Gives opportunity to students to convey information about their thesis and research plans with sharing background knowledges. The workshop also cultivates paper writing and presentation skills.
- (2) **Wook Hyun Kwon Outstanding Research Award / Kyu-Young Whang Outstanding Research Award** : Based on exemplary academic skills and excellent research achievements of the students, give Wook Hyun Kwon/ Kyu-Young Whang Outstanding Research Award and prize.
- (3) **EECS Happy Hour** : Along with pursuing healthy activities with all the department members, the event cultivates humanity through culture programs and promotes unity between the members.

Academic Events

Student Events

02

Departments and Majors

D & M

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II

Electrical Engineering and Computer Science

EECS

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Convergence with Other Departments

- (1) **Convergence with Physics and Chemistry** : Research on electronic devices based on new materials
- (2) **Convergence with Robotics and Mechatronics Engineering** : CPS and brain mapping based rehabilitation robot technologies, Machine-learning based brain machine interface, Sensor and actuator wireless interface
- (3) **Convergence with Energy Science and Engineering** : Energy IT convergence technologies including smart grid and renewable energy
- (4) **Convergence with Brain Sciences** : Medical imaging, Biomedical signal processing, Nano devices with possible application to human body, Database and data mining for medical applications, Biomedical wireless communications and network
- (5) **Convergence with New Biology** : Next Generation Sequencing(NGS) genome data analysis, Largescale protein mass spectrum data analysis

Career Paths

- (1) Faculty
- (2) Government research institutes including Agency for Defense Development(ADD), Defense Agency for Technology Quality(DTaQ), Korea Testing Laboratory(KTL), Korea Airports Corporation
- (3) Research centers of conglomerates companies including Samsung Electronics, LG Electronics, Samsung Display, Hyundai Motor Company, and Hyundai Mobis
- (4) Prospective foreign and mid-sized industries including UL Korea, SL and Innoreless
- (5) Ph.D. Course

The Interview Process

- (1) Oral examination about foundations and applications of information & communication, computer, electronics, mathematics, physics, chemistry, attitude, personality, and vision as an engineer
- (2) English Presentation of up to 5 minutes(5 slides) about an important concept that you learned through your undergraduate core courses for MS degree applicants, and that is related to your future Ph.D. research for Ph.D. degree applicants
- (3) A part of the interview will be conducted in English
- (4) Online interview can be arranged for students residing outside Korea, upon early request.



Student Conference

- In the Department of Electrical Engineering and Computer Science, students take the initiative to plan and carry out programs, cultivating their leadership and teamwork skills. They also share knowledge among researchers and provide opportunities for feedback on research by communicating research findings through academic events.



Development of Hybrid Structures for Graphene-Metallic Organic Structures with Hierarchical Porous Structures

- Professor Kwon Hyuk-joon's team at DGIST develops a "graphene-metal organic structure hybrid gas sensor" that can monitor the main culprit of fine dust in real time with a sensor that resembles "human lungs."
- Published online in May in the world-renowned journal Nature Communications



Professor Hwang Jae-youn's Team at DGIST : Drawing Characters with Ultrasonic Beams! Development of Deep Learning-Based Real-Time Ultrasound Hologram Generation Technology

- Proposal of a deep learning network and learning framework that allows real-time flexible configuration of ultrasonic beam shapes.
- Featured as the cover paper in the February issue of the international academic journal "IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control."
- It is expected to lead to the development of patient-specific precision stimulation techniques in the field of ultrasound brain stimulation and therapy, targeting conditions such as Alzheimer's disease, depression, and pain

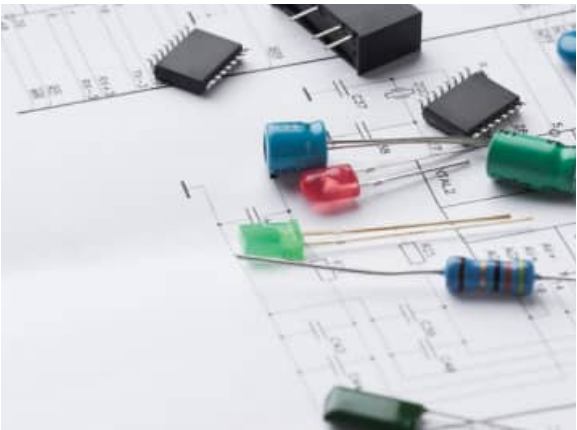
What topics are studied in the Department of Electrical Engineering and Computer Science?

Q) What do students study in the Department of Electrical Engineering and Computer Science?

Electrical Engineering and Computer Science department has a goal of fostering internationally competitive researchers and leaders. In order to pursue such a goal, we educate students with existing core technologies, such as information and communication, electronics, data processing, and electrical engineering to have fundamental skills sets. Furthermore, we ami to apply convergence technology in order to generate new ideas for technological transformation. To achieve these goals, we are researching various future convergence technologies through mutual cooperation with domestic and international institutions and researchers. Ultimately, Electrical Engineering and Computer Science department embraces various research areas that will impact the development of convergence technology.

Q) What are the prerequisites for applying to the Department of Electrical Engineering and Computer Science?

Electrical Engineering and Computer Science department emphasizes on converging various disciplines by fostering research that requires diverse technologies. Therefore, we encourage students not only from IT related fields, but also from other natural science and engineering fields to apply. Please do not hesitate applying to our department although you may not taken many IT related courses. However, you must have suitable knowledge and skill sets for your specific research interest.



Bahareh Behboodi
Electrical Engineering and Computer Science, M.S
Nationality) Iran
Assigned Lab) Lab of Communication and Signal Processing(Prof. Ji-Woong Choi)

Q) Welcome. Please introduce yourself.

The most important considerations were finding scholarships and an open position in a laboratory whose research focus is aligned with my interests. DGIST was a suitable option for me as I got a fully funded Master student position that covered both my tuition and living expenses. These days, it is getting increasingly difficult to find funded master degree positions in many parts of the world. Furthermore, I was lucky to find a laboratory in neuroimaging, which is a field that I love. In a nutshell, I had a fully funded position in a field I loved, so I just went for that and applied to DGIST.

Q) What are the strong points of DGIST and the department of Electrical Engineering and Computer Science?

DGIST has a great amount of available facilities. At DGIST, you can easily have access to any device that you may need in your field of research. Especially, in the lab I am working in, we have a yearly allocated budget for buying new devices that we need for research. We are encouraged to submit papers to reputed international conferences and journals. If our papers are accepted, we get the opportunity to attend that conference, all expenses paid. I had a chance to attend a conference in Paris in the first year I joined DGIST and it was an amazing learning experience.

Q) Explain your research field and purpose at DGIST.

My background is in biomedical engineering and my research interest is neuroimaging using functionalmagnetic resonance imaging(fMRI) as well as functional near-infrared spectroscopy(fNIRS). At DGIST, I am working on signal processing of fNIRS based brain computer interfaces(BCI), which is a promising neuroimaging modality useful for patients suffering from motor impairments.

Q) What are you planning to do after graduation?

My goal is to become an expert in my field of research. For this reason, I would like to pursue further education. After I graduate from DGIST, I would like to find a Ph.D. position and continue my research in the area that I am studying now.

Interview

“The scope of the field of view is broadened by convergence research with researchers in various fields.”

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Q) Please advise our applicants.

As a friendly suggestion, for attending DGIST, first you need to find a laboratory with a research field compatible to yours, then just make contact with its supervisor. Supervisors at DGIST have strong backgrounds in their fields and kindly consider international attendees as well as Korean students. I hope you will find the most suitable laboratory for your study and get scholarship benefits at DGIST.

III Robotics and Mechatronics Engineering

02

Departments and Majors

D & M

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Introduction to the Department



Department of Robotics and Mechatronics Engineering focuses on conducting field-leading researches as well as educating highly motivated students with strong multidisciplinary fundamentals. We cover a broad range of research areas in Robotics, Electrical and Mechanical engineering, Materials science, and Biomedical engineering. Our goal is to develop new technology that can impact our daily lives.

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III

Robotics and Mechatronics Engineering

RME

Introduction to the Department

Robotics and Mechatronics Engineering is a multidisciplinary field of study that converges core technologies from Mechanical, Electrical, Biomedical, and Computer Science and Engineering. Our research topics range from intelligent robots to nano technology with various applications areas. Of course, our strength also lies on biomedical applications as well as artificial intelligence.

Vision

“Pioneering the Future of Robotics: Where Humans and Technology Evolve Together”

At DGIST RME, we envision a future where robots are not just machines, but intuitive partners—thinking, sensing, learning, and evolving alongside us.

Robots are the ultimate embodiment of artificial intelligence, bridging the digital and physical worlds with unmatched precision and adaptability.

Our research breaks through the boundaries of disciplines—uniting mechanical and electrical engineering, computer science, biomedical technology, and beyond. Through this convergence, we create next-generation robots that are more intelligent, more responsive, and more human-centered than ever before.

We are building a world where robotics expands the limits of human potential, transforms industries, enhances healthcare, and leads us toward a more sustainable, intelligent future.

Join us at DGIST RME—where the future of human-robot symbiosis begins.

Educational and Research Framework

“Robotic Mechanics + Robotic Electronics + Robotic Intelligence”

Our program is dedicated to advancing next-generation robotics by conducting integrated research across scales—from nano and micro systems to full-scale robotic platforms.

(1) Education :

We provide a multidisciplinary curriculum that fuses mechanical engineering, electrical engineering, and computer science. Students develop the ability to synthesize diverse engineering knowledge and apply it to real-world, problem-solving scenarios.

(2) Research :

We offer a collaborative research environment that supports convergence across robotics domains. Through active partnerships with leading global institutions, we are building a world-class research network, fostering the development of future robotics leaders with a truly international outlook

Specialized Research Fields

At the Department of Robotics and Mechatronics Engineering, we pursue core technologies in robotics—including mechanism design, motion control, precision sensing, intelligent perception, and biomechanical integration. Beyond these foundations, our research extends into diverse application fields such as biomedical engineering, materials science, semiconductor technologies, and autonomous systems. Through this multidisciplinary approach, we aim to pioneer next-generation integrated robotics that drive innovation across future industries.

(1) The Muscles and Skeleton – Structure and Actuation

- Robotic mechanism design and manipulation
- Bio-inspired locomotion systems
- Soft actuators and sensors
- Mechatronic integration
- Surgical and rehabilitation robots

(2) The Brain and Nerves – Intelligence and Autonomy

- AI-based motion control systems
- Physical AI and embodied intelligence
- Autonomous navigation and flight control
- Brain-machine interfaces(BMI) and neural links
- Neuromorphic and intelligent devices

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Specialized Research Fields	(3) The Eyes – Vision and Perception - Advanced imaging and sensing systems - Intelligent vision for robotic perception - Perception/Decision-making/SLAM - Ultrasound and medical imaging (4) The Cells – Miniaturized and Autonomous Robotics - Micro/nano robotic systems - Bio-opto-mechatronics - Biomedical microsystems (5) The Skin – Sensing and Interaction with the World - Flexible and stretchable sensors - Electronic skin and smart sensing materials - Tactile intelligence and feedback systems. (6) The Materials – Functional Robotic Components - Advanced materials for flexible electronics - Quantum and optoelectronic devices - Microfluidic robotic systems (7) The Whole Body – Humanlike Integration - Dual-arm, quadruped, and biped robots - Full-body humanoid platforms - Human-robot interaction and co-adaptation	02	Departments and Majors
Convergence with Other Departments	(1) Although DGIST is still at its growing stage, the Robotics and Mechatronics Engineering Department will conduct an international education-research program called “Global Alliance Program” that collaborates with world leading universities. (2) The department will invite world renowned professors to give lectures, co-supervise student thesis, and conduct cooperative research. (3) The department will promote exchange of visits at the level of professor/research staff, and students’internship programs in order to encourage their international experience.		D & M
The Interview Contents	(1) Questions on fundamental knowledge of the robotics related subjects or courses, enthusiasm for research, potential ability to be a scholar, communication ability, etc. in both English and Korean. (2) A short presentation in English on the research experience, achievements, research plan, etc. for about 3 minutes and 5 minutes for M.S. and Ph.D. respectively. (3) Online interview can be arranged for students residing outside Korea, upon early request.		

III	Robotics and Mechatronics Engineering	Who should apply to graduate studies in the department of Robotics and Mechatronics Engineering? The field of robotics and mechatronics engineering is very broad and multidisciplinary. This is why our department members are from many different majors, such as mechanical, electrical, and biomedical engineering, as well as computer science and materials engineering. Even though the student is from different majors or has less-experience in robotics and mecha- tronics, our department offers a wide range of courses to bbolster your academic basics. If you are a type of person who enjoys an active collaboration and wants to work on real-life problems, the department of Robotics and Mechatronics is the right place to be.	
RME		Why DGIST Robotics and Mechatronics is the right career decision? Our department offers very competitive financial support to graduate students, including full tuition waiver, monthly stipend, national scholarships, and department fellowships. In addition, our depart- ment owns one of the best research facilities for manufacturing, microfabrication, robot prototyping, etc. Many students attend international conferences to present their work. After graduation, our alumni became faculty members in top level universities around the globe. Also, many students went to national research labs as well as companies, including Samsung, Hyundai, SK, et	



Abdalla Hisham
Robotics and Mechatronics
Engineering Ph.D.
Nationality) Egypt
Assigned Lab) Surgical Robotics and Robotic
Manipulation Lab.(Prof. Minho Hwang)

Q) What made you choose DGIST?

I chose DGIST because of its strong focus on robotics research, advanced graduate-level courses, and excellent research infrastructure. The interdisciplinary environment encourages collaboration across engineering, AI, and applied sciences, while the high quality of education and research-driven atmosphere align well with my academic goals.

Q) What are the strong points of DGIST and the department of Robotics and Mecha-tronics Engineering?

DGIST offers high-quality learning through advanced courses, state-of-the-art facilities, and strong industry-academia collaboration. As a fast-growing institute with a clear future vision, DGIST is gaining strong global recognition. The Department of Robotics and Mechatronics Engineering is especially strong in robotics, intelligent systems, and close faculty mentorship.

“DGIST Graduate School is a fast-growing, high-quality research institution with a strong global vision.”

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Q) Explain your research field and purpose at DGIST.

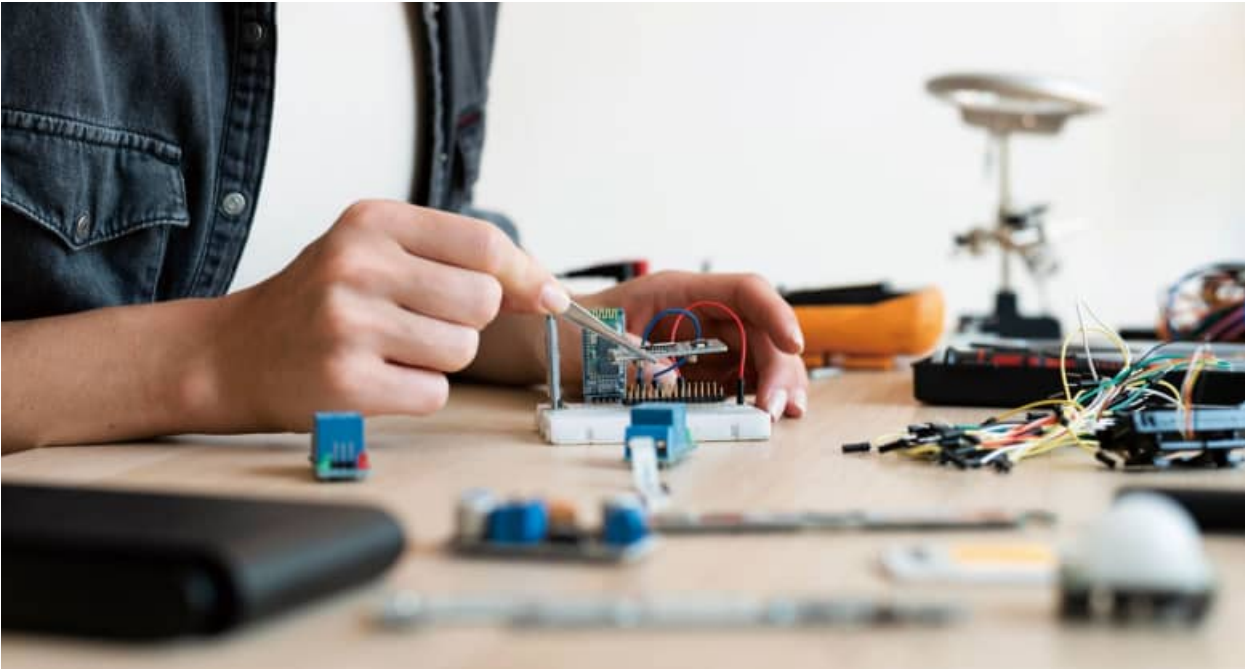
My research focuses on vision-based perception and control for robotic manipulation. My goal at DGIST is to combine advanced coursework with impactful research to develop practical and robust robotic systems.

Q) What are you planning to do after graduation?

After graduation, I plan to pursue postdoctoral research in academia or advanced research institutes and continue contributing to robotics research.

Q) Please advise our applicants.

I recommend that applicants take advantage of DGIST’s advanced courses and research-oriented learning environment. Having strong curiosity, initiative, and an open mindset for interdisciplinary research is essential to fully benefit from the many opportunities DGIST provides.



IV Energy Science and Engineering

02

Departments and Majors

D & M

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Introduction to the Department



The limited supply and detrimental environmental effects of fossil fuels is seriously intimidating human survival. In order to solve such issues, ESE pursuits the education and research for the next generation sustainable energy sources and their applications.

Securing sustainable and environmentally friendly energy resources is an important task to accomplish human survival in future. Frontier science and technology are extensively searching for such power sources as well as systems utilizing the renewable energies. With this wide range of social movement, it is required to shift the conventional education paradigm innovatively to have students handle new forms of the energies. The Department of Energy Science & Engineering in DGIST aims at educating graduate students to contribute to the new generation of renewable energies with the creative mind.

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IV

Energy Science and Engineering

ESE

Vision

- (1) Advanced courses fostering competent scientists and engineers for the beyond conventional energy sources
- (2) Creation of core academic areas and policies for future green energy society
- (3) Education of graduate students for future-oriented and creative R&D capability

Research and Education Focus

- (1) Cultivation of international leaders or the convergence energy devices through closely interconnected interdisciplinary system of DGIST.
- (2) International exchange(including double-degree program) and team projects with global top institutes
- (3) Solution searching education and research experiences to technical challenges

Specialized Research Fields

- (1) Key materials and system design for the advanced hydrogen and bio fuel cells
- (2) Production and storage of hydrogen and practical applications of renewable energy systems
- (3) Core-material and fabrication technology for the next generation photovoltaic cells
- (4) Photo-electrochemical water splitting and recycle of the waste products such as CO₂ and waste water
- (5) New materials for high energy density Li secondary batteries
- (6) Post-Li batteries including multivalent(Mg, Zn, Ca) ion, metal-air batteries
- (7) New materials for low-energy-consumption electronic devices
- (8) Multi-scale molecular modeling of materials for clean energy
- (9) Energy harvesting materials and devices
- (10) Data-driven Materials Discovery and AI-based Analysis for Energy Materials and Devices

Convergence with Other Departments

- (1) **Electrical Engineering and Computer Science** : Electricity storage devices and sensor network system for smart grid to improve the efficiency of renewable energies
- (2) **Robotics and mechatronics Engineering** : Small batteries for micro-robots for medical application and large batteries for human care/industrial robots
- (3) **Brain Sciences/New Biology** : Bio-energy systems for the treatment of brain signals and processing and biocompatible power sources

Career Paths

- (1) **Academia** : Ph.D. program(domestic and foreign universities), Ph.D. Research Institute, professor
- (2) **Government-Funded Institutions** : Korea Institute of Energy Technology, Korea Research Institute of Chemical Technology, KIST, Korean Intellectual Property Office, KIMS Materials Research Institute, Korea Institute of Machinery and Materials, Korea Institute of Standards Science, and Electronic Components, etc
- (3) **Industry/Start-Up** : Large and medium-sized enterprises in the fields of energy, chemical, materials, and electrical and electronics

The Interview Process

- (1) Personal interview in English with the concerned professors
- (2) Self-introduction(5 Min. presentation)
- (3) Questions on fundamentals and specialized knowledge about application of Energy Science and Engineering such as Physics, Chemistry, Mathematics, Biology, Thermodynamics and Transfer phenomenon according to the applicant's specialty background and on culture, personality and vision as engineering students.
- (4) Online interview can be arranged for students residing outside Korea, upon early request

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What topics are studied in the Department of Energy Science and Engineering?

Q) What are we going to study in the Department of ESE?

The Department’s core courses are thermodynamics, electrochemistry and fundamentals of materials science &engineering. After completing the core courses, students are supposed to choose a major track among solar cell, fuel cell, battery, and molecular modeling and battery and take the in depth courses within the track. In addition, you will extend your textbook knowledge through various R&D activities in the relevant research sectors in DGIST. You will be trained to be a creative and challenging personnel to lead the global future energy fields.

Q) Specific subject of each track?

The R&D fields of the major tracks are as follows :

- **Solar cell** : Core-materials and fabrication technology for the next generation photovoltaic and catalysts
- **Fuel cell** : Key materials and system design for the hydrogen/bio/ solid-oxide fuel cells.
- **Battery** : Mastering the present Li-ion battery technologies and exploring the innovative post-Li chemistry
- **Molecular modeling(computational chemistry)** : Virtual experiments using supercomputers(complementary to real world synthesis, fabrication, and measurements) to get the basic understanding of molecular-level mechanisms and design principles underlying the above three tracks.
- **Data-driven materials modeling and computational chemistry** : Integration of supercomputer-based simulations, materials informatics, and AI/ML prediction to understand atomic level mechanisms and guide the design of materials, processes, and devices.

Q) I’m worried about my English skills and hesitate to apply for DGIST since all the classes are delivered in English.

English communication skill is a prerequisite for the “World Top Class” university that DGIST aims at. Our Department is providing various English education programs to improve the students’ English proficiency. With those courses you are encouraged to substantially mature your English communication capability.

Q) Possible career path after graduating the Department of ESE?

I want to keep growing in my research field and go for a post-doc position. In addition, I want to use my expertise to improve the quality of our society.

- Private R&D institutes(Samsung, LG, SK, Hyundai, POSCO, BASF, etc.)
- Universities and Government R&D institutes
- Renewable energy fields(solar &hydrogen fuel cells)
- Battery and energy conversion
- Energy and environment policy

Q) International network being built so far?

The world’s greatest scholars are invited to offer the firm background and the world class education on the future energy issues to DGIST students. We have, at present, Professor J. Caton at the Mechanical Engineering in Texas A&M University, Nobel laureate Professor J. Byrne at the Energy & Environmental Policy in University of Delaware, world leading Professor M. Watanabe in Yamanashi University in the fuel cell. We are also collaborating with world renowned research groups (e.g., Waseda university, Uppsala university). In addition, the department will continue to invite outstanding full-time Professors from all over the world and take off to the “World Top Class” Department in the future energy field.



Setiawan Dedy

Graduated Energy Science and Engineering, Ph.D.

Nationality) Indonesia
Assigned Lab) Discovery Lab(Prof. Hong, Seung-Tae)

Q) What made you choose DGIST?

Being involved in technology and innovation growth, particularly as a scientist, is a dream for such motivated students. DGIST has been considered as one of the best young universities globally, which uniquely prioritizes scientific discoveries, innovations, and convergence in its education system. There are world-renowned professors whom I can share and expand my scientific ideas with to be directly involved in technology development globally. Additionally, the institution is also full of cultural diversity judging from its international community, allowing us to gain unforgettable experiences.

Q) What are the strong points of DGIST and the department of Energy Science and Engineering?

DGIST has a clear vision regarding its education system, which focuses on convergence. It trains students to not only innovate in one particular area but also be able to grab some aspects from other related areas through collaborations. Many notable alumni are recognized and have been involved directly in the technology commercialization in industry and academia. In particular, the Department of Energy Science and Engineering has a solid mission to lead in energy innovation with a future-oriented education system. It consists of reputable faculty members worldwide known for their experiences and publications. Many collaborations with industries also allow students to face real challenges in technology commercialization, which is a marvelous experience.

Q) Explain your research field and purpose at DGIST.

Ultimately, my research purpose is to pursue a new, low-cost, and sustainable battery chemistry that has the potential to surpass the theoretical energy density of the current lithiumion battery for a future electric vehicle or large-scale energy storage applications. My current research is to demonstrate the rechargeability of magnesium and calcium metal batteries, which are kind of early-birth energy storage systems. Moreover, our laboratory expertizes in advanced powder X-ray diffraction studies on battery electrode materials behavior during charge and discharge to better

Interview

“Enjoy the moment of actively conceiving new experiments.”

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understand the mechanism. My group, including me, are also eager to discover new-to-the-world inorganic materials using what-so-called exploratory synthesis.

Q) What are you planning to do after graduation?

As a doctoral student, I desire to continue doing research in the field which has an enormous impact on society. Therefore, after my doctoral degree, I plan to expand my research skill in academia, particularly on battery electrode characterization. Moreover, I have set my long-term plan to contribute to the energy storage research and development in my home country either in academia or industry in the future.

V Brain Sciences

02

Departments and Majors

V

Brain Sciences

What is Brain Science?



Brain science is a field of study that aims to understand the fundamental principles of the brain's structure and function at microscopic and macroscopic levels, based on neurobiological and cognitive scientific understanding of the brain's nervous system, and to apply this understanding. The Department of Brain Sciences at DGIST strives to cultivate professionals who will conduct basic research and develop original technologies for human well-being and the overcoming of brain diseases in the face of an aging society. This is achieved by integrating research achievements and methodologies from various academic disciplines to explore new brain research methods and processes based on interdisciplinary knowledge.

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Vision

- (1) **In-depth Research on Fundamental Brain Principles** : Focus on clearly elucidating the core principles of the brain's nervous system.
- (2) **Leading Future Convergence Technologies** : Develop next-generation convergence technologies to lead brain science research.
- (3) **Contributing to Overcoming Brain Diseases and Advancing the Brain Industry**: Contribute to solving brain diseases and creating new brain-related industries through innovative research.
- (4) **Cultivating World-Class Brain Science Talent** : Foster global talent by providing an international-level education and research environment.
- (5) **Center of Brain Convergence Science** : Aim to become a central hub for brain science research that integrates various academic disciplines.

Education and Research Focus

- (1) Operate a creative system education, research-oriented, interdisciplinary convergence, and global network-based education and research system.
- (2) Foster experts in interdisciplinary science who will be responsible for future academic advancements by reintegrating isolated and fragmented specialized knowledge related to the brain.
- (3) Cultivate global leaders who will demonstrate international acumen and lead the commercialization of brain convergence fields based on specialized knowledge and research and development capabilities.

Specialization of Education and Research

- (1) Specialization of brain science education through a novel education system that conducts creative and convergent research topics on the subject of the brain, without major restrictions.
- (2) Specialization as a brain science education and research institution responsible for developing convergence technologies necessary for the prevention and treatment of brain-related diseases, which are increasing with the advent of an aging society and the deepening of modern material civilization, and for creating the brain industry.

Key Research Areas(3 Major Research Themes)

- (1) Understanding the Brain and Solving Challenges in Brain Science
- (2) Overcoming Brain Diseases and Realizing a Healthy Brain
- (3) Development of Advanced Brain Engineering Technologies and Value Creation

Convergence with Other Departments

Brain science, which explores the mysteries of the brain, inherently possesses the characteristics of convergence science, making it readily integrated with cutting-edge science and technology fields such as physics, chemistry, NT(Nanotechnology), BT(Biotechnology), and IT(Information Technology). Therefore, we pursue a natural interdisciplinary convergence strategy through PBL(Project Based Learning) centered on the brain.

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Career Paths

- (1) Academic paths

- Post-doctoral researchers : Korea's leading universities and research institutes

- Faculty member in university

- Domestic research institutes PI : KBRI, KIST, KRIBB

- Overseas Research Institute PI : MPI, HHMI, Janelia

- Domestic and foreign corporate research institutes PI : Samsung, LG, CJ, J&J, etc
- (2) Industrial paths

- Bio companies : LG, CJ,Biogen, SK Biopharm

- Healthcare Company : GE Health

- Pharmaceutical companies : Pfizer, J&J, Amgen, Genetech

- Healthcare Company : GE Health

- Venture Start-up : New business related to brain and cognition

- Research-oriented medical institution : University Hospital
- (3) Bio-related Fields

- Technology valuer

- Patent attorney

- Science and technology journalist

- Science fiction writer

- Science and technology government official

- Science teacher

The Interview Process

- (1) Presentation in English : Ph.D.course applicants should present their M.S.thesis work. M.S.course applicants and M.S.-Ph.D. combined course applicants should choose one option from the two options below.

Option 1 :

You should present one paper chosen from the provided list of recommended researchpapers(please check the papers on our website at <https://brain.dgist.ac.kr>) using PowerPoint within a 10-minute time frame(5-10 slides), followed by an additional 10 minutes for Q&A.

Option 2 :

You should present a research paper that has been published in renowned scientific journals(e.g., Nature, Cell, Science, Nature Neuroscience, Neuron, or other journals of similar caliber) using PowerPoint within a 10-minute time frame(5-10 slides), followed by an additional 10 minutesfor Q&A.
- (2) Personal Essay : Presentation of motivation and interests on a suggested topic

(3) Online interview can be arranged for students residing outside Korea, upon early request.

5 Core Education Modules

 Molecular and Cellular Brain Science	Molecular and Cellular Brain Science - Applying the latest technologies of neuroscience to elucidate the core principles of neuronal and synaptic generation, degeneration, function, and plasticity at the molecular and cellular levels. - Studying the fundamental principles of the central nervous system's development, differentiation, and cell death through molecular and cellular approaches. - Developing new technologies to control neuropsychiatry, developmental, and neurodegenerative disorders through the discovery of molecular and cellular signaling involved in the diseases. - Conducting research from single molecules and cells to genomics, proteomics, and metabolomics to elucidate the pathogenesis of neurodevelopmental and degenerative diseases and metabolic disorders and develop early diagnostic techniques
 Systems Brain Science	Systems Brain Science - Interoception and behavioral plasticity - Neurobiological understanding and overcoming techniques of mental illness - Neuron-glia interactions underlying emotional behaviors - Circadian rhythm and behavior - Functional evo-devo study of locomotor neural circuits - Behavioral disorders and psychiatric illnesses by dysregulation of behavioral/ cognitive plasticity - Identification of plastic-degrading bacteria and enzymes

02

Departments and Majors

D & M

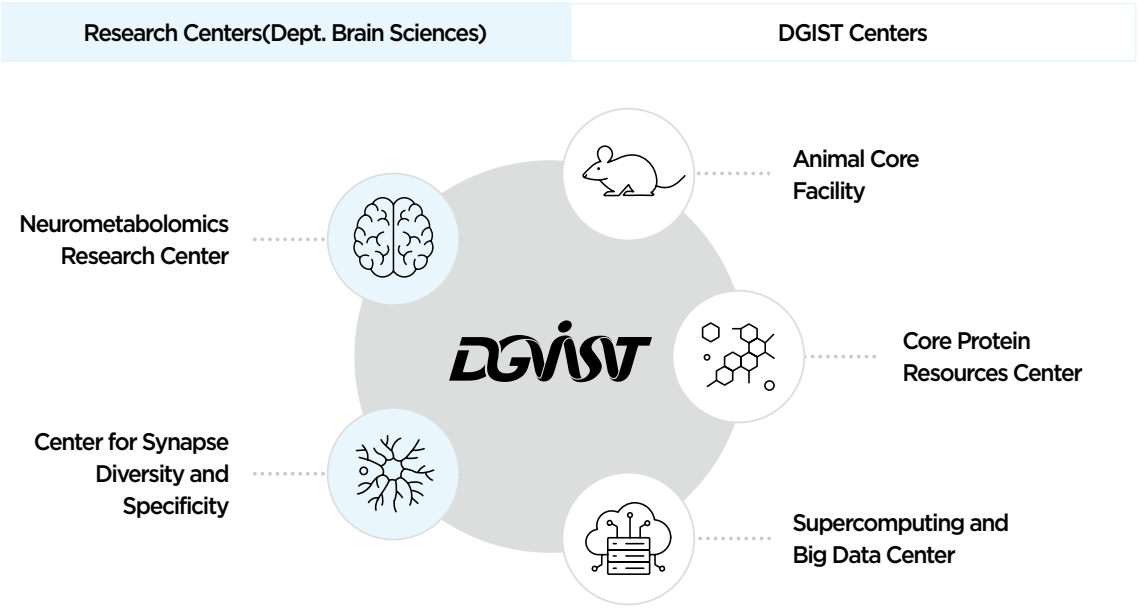
V

Brain Sciences

BS

 Brain Engineering	Brain Engineering - State-of-the-art tools and methods for fundamental understanding of the brain - Large-scale brain interface and high-resolution neural imaging - Neural modulation techniques for manipulating brain signals - Brain signal processing, encoding, and decoding - Engineering approaches to rehabilitate, repair, and replace neurological deficits and disorders
 Cognitive Brain Science	Cognitive Brain Science - Understanding the neural correlates of high-level cognition through convergent approaches of brain sciences - Interrogating brain mechanisms of mental processes embracing memory, attention, problem-solving, decisionmaking, inference, and language - Exploring the relationship of mind-brain-behavior by imaging, recording, and manipulating neural activity - Investigating brain maps and brain networks using brain big data
 Computational Brain Science	Computational Brain Science - Deciphering proteomic structures and functions at an atom level through statistical and computational physics and investigation of physicochemical fundamentals of life science in Bio-Neuro-Brain system - Mechanisms of protein fibrillization and proteomic principle of neurodegenerative diseases - Supercomputing of dementia-predicting big-data and complex network analysis - Supercomputing-based modeling of protein structure in the brain and nervous system - Structure analysis of membrane proteins and receptor proteins in the view of signal transduction mechanisms through the cell membrane

Research Centers



Q) What curriculums does the Department of Brain Sciences provide to the students?

- Intensive courses for the basics of physiological and pathological mechanisms of the brain
- Courses centered on the experimental methods for the study of the brain function and structure
- Internships and seminars for in-depth as well as broad knowledge and thinking
- Taking courses from other departments, such as IT, RT, and ET, as a prerequisite for brain convergence science
- Study the theoretical and computational biophysics in order to understand the fundamental physico-chemical principle behind the brain-cognitive phenomenon

Q) What are the goals of the Department curriculums?

- To provide creative and systemic education, research focused, inter-disciplinary training, and global networking in education and research
- Individual meeting with faculty for deeper one on one conversations
- To produce global leaders who will lead application of our knowledge for mankind on the basis of professional knowledge and research ability of the brain convergence science

Q) What is the educational philosophy of the Department?

- **Integrity** : responsibility and honesty in performing and reporting research
- **Collegiality** : scientific interactions and communications
- Collaboration: sharing of knowledge and resources for mutual development
- **Collective wisdom** : sharing of knowledge for the pursuit of truth
- **Social responsibility** : the accountability of science to society
- **Translation** : conduct of research for clinical and practical application
- **Partnership** : partnership between faculty and students

Q) What are extracurricular activities on-going in the Department?

- **Student Symposium** : At this student-run annual symposium, the students invite speakers for seminar and present their research work.
- **Seminar** : The Department invites renowned speakers for seminar.
- **Convergence seminar** : This seminar is co-hosted with other departments to facilitate convergent research and collaboration between the departments.



Eu Jeong Oh
Brain sciences/Integrated MS&Ph.D

Nationality) Republic of Korea
Assigned Lab) Laboratory of Neurobehavior and Neural Circuits(Prof. Kyuhyung Kim)

Q) What made you choose DGIST?

During my undergraduate studies, I engaged in research activities to investigate the impact of natural substances on brain activity. The process of proving hypotheses by using various experimental techniques appealed to me, leading me to decide to pursue graduate studies. Thanks to DGIST's stateof-the-art experimental equipment and its high reputation for excellent brain science research, I thought DGIST is the ideal environment for neuroscience research. While interning in Professor Kyuhyung Kim's lab during the summer, I realized the utility of C. elegans as a model organism for research. C.elegans shares similarities with mammals in terms of neurotransmitters and receptors responsible for synaptic transmission, and its short lifespan and ease of genetic manipulation makes it an ideal model for neuroscience research. Taking these advantages into consideration, I decided to pursue neuroscience research using C. elegans as a model organism and joined the Neurobehavior and Neural Circuits lab in Brain Sciences Department.

Q) What are the strong points of the departmentof Brain Sciences?

The educational program offered by the Department of Brain Sciences is highly well-coordinated. It begins with introductory classes that provide a general approach to neuroscience, covering basic concepts, which is beneficial for students with minimal background knowledge. Furthermore, the advanced courses focused on specific neuroscience fields allow students to select courses aligned with their research interests. These comprehensive curriculums facilitate the development of expertise in neuroscience. Additionally, weekly department seminars featuring renowned speakers enrich the academic experience and provide opportunities to explore new research areas. Furthermore, the department's close association with the Korea Brain Research Institute(KBRI) offers students numerous opportunities to collaborate on research projects in a diverse range of laboratories.

Q) Explain your research field and purpose at DGIST.

I am researching the molecular mechanisms of the brain's response to sensory perception and physiological changes through neuropeptides. Neuropeptides are neurotransmitters secreted by neurons to transmit signals, regulating synaptic transmission by binding to G protein-coupled receptors.

“After a hard study, I’m going to show you happiness and sense of accomplishment Experience.”

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As the nervous system utilizes neuropeptides to adapt and respond to physiological changes, I believe this research is essential for understanding brain function mechanism. To comprehend the brain's communication methods, I am investigating the receptors that neuropeptides bind to activate downstream signals. Based on this, I aim to deepen the understanding of the relationship between neuropeptides and receptors, elucidating the mechanisms by which the nervous system responds and adapts to external stimuli.

Q) What are you planning to do after graduation?

Understanding the mechanism of action of neuropeptides is crucial for uncovering how the brain operates. Based on the experimental results obtained during my master's and doctoral studies at DGIST, I plan to conduct more in-depth neuroscience research as a postdoctoral researcher. While neuropeptide research is actively conducted worldwide, there are still many challenges to be addressed. Therefore, I aim to go beyond simply elucidating the behavioral consequences of specific neuropeptide defects and strive to build a comprehensive understanding of their impact on the neuropeptide-receptor connectome within the nervous system. Ultimately, I hope to contribute to expansion of human knowledge by becoming an independent researcher based on these research experiences.

Q) Please advise our applicants.

It's important to consider one's areas of interest and the problems they wish to address through research before entering graduate school. Seeking tips from senior graduate students and professors through consultations can be helpful in making career decisions. DGIST offers a summer and winter internship program for students considering graduate school, which I personally participated in and highly recommend. Additionally, through the open lab program held in each graduate department, you can take lab tours and consult with professors and graduate students. Participating in these programs can provide valuable indirect experience in labs that interest you. While conducting research, there may be times when positive results are not achieved, but overcoming challenges and exploring more effective ways to validate hypotheses brings great satisfaction during graduate school. I am confident that by making careful decisions, you will experience the sense of accomplishment that I felt during the research program.

VI New Biology

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New Biology

NB

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What is “New Biology”?



“New Biology” is a novel paradigm in life sciences that takes a multidisciplinary approach and utilizes cutting-edge technologies to understand life phenomena and to solve grand challenges facing humanity. The Department of New Biology aims to cultivate leading scientists who will open a new scientific culture and future civilization. With creative and analytical convergence thinking, we strive to lead an emergent research paradigm, explore uncharted territories, and solve fundamental problems, ultimately contributing to the sustainability of humanity.

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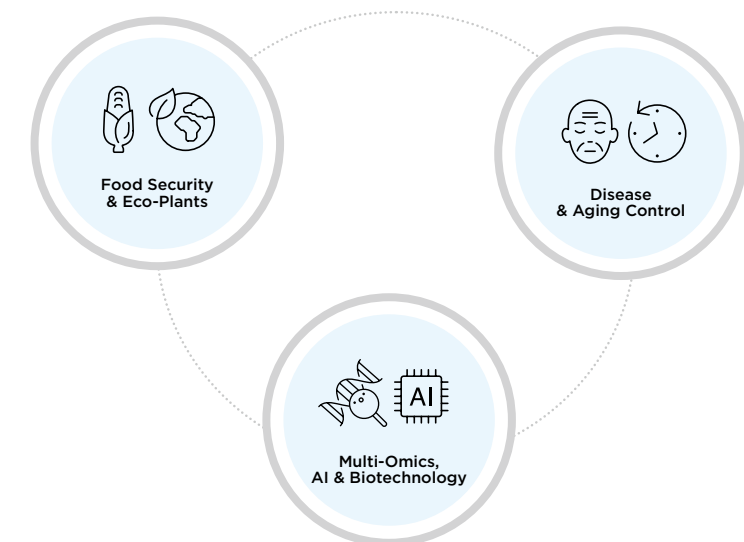
Vision

- (1) To lead a new paradigm in future biological sciences
- (2) To pioneer unexplored areas of biology and address fundamental scientific challenges
- (3) To contribute to sustainable humanity through education and research in New Biology

Goals

- (1) To become a global leader in life sciences by advancing into the top 30 departments worldwide
- (2) To identify and address grand challenges through collaborative research within the core New Biology clusters
- (3) To nurture the next generation of life scientists with strong analytical thinking, independent research capabilities, and interdisciplinary skills.

Core Research Clusters



Specialized Program Features

- (1) **Integrated Master's and Ph.D. Program(5-Year Track)**
 - **Year 1** : Education in core technologies, interdisciplinary knowledge, and experimental skills essential for convergence research; acquisition of foundational knowledge and selection of academic advisor
 - **Years 2-5** : Execution of interdisciplinary thesis research; academic advisor system supports degree completion within five years
- (2) **Creative Curriculum**
 - **Creative Education** : Cultivation of talent capable of creating new problems, methodologies, and outcomes
 - **Holistic Education** : Development of programs focused on scientific creativity, logic, science communication, and the history of science and technology
- (3) **Global Collaborative Research Programs**
 - **Joint research initiatives with world-leading institutions, including** : Max Planck Institute, Harvard University, UC San Diego, Duke University, National Cancer Institute(USA), National Cancer Center(Japan), University of Copenhagen, A*STAR(Singapore), European Liquid Biopsy Society(ELBS), Salk Institute, Nanyang Technological University(Singapore), University of Michigan, Rutgers University, and more

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Specialized Research Fields

Food Security & Eco-Plants(FEP) Cluster

- (1) **Goal** : To understand developmental principles of living organisms and contribute to food security and climate change adaptation
- (2) **Faculty** : Felix Jonas*, Hye Ryun Woo, Jong-Chan Lee*, Jun-Myeong Kwak, Min-Sik Kim*, Sang-Im Lee, Song-Yi Lee*(* involved in multiple clusters)
- (3) **Outlines**
 - Growth of human population and climate change threaten the sustainability of nature and humanity, thereby creating new challenges.
 - It is necessary to secure sustainable agriculture by clarifying the principle of development and/or adaptation of living organisms(animals and plants) to climate change.
 - FEP cluster focuses on investigating metabolism and function of organisms in response of climate change and for food security in collaboration with the DAC cluster in the departmentSpecialized Programs
- (4) **Specialized Programs**
 - **FEP1** : Elucidation of principles underlying plant spatiotemporal development and adaptation to environmental stress
 - **FEP2** : Investigation of metabolism and processes associated with plant vitality and aging
 - **FEP3** : AI-based research on enhancement of plant growth and functionality

Disease & Aging Control(DAC) Cluster

- (1) **Goal** : Research on disease control and vitality-driven aging for human longevity and well-being
- (2) **Faculty** : Byung-Hoon Lee, Chan Chung, Chang-Hoon Nam, Chang-Hun Lee, Felix Jonas, Il-Kyu Choi, Jae-Hyung Koo, Jae-Min Lee, Jin Hae Kim, Jong-Chan Lee*, Kyung-Moo Yea*, Min-Seok Kim, Min-Sik Kim*, Song-Yi Lee*, Tae-Wan Kim, Young-Hoon Kee, Young-Sam Lee, Young-Tae Jeong**, Yoori Kim*(*Professors involved in multiple clusters)
- (3) **Outlines**
 - Early disease diagnosis, customized precision medicine, and new drug development are key areas for securing global competitiveness and creating new bio-industry in the future life sciences field.
 - The need for researches of vitality and healthy aging has increased as social, economic, and health care costs increase due to rapid growth of aged population.
 - DAC cluster contributes to human permanence through the development of technologies for disease and aging control.
- (4) **Specialized Programs**
 - **DAC1** : Early diagnosis, precision control, and prevention of diseases
 - **DAC2** : Next-generation biotechnology-based drug development
 - **DAC3** : Elucidation and control of aging processes
 - **DAC4** : Development of analytic technologies for biomolecules related to aging and diseases

Multi-Omics, AI & Biotechnology(MAB) Cluster

- (1) **Goal** : Development of core technologies through the convergence of multi-omics, artificial intelligence, and biotechnology
- (2) **Faculty** : Felix Jonas, Jong-Chan Lee, Kyung-Moo Yea***, Min-Seok Kim*, Min-Sik Kim*, Song-Yi Lee*, Yoori Kim*,(*involved in multiple clusters)
 - Multi-omics, AI, biotechnologies are at the core of the biohealth industry innovation strategy in the era of 4th industrial revolution.
 - Developing emerging technologies as core foundational tools to establish the foundation for an innovative and distinguished New Biology research program.

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New Biology

NB

Convergence with Other Disciplines

- (3) **Specialized programs**
 - **MAB1** : Establishment of multi-omics data generation and analysis platforms
 - **MAB2** : Development of next-generation AI-based analysis technologies for big biological data
 - **MAB3** : Development of next-generation core technologies for life sciences and biotechnology

- (1) Interdisciplinary education and research in collaboration with other departments at DGIST leading to novel challenges and ground-breaking discoveries
- (2) Collaborative research with DGIST institutes/research centers such as Nano-Energy Research Group, IoT Robotics Convergence Research Group, and Well-Aging Research Center with an aim of developing new applications

Career Paths

- Post-doctoral Research**
Graduates have pursued postdoctoral research at globally renowned institutions, including :
- (1) UC Berkeley, CNRS, Harvard University, UC San Diego(UCSD), University of Pennsylvania(Upenn), Stanford University
 - (2) Max Planck Institute, Salk Institute, Scripps Research, Yale University, National Institutes of Health(NIH), Johns Hopkins University
 - (3) University of Cambridge, ETH Zurich, Technical University of Munich, Memorial Sloan Kettering Cancer Center, and more

Industry Employment

- (1) **Biotechnology Companies** : Samsung, LG, and other major biotechnology firms
- (2) **Bioinformatics Companies** : Theragen, Macrogen, DNA Link, BERTIS, and more
- (3) **Pharmaceutical Companies** : Green Cross(GC), Chong Kun Dang, and other domestic pharmaceutical firms
- (4) **Bio-venture Startups** : Opportunities in industrial proteins, bio-based materials, bioenergy, and entrepreneurship in emerging biotech sectors

- Government-Funded Research Institutes**
Graduates also work as researchers in prominent Korean national institutes, including :
- (1) Korea Research Institute of Bioscience and Biotechnology(KRIBB)
 - (2) Korea Basic Science Institute(KBSI)
 - (3) Korea Disease Control and Prevention Agency(KDCA), National Cancer Center, Rural Development Administration(RDA), National Institute of Biological Resources(NIBR) among others

- Academic Careers**
Many alumni have been appointed as professors or lecturers at prestigious universities, including :
- (1) Seoul National University, Yonsei University, Ajou University, Sahmyook University, Wonkwang University(Korea)
 - (2) Hanoi Medical University(Vietnam) and others

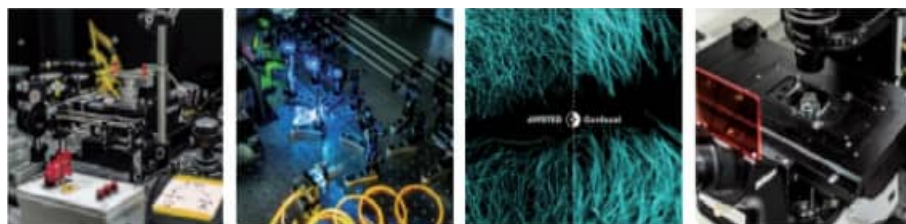
The Interview Process

- (1) **Interview(10 min)** : Qualification evaluation of personality, leadership and communication skills including English, creativity, and knowledge required for study of convergence biology.
- (2) **Oral Presentation** : Each applicant will be asked to give a 30 min presentation, which includes a 10 min Q&A. Presentation topic will be announced a few days before the presentation.
- (3) Online interview can be arranged for students residing outside Korea, upon early request.
 - ※ Applicants should arrive 30 min before the interview.
 - ※ Detailed guidelines will be provided prior to the interview.

Major research facilities

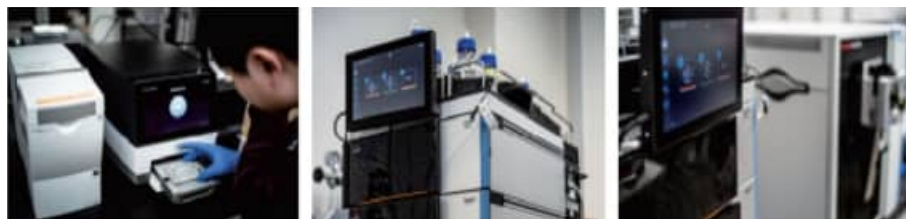
Bio-imaging Core Facility

- (1) State-of-the-art fluorescence microscope and confocal microscope
- (2) Super-resolution microscope(STED, SPRIE-TIRF)
- (3) Single-molecule fluorescence measurement platforms



Multi-Omics Facility

- (1) High-tech multi-omics facility for transcriptomics, proteomics and metabolomics analysis



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New Biology

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What topics are studied in the Department of New Biology?

Q) What kind of interesting researches are going on in New Biology?

The Department of New Biology aims to integrate biology with various other disciplines(physics, chemistry, engineering, computer science, etc.) to establish an innovative research paradigm and pioneer unexplored fields. Through this, we strive to address critical challenges in health, food, and the environment that humanity faces today. To achieve this goal, the following research and education programs are in place :

- **Food Security & Eco-Plants** : Investigating the principles of living organisms' adaptation and development in response to climate change to contribute to food security
- **Disease & Aging Control** : Researching disease control and vitality aging for improved human health and longevity
- **Multi-omics & AI Bioinformatics** : Developing core foundational technologies through the integration of multi-omics, AI, and biotechnology

Q) Does the Department of New Biology offer a unique educational and research environment?

The Department of New Biology offers a specialized educational and research environment aimed at nurturing future-oriented, next-generation scientists with the potential to become global leaders. Students are expected to complete their degrees within an average of 5.5 years(Integrated Master's and Ph.D. program). The department enhances graduate students' multidisciplinary research experience through collaborative research among faculty members and partnerships with leading international research groups. Additionally, graduate students are encouraged to participate in international academic conferences, which help foster academic growth, global awareness, and competitiveness through scholarly exchanges and motivation.

Q) Who are the right students for New Biology?

The Department of New Biology seeks creative and talented students who are capable of not only solving given problems and developing knowledge and technologies, but also identifying new challenges. The department aims to nurture well-rounded scientists through a holistic curriculum that includes diverse topics such as scientific creativity, ethics and philosophy, scientific communication, the history of scientific discoveries, business administration, and more.

Q) Who can apply for New Biology?

Undergraduate students from any disciplines with an interest in convergence biological science are welcome to apply to the New Biology department at DGIST. Students majoring in New Biology are expected to enjoy confronting challenges and creative thinking, which are characteristics required for student-led learning and research.

Q) How is the research environment in New Biology?

Instead of the typical laboratory-based environment, the New Biology department integrates education and research in a matrix structure, and maximizes research and learning capacity for largescale projects. Students will be offered diverse opportunities to participate in major research groups during their course of study and expected to produce world-class results.

- Translational Responsive Medical Center
Development and commercialization of precise biomedical technology for diagnosis and treatment of intractable diseases. Vitalization of start-up in fields of personalized targeted therapeutic drugs and diagnosis. Synergy maximization with Daegu Gyeongbuk hightech medical complex and contribution to companies in local community.
- Disease mimic biochip, disease model animals
- Precision biomedical stimulation, Precise cell separation, Precision tissue engineering
- Antibody therapeutics and Cancer immunotherapy

Q) Are there extracurricular activities in the department?

Various extracurricular activities help the development of students in the department of New Biology by stimulating open discussions and knowledge exchange.

- **New Biology Research in Progress(NBRiP) eminar** : Research exchange meeting led by graduate students and researchers in the department.
- Inter-lab social activities including the Year-end lab festival and research photo exhibition
- **DGIST Post-Graduate Research Abroad Awards** : a program for graduate students in the department which supports international lab visits and research exchange

Q) How can we learn about the department of New Biology in more detail?

You can apply for the following programs to learn more about the department

- Summer and winter internship program
- DGIST graduate school open lab
- New Biology Boot Camp



Shirley Nguyen Ngoc Chau Thy
Nationality) Vietnam
Lab) QBIO and Precision Medicine lab

Q) What made you choose DGIST?

I first know of DGIST as a research-orientated institution with a strong emphasis on creativity and interdisciplinary collaborations. I was impressed by the well-equipped facility, alongside a multitude of innovative research themes that DGIST offered. Moreover, for an international student such as myself, studying abroad is not merely for acquiring knowledge but also to immerse oneself in cultural exchange. I discovered that DGIST's International Affairs team would organize excursions to explore the heritages alongside other engaging activities for students to adapt to Korean customs or simply to unwind after work. To top it all off, DGIST's generous financial benefits, which scholarships and stipends would be endowed to enrolled students, allow individuals to be engrossed in academic excellence without the monetary concerns.

Q) What are the strong points of DGIST and the department of New Biology?

DGIST presents an environment that is exceptionally conducive to scientific research. The campus harbors cutting-edge technologies and sophisticated systems which serve an array of purposes. For instance, the Laboratory Animal Resource Center provides invaluable management for research organisms, whereas the Supercomputing and Big Data Center supports interdisciplinary studies that offer multifaceted insights into overcoming pressing biological challenges. Moreover, New Biology students can work with fellow researchers from diverse departments such as Robotic Engineering or Brain and Cognitive sciences to elevate their research output's caliber, as shown by the prolific publications in distinguished journals annually. The seminars and lectures, delivered in English by renowned professors, ensure that international students can seamlessly follow along and stay abreast of the latest developments in the field. The Post-Graduate Research Abroad Awards also enable students to broaden their horizons and experience top-tier education at universities worldwide. With the opportunities that DGIST affords, individuals can unlock new avenues for their future endeavors.

“Experience happiness and a sense of accomplishment when the results are presented as papers after difficult research.”

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Q) Explain your research field and purpose at DGIST.

In general, we employ state-of-the-art mass spectrometry to comprehend the alteration of proteomic and metabolomic profiles of ample diseases, including but not limited to cancers, neurodevelopmental disorders, and cardiovascular disease. Our objective is to translate the scientific knowledge into clinical utility. We are at the forefront of discovering the putative lung cancer biomarkers from patients' bronchoalveolar lavage fluid, and detecting the neoantigens for immunotherapy in gastric cancer and calcific aortic valve disease. Coming from a biomedical background, I am intrigued by the core regulation of pathogenesis, the protein interaction networks, and how they can be disrupted to halt disease progression. My own research focuses on peripheral neuropathy, aiming to unravel its molecular mechanisms for developing therapeutic regimes. By implementing the advanced multi-omics approach, we have justified the effectiveness of several drugs that can prevent the exacerbation of nerve damage and potentially reverse it. This will be of significance to diabetes patients and the aging cohort who have to endure chronic pains and debilitating conditions stemming from nerve degeneration. Another aspect I invest most of my time in is characterizing the “toggle switch” of proteins, termed post-translational modification(PTM). A small perturbation in these switches might drastically lead to chaotic signals within and between cells. I have optimized the mass spectrometer compatible methods to depict the holistic overview of the phosphorylation status of thousands of proteins and infer their contributions to cancer development. In the impending future, I aspire to transcend the understanding of other PTMs, such as nitrosylation, acetylation, and ubiquitination, to grasp the intricacy of their harmonized cross-talks.

Q) What was the best moment in your DGIST life?

It was a humbling experience for me to witness the discussion between experts in the medical and proteomic fields at an international conference regarding the application of artificial intelligence to biomarker discovery. I was indeed astounded by the study they devised, the opposing perspectives they raised, and their ability to efficiently process complex information to tackle potential shortcomings on the spot.

All of which I would have missed if it were not for the financial support from DGIST that encouraged me to attend the event. In terms of life experience, I have lived a few delightful moments with my local friends. We assimilated the Korean tradition of viewing the sunrise on New Year's Eve by embarking on a 3-hour hike to the summit of the Biseul mountain, which is in the close vicinity of DGIST. Cliché, but I always think of it as an analogy of the postgrad journey - there will be a time that you are burnt out and question the meaning of it all. Yet, you can rest, adjust the gears, and return to the trail. The moment you are mesmerized by the dawn atop the mountain while catching your breath and saying to your companions, “we made it”, all the perseverance will be worthwhile.

Q) What are you planning to do after graduation?

My experiences participating in multiple projects at DGIST have substantially cultivated my scientific mindset and myriad transferable skills that will ultimately pave my path toward success in academia and industry settings. My unwavering passion for combatting diseases is constantly kindled throughout the rigorous Ph.D. program. I consider it a great honor to have been inspired and mentored by numerous elites in the field. Therefore, I am compelled to pay it forward and bring out the best in the next generation through teaching and sharing the sheer wonder of scientific discovery with them. As such, I have planned to pursue an academic track, commencing with a postdoctoral position.

Q) Please advise our applicants.

Selecting a research focus that aligns with one's interests is crucial for postgraduate students. To this end, a short internship is advantageous for prospective applicants to explore personal inclinations, get the gist of the research routine, and acquaint themselves with critical thinking in a research-intensive milieu. Furthermore, adequate biological knowledge is a prerequisite for admission interviews and academic assignments. The notion that one should be curious to thrive is also particularly accurate in the New Biology research discipline. Building a habit of perusing scholarly articles is a good way to stay updated with the latest scientific advancements and expand one's intellectual horizons.

VII 1. Interdisciplinary Engineering of Interdisciplinary Studies

02

Departments and Majors

D & M

VII

1. Interdisciplinary Engineering of Interdisciplinary Studies

IE

Introduction to the department



Interdisciplinary Engineering Major in Interdisciplinary Studies is designed for studies and research on intelligent mobilities and emerging devices, the key elements for the fourth industrial revolution, through interdisciplinary and multidisciplinary education. The main goal is to foster science and technology professionals with creative problem-solving skills through education and research at Convergence Research Institute in collaboration with other departments at DGIST Graduate School.

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Introduction to the Department

Interdisciplinary Engineering combines various fields of study and technologies that can respond to the rapidly changing industrial and social structure to seek creative convergence of science and technology for the future. We provide interdisciplinary education. Through the curriculum, we aim to nurture talents who have comprehensive design thinking capability and convergence research capacity on the fields drawing attention in the era of the fourth industrial revolution such as future autonomous mobilities, high-tech materials, components, and devices.

Vision

- (1) To cultivate problem building and solving skills in the emerging technology fields
- (2) To foster competences in creative, innovative science and technology for the future industries
- (3) To nurture creative leaders in convergence science and technology

Research and Education Focus

- (1) Cultivation of international leaders for the convergence energy devices through
- (2) closely interconnected interdisciplinary system of DGIST.
International exchange(including double-degree program) and team projects with global top Institutes
- (3) Solution searching education and research experiences to technical challenges

Key Research Fields

- | | |
|--|---|
| (1) Intelligent Mobilities | (2) Emerging Materials and Components |
| - Autonomous Driving | - Energy Conversion Materials & Technology |
| - Technology/Human Mobility | - Functional Material for Carbon-neutral Technology |
| - Interaction/High-Performance | - Sensors & Packaging Technology |
| - Radar Signal Measurement Technology | |
| (3) Advanced Biotechnology | |
| - Practical Technology for Translational Medicine(Therapeutics, Diagnostics) | |
| - Convergence Technology for Quality of Life(Medical Device & Services) | |

Specialized Research Fields

- (1) Interdisciplinary Engineering has pioneering curriculums that cover creative and interdisciplinary areas of research in convergence technology for intelligent mobilities and emerging devices, and in biotechnology
- (2) Education system focused on core research fields by participating in R&D projects

Career Paths

- (1) DGIST Convergence Research Institute
- (2) National Research Institutes such as CRI of DGIST, ETRI(Electronics and Telecommunications Research Institute), ADD(Agency for Defense Development), KITECH(Korea Institute of Industrial Technology), etc.
- (3) Research institutes of conglomerate, foreign companies, or promising middle-market enterprises such as Samsung Electronics, LG Electronics, and Hyundai Motor Group, SKT, Hyundai Heavy Industries, etc.
- (4) Entering domestic and international graduate school doctoral programs and academic circlesacademic circles

The Interview Process

- (1) Individual interviews to evaluate the essential background and professional knowledge.
- (2) Oral presentation on self-introduction, experience or achievement of research, study or research plans, plans after graduation, etc. in both Korean and English
- (3) The online interview can be arranged for students residing outside Korea, upon early request.

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What topics are studied in Interdisciplinary Engineering Major in Interdisciplinary Studies?

- Students learn about the world’s leading convergence science and technologies and develop the emerging technologies, mainly focused on intelligent mobilities, intelligent robots, advanced materials and devices and biotechnology, the key technologies of the fourth industrial revolution.
- Like other departments at DGIST, students have opportunities to experience interdisciplinary and multidisciplinary research, and convergence R&BD(Research and Business Development), which cannot be provided in a traditional single major.
- Students will acquire advanced convergence knowledge and technologies by participating in government or industrial research projects conducted at DGIST Convergence Research Institute(CRI) as well as taking range of related courses offered at other departments.

Q) What lecture courses and research projects are offered?

- Students acquire basic interdisciplinary knowledge by taking common courses offered at Convergence Science and other departments.
- After taking the basic common courses, students will take advanced interdisciplinary courses specialized in autonomous mobilities and emerging devices.
- Students perform Project-Based-Research(PBR), the program where students participate in a variety of interdisciplinary research projects in CRI.
- Students are focused more on carrying out research projects to acquire practical knowledge than on learning basic principles, which distinguishes IE from other departments. The main advisor can be chosen from the adjunct faculties of CRI. If needed, co-advisors can be selected from the faculties at IE or other departments, to conduct in-depth multidisciplinary research projects successfully.

Q) Are there any specific undergraduate majors or mandatory courses required to apply for admissions into the graduate programs of IE?

- As the title of ‘Convergence Science’ itself implies, we welcome ambitious students who have the basic knowledge required for the Convergence Science programs with an academic background in the fields of science and engineering, not limited to computer, electric, electronic, mechanical, materials, or device engineering.

Q) What are the expected fields for students to work inafter graduation?

- After graduation, students would be able to work in most industries and academia related to the fourth industrial revolution, including the areas of IT, automobile, robotics, energy, device, and materials engineering.
- What makes this program better is that DGIST has cooperative networks of international and domestic research institutions where students can get further opportunities to work.

Q) What is the difference in benefits between Interdisciplinary Studies and other departments?

- Students of the Interdisciplinary Studies department will receive the DGIST scholarship and should pay the tuition. However, they will receive a decent amount of stipend that is enough to cover the tuition fee. Since the full stipend comes from the external funding sources, participation in the related research projects is obligatory. Besides, Convergence Science students are not eligible to be a Technical Research Personnel(Convergence Science students are not exempt from military service).

Q) Please introduce divisions of DGIST Convergence Research Institute(CRI).

- Division of Future Automotive Technology**
Division of Future Automotive Technology leads the development of convergence technology to create innovative value for the automotive industry. It aims to open a new era of automotive research that will address environmental issues by securing convergence technology of automotive with AI, Smart Sensor, and lot for unmanned and accident-free smart cars.
- Core Sensor and Element Technology for Smart Cars
 - Practical Technology for Autonomous Driving.

- Division of Electronics and Information System**
Division of Electronics and Information System conducts researches focusing on the following fields:
- High precision positioning/cognition technology and system based on multiple types of sensors to enhance the core cognitive performance of human support system in the future
 - Bio-based Big Data analysis and diagnosis-treatment system based on AI(Artificial Intelligence)
 - Display technology & Conformal electronics
 - Open innovation research based on data science, system dynamics, and qualitative research-based business model

- Multi-Sensor-based Cognitive Technology and System
- Diagnosis-treatment system based on Big Data
- Display & Conformal electronics

- Division of Intelligent Robot**
Division of Intelligent Robot pursues excellence in research by securing the leading robotics technology. It plays a crucial role in making the domestic robotics industry competitive in the global market through the steady commercialization of its technology. The ultimate goal is to lead technology commercialization to build a welfare society where humans and robots coexist.
- Collaborative Robotics
 - Human Cognitive and Physical Augmentation
 - Complex Information Processing Platform based on Life-log

- Division of Energy & Environmental Technolog**
Division of Energy Technology focuses on next-generation thin-film solar cells, efficient hydrogen energy technology, and smart textile technology for energy conversion and storage, which is versatile, eco- friendly, and highly reliable. It aims to promote key research areas and commercialize its research performance.
- Eco-friendly and High-Performance Solar Energy
 - Materials and Devices of Hydrogen Energy
 - Energy Harvesting and Storage Technology for Wearable Electronics

- Division of Nanotechnology**
Division of Nanotechnology focuses on new functional materials using nanotechnology and structure control technology. It includes synthesis and application technology of inorganic and organic composite materials.
- High-Performance Thermoelectric Energy Conversion
 - Next-generation Extreme Low-power Semiconductor Materials/Devices
 - Self-luminescent Nanomaterials and Colloidal Semiconductor Nanocrystals(Quantum Dots)

- Division of Biomedical Technology**
Division of Biotechnology aims to improve human life quality through the combination of applied life science and biomaterial technology development. It conducts research on disease-related mechanisms and therapeutic targets, development of the molecular diagnostic index, which is a key technology to realize personalized precision medical care, and development of molecular and non-molecular diagnostic indicators, including drug-susceptibility.
- Establishment of the Biological and Computational Model for Controlling and Revealing the Mechanism of Incurable Diseases
 - Application and Practical Use of Precision Medicine
 - Functional Biomaterials and Bioplastics

Interview

(Major chair professor)



Hyunmin Kim

Head Professor of Department of Interdisciplinary Engineering

Q) What does the new beginning of DGIST Interdisciplinary Engineering mean?

The Interdisciplinary Program at DGIST is not centered on course-based education, but on Project-Based Research. Students are not passive learners following predetermined answers; instead, they become the main agents of research, defining real social, scientific, and technological problems, and taking responsibility for the entire process—from experimentation and design to analysis and validation—by independently integrating the knowledge and methodologies they need.

This approach is grounded in the recognition that, in an era where AI rapidly replaces standardized knowledge and techniques, the most critical competencies are problem formulation and integrative thinking.

The program also aims to move beyond the traditional vertical advisor–student hierarchy, fostering a research community in which professors, researchers, and students collaborate horizontally within a single project, each contributing their own expertise. In this structure, leadership does not stem from position or title, but emerges naturally from depth of understanding, quality of contribution, responsibility, and execution. In other words, the interdisciplinary program is not designed to train followers, but to cultivate researchers who can become leaders depending on the context.

Q) What do you expect from the students of DGIST Interdisciplinary Engineering?

In the age of AI, the importance of self-driven motivation cannot be overstated. While AI can increasingly take over the “how,” the questions of what to do and why it matters remain firmly within the human domain.

Rather than injecting motivation from the outside, the DGIST Interdisciplinary Program places its core value on students choosing their own problems, defining the meaning of their research, and enduring failure and trial-and-error through intrinsic, self-generated motivation. Without such motivation, one may become a skilled technician adept at using AI tools, but not a researcher capable of opening new research paradigms. This conviction underlies the program’s educational philosophy.

“Learning self-driven motivation in a horizontal leadership environment”

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Q) Through Interdisciplinary Engineering, what kind of scientist should students be?

The scientist fostered through the interdisciplinary program does not remain confined within a single discipline, but independently defines real-world problems, uses powerful tools such as AI wisely, and keeps judgment and responsibility firmly in human hands.

This scientist develops integrative thinking through project-based research, learning to understand and connect the languages of different disciplines, and becomes comfortable with horizontal collaboration where leadership is exercised through contribution rather than hierarchy. Guided by self-directed motivation rather than external evaluation or instruction, they embrace uncertainty and failure, striving to expand the boundaries of knowledge and technology as proactive, responsible, and creative scientists in the AI era.

Q) What advice would you give to students who are considering their career?

Rather than confining yourself to a fixed disciplinary identity or job title, first ask what kind of problems you are willing to engage with over the long term. In the AI era, technical skills and credentials tend to be standardized more quickly than expected, but the attitude of creating your own questions and taking responsibility for pursuing their answers to the end cannot be replaced.

Do not avoid failure or uncertainty. Learn the languages of multiple fields, and embrace collaboration with others as an integral part of your growth. The interdisciplinary program does not guarantee a safe or predetermined path it is a training ground for practicing self-motivation, self-judgment, and self-responsibility. Those who pass through this training with sincerity will ultimately be able to create their own paths—whether in academia, industry, entrepreneurship, or policy.

VII 2. Artificial Intelligence of Interdisciplinary Studies

02

Departments and Majors

VII

2. Artificial Intelligence of Interdisciplinary Studies

D & M

AI

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What is the Interdisciplinary AI Major?



An interdisciplinary, convergence-based program dedicated to cultivating world-class AI experts who will lead the field of Physical AI — artificial intelligence that breaks beyond the boundaries of code and interacts directly with the physical world through robotics, autonomous driving, smart manufacturing, and healthcare.

Program Overview

The DGIST Interdisciplinary AI Major operates a distinctive education and research framework that converges multidisciplinary studies, built upon a faculty and research infrastructure that ranks among the best in Korea and abroad. Through an end-to-end curriculum spanning AI theory(ML Theory), perception(Vision & Imaging), action(AI Robotics), foundational systems(AI System), and industrial applications(AI+X), students develop the capability to realize intelligence that operates beyond the digital realm in real-world environments. The program places particular emphasis on applied research that integrates AI with smart city, manufacturing-industry, and bio-medical fields — the core domains of the 4th Industrial Revolution — and offers industry-academia convergence research programs aligned with the needs of domestic and local industries, enabling graduates to emerge as Physical AI leaders ready to deliver impact in the field from day one.

Vision

- (1) Identifying and solving real-world Physical AI challenges through close industry-academia collaboration
- (2) Providing a creative and innovative AI curriculum dedicated to realizing intelligence that operates beyond the digital realm in the physical world
- (3) Cultivating practice-ready, convergence-driven Physical AI innovators equipped with end-to-end capabilities spanning theory, systems, and applications

Specialization of the Major

- (1) **Convergence Industry-Academia Education Tracks** : AI-Entrepreneurship, AI-Industry Linkage, and AI-Industry Collaboration tracks
- (2) Physical AI-Specialized Curriculum
- (3) Synergy through Organic Integration with Core AI Research Fields
- (4) Personalized Project Courses Tailored to Student Career Paths

Key Research Fields

- (1) **Three Major Applied Research Areas(AI+X: Industrial Convergence of Physical AI)**
 - **AI + Smart City** : Intelligent transportation systems and autonomous vehicles / AI-based real-time perception and control
 - **AI + Bio · Healthcare** : Smart healthcare and surgical-rehabilitation robotics / AI-based imaging and analysis
 - **AI + Manufacturing · Industry** : Automation of manufacturing yield and process defect detection / Robot vision and collaborative control systems
- (2) **ML Theory(Core Theoretical Foundations for Physical AI)**
 - Explainable AI / Efficient AI / AI optimization and lightweighting
 - Human-AI interaction / Training data optimization / Large Language Models(LLMs) and multimodal modeling / AI software engineering
- (3) **Vision & Imaging(The Eyes of Intelligence Perceiving the Physical World)**
 - Visual perception and image processing / Real-time deep learning networks
 - Weakly supervised learning / Inverse problems in imaging / Medical image analysis
 - Decision-making AI(prediction-planning) and autonomous driving vision
- (4) **AI Robotics(Where Intelligence Takes Physical Form and Moves)**
 - Robotic automation and human-robot collaboration / Surgical robot vision systems / Unstructured data analysis
 - Edge computing for real-time control / Personalized services
- (5) **AI System(Hardware and System Backbone Supporting Physical AI)**
 - AI accelerator design / Real-time learning and inference
 - Cyber-Physical Systems(CPS) / AI security
 - Machine learning-based data recovery / Brain-machine interfaces

Career Opportunities after Graduation

- (1) DGIST Convergence Research Institute
- (2) National Research Institutes such as CRI of DGIST, ETRI(Electronics and Telecommunications Research Institute), ADD(Agency for Defense Development), KITECH(Korea Institute of Industrial Technology), etc.
- (3) Research institutes of conglomerate, foreign companies, or promising middle-market enterprises such as Samsung Electronics, LG Electronics, and Hyundai Motor Group, SKT, Hyundai Heavy Industries, etc.
- (4) Entering domestic and international graduate school doctoral programs and academic circles

The Interview Process

- (1) Individual interviews to evaluate the essential background and professional knowledge.
- (2) Oral presentation on self-introduction, experience or achievement of research, study or research plans, plans after graduation, etc, in both Korean and English
- (3) The online interview can be arranged for students residing outside Korea, upon early request.



Hyuk Jun Kwon
Artificial Intelligence of Interdisciplinary Studies

Department and Program) AI Major in Interdisciplinary Studies, Integrated M.S.-Ph.D. Program Working Lab) Computation Efficient Learning Lab (Prof. Yeseong Kim)

Q) What made you choose DGIST?

During the undergraduate course of DGIST, we researched UGRP with a topic related to computer engineering. While conducting the study, I aimed to enter graduate school with an interest in computer science and related fields. In particular, I wanted to study more about the subject of alternative computing for AI. So, I participated in the internship program in DGIST graduate labs and learned about the research process and graduate life. When I heard the news of the opening of the artificial intelligence major at the time of graduation, I entered the artificial intelligence major master’s program, which I later transferred to the integrated M.S.-Ph.D. program.

Q) What are the strong points of DGIST and the department of AI Major in Interdisciplinary Studies?

I think DGIST’s biggest advantage is its excellent research facilities, faculty, and research support. The pleasant research environment and supporting system allows me to focus more on research, which is the best aspect as compared to other graduate schools.

Q) What was your most rewarding moment in graduate school?

I organized the topics I studied during the undergraduate and graduate programs and published a paper in a top-tier international academic conference. I also had a chance to attend the conference happening in San Francisco. I think it was a good experience to meet other researchers in related fields and expand my knowledge. This experience was a good motivation for my research and made me decide to keep doing research with great vision.

Q) Explain your research field and purpose at DGIST.

I am studying alternative computing for more efficient artificial intelligence. Recently, the size of models and data used in machine learning are increasing significantly, and the computing resource is not capable anymore to run AI on the current computing systems. We are studying both theoretical approaches and system designs to improve the efficiency of AI for various systems, from servers to edges.

Interview

“An environment is provided to focus on convergence research and research with experts in various fields.”

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Q) What are you planning to do after graduation?

Since I am currently enrolled in the integrated M.S.-Ph.D. program, I plan to pursue long-term research. After graduation, I hope to work as a researcher in a research institute or industry where I can continue impactful AI research.

Q) Please advise our applicants.

Before going to graduate school, you should experience and decide about graduate life through undergraduate research or intern programs. In the process, it is important to make sure that research fits your aptitude and interest. Also, if you are interested in entering graduate school but are not sure about the research field or topic, I think it is important to participate in open labs or related events to obtain as much information as possible.

VII 3. Biomedical Science Engineering Major of Interdisciplinary Studies

02

Departments and Majors

D & M

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Biomedical Science & Engineering Major of Interdisciplinary Studies



The Biomedical Science & Engineering(BMSE) Program in the Department of Interdisciplinary Studies is dedicated to addressing intractable human diseases, particularly those associated with aging, through interdisciplinary research integrating brain engineering, neuroscience, biotechnology, artificial intelligence, robotics, and rehabilitation engineering. Our program aims to cultivate global physician-scientists, biomedical scientists, and engineers who will drive future innovations in healthcare by identifying novel mechanisms underlying various intractable diseases and developing cutting-edge diagnostic and therapeutic technologies. The BMSE program includes top-level professors specializing in life sciences, brain sciences, artificial intelligence, medical imaging, robotics, and rehabilitation engineering across IT, BT, and NT sectors to nurture interdisciplinary talent. The program offers a range of academic tracks, including M.S., Ph.D., Integrated M.S./Ph.D., and physician-scientist programs. Committed to excellence, the BMSE program conducts world-class research, drives innovation in R&D, promotes industry-academia collaboration, and strengthens global competitiveness.

VII

3. Biomedical Science & Engineering

BS & E

Vision

The vision of the Biomedical Science and Engineering program is to cultivate global physician-scientists, biomedical scientists and engineers who will lead future medical innovations to treat intractable human diseases.

Specialization of Our Program

- (1) **Multidisciplinary Curriculum :**
Integrates cutting-edge knowledge in medicine, neuroscience, brain engineering, life sciences, and biomedical engineering to develop new technologies for the treatment of intractable human diseases.
- (2) **MD-Ph.D. and M.S./Ph.D. Programs :**
Offers in collaboration with leading global medical schools and institutes.
- (3) **Innovative Therapeutics and Diagnostics :**
Focuses on developing new therapeutic technologies by elucidating novel mechanisms in life sciences, while also innovating diagnostic and therapeutic medical devices through interdisciplinary research.
- (4) **Translational Research :**
Accelerates the commercialization of research outcomes through close collaboration with hospitals and industries.

Key Research Areas

- (1) **Mechanism and Therapeutic Research for Treatment of Intractable Human Diseases**
 - Regenerative medicine using stem cells, organoids, spheroids, etc.
 - Precision medicine for cancer diagnosis/treatment
 - New drug design for intractable human diseases
 - New technology for Super-resolution microscopy, single-molecule observation, and protein phase separation
 - AI technology for biomarker discovery
 - Mechanism study for treating brain diseases through brain stimulation
- (2) **Brain engineering :**
 - Implantable electronic circuits
 - Non-invasive/minimally invasive technique for brain stimulation and sensing technology
 - Signal sensing and processing/stimulation technology for implantable brain devices
 - High-resolution soft brain interfaces
- (3) **Intelligent medical imaging systems and analysis :**
 - Ultrasound and optical imaging systems
 - AI technology for medical image and signal analysis
 - Edge AI for medical instrumentation
 - Multimodal imaging and analysis technology for biomedical applications
- (4) **Medical robotics and therapeutic support systems :**
 - Biomedical devices such as wearable and implantable sensors and stimulators
 - Robotics and exoskeleton technology for human rehabilitation
 - Surgical robots, navigation systems, and medical virtual/augmented reality systems
 - AI-based diagnostic and therapeutic technologies

Career Development

- (1) Graduate students can pursue careers as researchers or faculty members at research institutes or universities, both domestically and internationally.
- (2) Graduate students in biomedical sciences can join global pharmaceutical companies, including Janssen, AstraZeneca, SK Biopharm, SK Bioscience, Samsung Biologics, and others.
- (3) Graduate students specializing in biomedical engineering can work for leading corporations such as Samsung Electronics, LG Electronics, Siemens, GE, Samsung Medison, and others.
- (4) MD-Ph.D. graduates from our physician-scientist program can become clinical researchers or professors at hospitals, both domestically and internationally.
- (5) Graduate students can also pursue careers in government agencies such as the Ministry of Health and Welfare, the Korea Food & Drug Administration(KFDA), or policy research institutes.

Graduate Programs

- (1) **Physician-Scientist Program**
 - **Integrated M.S./Ph.D. Program** : Open to individuals with a Bachelor's degree or those expecting to obtain one, along with a license in Medicine, Dental Medicine, or Korean Medicine.
 - **Ph.D. Program** : Open to individuals with a Master's degree or those expecting to obtain one, along with a license in Medicine, Dental Medicine, or Korean Medicine.
- (2) **Biomedical Science and Engineering Program**
 - **M.S. or Integrated M.S./Ph.D. Program** : Open to Bachelor's degree holders or those expecting to obtain one.
 - **Ph.D. Program** : Open to Master's degree holders or those expecting to obtain one.

Admission process for Prospective Graduate Students

- Applicants for the government-funded scholarship, DGIST President's Scholarship, and general scholarship for the Master's Program, Integrated M.S./Ph.D. Program, and Ph.D. Program must meet the same eligibility criteria.
- Final candidates invited for on-site or online interviews are selected by the admission committee based on evaluations of application materials.
 - The on-site or online interview is customized to the applicant's major, such as medicine, engineering, or science.
 - Prospective graduate students are expected to demonstrate potential as researchers, global competence, commitment to further education, and strong academic achievements.

Q) What is the background and vision behind the establishment of the Biomedical Science and Engineering Program at DGIST's Interdisciplinary School?

The vision of the Department of Biomedical Science and Engineering is to nurture global physician-scientists who lead innovative medical research to overcome intractable human diseases through biomedical science and engineering. In a research and educational environment that fosters interdisciplinary convergence, students are encouraged to explore the mechanisms of complex diseases using cutting-edge knowledge and to develop new diagnostic and therapeutic strategies through IT, BT, and NT technologies. DGIST promotes collaboration among experts in various fields—life sciences, neuroscience, neuroengineering, artificial intelligence, medical imaging, and robotics—to support students in acquiring world-class research capabilities in biomedical science and engineering. Through partnerships with numerous medical institutions, we also provide practical experiences, offering students unique opportunities to strengthen both their research and clinical competencies.

Q) What academic background is required for students to apply to the Department of Biomedical Science and Engineering at DGIST?

The Department of Biomedical Science and Engineering at DGIST welcomes students from diverse academic backgrounds. As we emphasize interdisciplinary research across medicine, life sciences, and engineering, applicants with expertise in medicine, biology, neuroscience, bioengineering, electrical engineering, computer science, and related fields are all encouraged to apply. Students passionate about tackling human diseases and neurological disorders—particularly through neuroscience, biomedical engineering, artificial intelligence, and robotics—will find this major especially enriching. It also offers an ideal environment for those on the MD-Ph.D. track, supporting the development of both clinical and research competencies. Moreover, DGIST's extensive global research network provides unique opportunities for academic and professional growth. This program is open not only to medical doctors but also to scientists and engineers who aspire to contribute to biomedical innovation.

Q) What are the career prospects for graduates of the Department of Biomedical Science and Engineering at DGIST?

Graduates of our Biomedical Science and Engineering Program have access to a wide range of career paths. After graduation, they may become researchers or faculty

members at universities and research institutes. They also contribute to drug development and precision medicine at global pharmaceutical and biotech companies such as Janssen, AstraZeneca, SK Biopharmaceuticals, and Samsung Biologics. Graduates may work at major corporations such as Samsung Electronics, LG Electronics, Siemens, GE, and Samsung Medison, developing advanced technologies in medical imaging, robotics, rehabilitation devices, and AI-based diagnostics. Those who complete the MD-Ph.D. track can pursue careers as clinical faculty at hospitals or medical schools, engaging in both patient care and translational research. Additionally, opportunities exist in public institutions such as the Ministry of Health and Welfare and the Ministry of Food and Drug Safety, where graduates can contribute to health policy and regulatory affairs. With a strong foundation in interdisciplinary training, our graduates are equipped with global research capabilities and practical expertise to pursue diverse and impactful careers.

Q) What's the unique features of the department of biomedical Science and engineering in DGIST from medical graduate schools in other universities?

We train medical engineers and life scientists with strong backgrounds in AI, neuroscience, brain engineering, and robotics engineering. A key strength of the program is its focus on empirical and clinically oriented research through collaboration with domestic and international medical schools and global universities. DGIST partners with leading medical schools and hospitals in Korea, as well as renowned overseas universities and research institutes such as the University of Oxford, Johns Hopkins, Stanford, USC, Harvard, and Yale. These collaborations allow students not only to gain academic knowledge in an advanced interdisciplinary research environment but also to engage in the development of diagnostic and therapeutic technologies that are directly applicable to real-world medical settings. Through this global network, students acquire research experience in actual clinical environments and participate in hands-on research aimed at developing innovative medical solutions. Based on these collaborations, DGIST supports future medical scientists in building practical problem-solving skills across both clinical and research domains, providing the optimal environment for them to grow into global leaders in medical science.



VII 4. Quantum Information Science of Interdisciplinary Studies

02

Departments and Majors

VII

4. Quantum Information Science

D & M

QIS

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Introduction to the department



The Quantum Information Science major in the Department of interdisciplinary studies aims to address the challenges of the second quantum revolution by advancing research and education in next-generation quantum computing, quantum communication, and related quantum information science technologies. Next-generation quantum technologies explores various physical systems, including photons, atoms, superconductors, semiconductor quantum dots, and solid-state quantum devices, to generate, control, and measure qubits, as well as to study quantum entanglement, quantum gates, and quantum circuit design. Accordingly, the major provides a well-structured environment for both research and education by collaborating with faculty members from various academic backgrounds such as the Department of Physics and Chemistry, the Department of Electrical Engineering and Computer Science, the Department of Robotics and Mechatronics Engineering, and the Department of New biology et al, and utilizing DGIST's state-of-the-art research infrastructure. Furthermore, we aim to establish itself a leading hub for quantum information science research and education by actively strengthening industrial and global collaborations.

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Vision

- (1) **Lead the Second Quantum Revolution** : Establish a research and education hub at the forefront of the Second Quantum Revolution.
- (2) **Cultivate Innovative Talent** : Nurture creative, interdisciplinary talent with a strong foundation in fundamental knowledge.

Key Areas of Research

- (1) Quantum algorithm and software development
- (2) Research on quantum computing based on photonic integrated circuits
- (3) Research on fabrication of quantum interference circuits using topological quantum gates
- (4) Development of topological superconductors and two-dimensional heterojunction devices for error-free quantum circuits
- (5) Fabrication and measurement of spin qubit devices
- (6) Research on ultrafast control of quantum qubits using lasers
- (7) Quantum sensing using ultrafast spectroscopy
- (8) Research on super-resolution bioimaging using quantum entanglement
- (9) Research on exciton-polariton-based quantum information devices
- (10) Design and safety analysis of quantum-resistant cryptography
- (11) Study of the time-dependent evolution of quantum information

Career Paths

- (1) Professors and researchers at major domestic and international universities and research institutes
- (2) Conduct research at government-funded quantum technology research institutes(KIST, ETRI, KAERI, KISTI, ADD, NSR, etc.) and private research institutes
- (3) Employment at global quantum technology companies(Google, IBM, Microsoft, intel, D-wave etc), and domestic semiconductor and IT companies(Samsung Electronics, SK Hynix, LG Electronics, etc.)
- (4) Founding startups based on quantum computing, quantum sensing, and quantum cryptography
- (5) Planning and researching quantum technology policies at government agencies or policy research institutes

The Interview Process

- (1) Selection of final successful candidates through stage 1 document review and stage 2 interview assessment
- (2) Interviews consist of presenting one's own research or reviews of others' research papers, followed by related questions and answers
- (3) Evaluation of potential for growth as a researcher, academic achievement, willingness to pursue higher education, and global competency

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What topics are studied in the Department of Physics and Chemistry?

The quantum information science major conducts research in various fields such as quantum computing, quantum sensing, quantum communication, and quantum materials. In particular, we are developing quantum algorithms and software, studying quantum dynamics, fabricating quantum interference circuits using topological quantum gates, developing topological superconductors and two-dimensional heterojunction systems for error-free quantum circuit realization, and researching quantum computing based on photonic integrated circuits. Also we are fabricating and measuring spin qubit devices, ultrafast control of quantum qubits using lasers, developing quantum sensing technologies using ultrafast spectroscopy, researching ultra-high-resolution bio-imaging using quantum entanglement,

and researching exciton-polariton-based quantum information devices. Furthermore, we are designing and analyzing quantum-resistant cryptography and studying the time evolution of quantum information to develop safe and efficient quantum communication technologies. Quantum materials explores new materials for quantum computing and quantum sensing, and is laying the foundation for the second quantum revolution through the realization and understanding of quantum states. In these superposed and entangled research topics, students will experience the process of moving research activities from thesis to the lab to the industrial field. They will also have the opportunity to collaborate and compete with other research groups at home and abroad, and grow as world-class researchers.



Keeseong Park

Department of Physics and Chemistry

Education) Ph.D University of Texas at Austin
Laboratory) Novel Quantum Materials Laboratory

Q) What is the background and vision for the establishment of the Quantum Information Science major in the Interdisciplinary Studies Department at DGIST?

The Quantum Information Science major was established in response to the Second Quantum Revolution, with the mission of leading future research and education in quantum technologies. Quantum computing, quantum sensing, quantum communication, and quantum materials represent transformative paradigms that go beyond the limits of conventional information technologies. These emerging quantum technologies are expected to play a pivotal role across a wide range of industries in the near future. In line with this global movement, the Quantum Information Science major at DGIST integrates diverse disciplines—including Physics and Chemistry, Electrical Engineering and Computer Science, Robotics and Mechatronics Engineering, and New Biology—to pioneer next-generation quantum technologies and establish a robust environment for practical research and education. As the international race in quantum innovation accelerates, it is imperative for Korea to cultivate top-tier talent and foundational research capabilities. Through strong academia-industry-government collaboration and international partnerships, the program aims to conduct world-class research and foster creative, interdisciplinary leaders who can advance and apply quantum technologies across emerging fields.

Q) What background do students need to have in order to apply for the Quantum Information Science major at DGIST?

The DGIST Quantum Information Science major is an interdisciplinary field encompassing a wide range of quantum-related research, including quantum computing, quantum sensing, quantum communication, and quantum materials. Students from diverse academic backgrounds—such as physics, electrical engineering, computer science, mathematics, materials science, chemistry, and bioengineering—are encouraged to apply. Most importantly, the major welcomes individuals from any field who have a strong interest in quantum science, along with a passion for research and a spirit of innovation and challenge.

Interview (Major chair professor)

“Do you want to dive into the 2nd Quantum Revolution? This is the place. Join us!”

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Q) What career paths are available after graduating from the Quantum Information Science major at DGIST?

Graduates of the DGIST Quantum Information Science major can pursue a wide range of career paths. They may become professors or researchers at leading universities and research institutes both in Korea and abroad, and have opportunities to work at government-funded and private research centers specializing in quantum technologies, such as KIST, ETRI, KAERI, KISTI, ADD, and NSR. In addition, graduates may pursue careers at global quantum technology leaders such as Google, IBM, Microsoft, Intel, and D-Wave, as well as top domestic companies including Samsung Electronics, SK hynix, and LG Electronics. They are also well-equipped to launch innovative startups in quantum computing, sensing, or cryptography, and contribute to national quantum policy and strategy development through roles in government agencies and think tanks.

VIII. 공학전문대학원 첨단기술공학과

02

Admissions Process

영문 내용 없음

Admissions Process

II

Scholarships

전공 소개

DGIST 공학전문대학원 첨단기술공학과는 지역 산업의 복합적인 문제를 해결하고, 차세대 고급 공학 인재를 양성하기 위해 설립되었으며, 실무와 이론을 겸비한 첨단기술 분야의 전문 인재를 배출하여 지역 및 국가의 발전에 기여하는 것을 목표로 합니다.

주요 교육 프로그램은 수요자 중심의 프로젝트 기반 학습을 통해 이론과 실습을 통합하여 학생들의 비판적 사고, 문제 해결 능력, 커뮤니케이션, 협업 역량을 체계적으로 향상시키도록 설계되었으며, 이를 통해 실질적인 문제 해결 역량과 혁신적인 사고를 갖출 수 있도록 교육합니다.

비전

- (1) 첨단기술 분야의 전문 기술을 보유한 미래 인재 양성
- (2) 지역 주력산업의 혁신 주도형 인재 양성
- (3) 현장 난제 해결 능력이 뛰어난 인재 양성
- (4) 기업이 정신을 함양한 인재 양성

중점연구 분야

- (1) 기본적으로 기업 문제 해결을 위한 DGIST의 모든 공학 분야를 포함하며, 구체적으로 아래와 같은 분야를 포함합니다
- (2) 반도체·디스플레이, 인공지능·기계학습, 의료공학, 첨단로봇공학, 나노시스템공학, 신소재공학, 기계·전자공학, 소재·부품·장비공학, 바이오공학, 모빌리티공학, 에너지시스템공학, 기타 지역산업에 특화된 분야.

본 교육과정은 기업 재직자를 중심으로 설계되었으며, 졸업 후에는 지역 산업과 국가 발전을 선도하는 세계적 경쟁력을 갖춘 공학 리더로서 중추적인 역할을 수행할 수 있습니다.

면접전형 내용

- (1) 서류 심사, 면접 심사를 통해 최종 합격자 선정
- (2) 면접에서는 지원자가 현재 회사에서 수행 중인 업무와 본 학과에서 계획 중인 연구를 발표 및 연구 내용과 관련된 질의응답을 진행하며, 이를 통해 연구자로서의 발전 가능성, 글로벌 역량, 문제 해결 의지 등을 종합적으로 평가합니다.

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학과에서는 무엇을 연구하나요?

본 학과에서는 차세대 고급 공학 리더를 양성하기 위해 산업 현장에서 발생하는 복합적인 문제를 해결하는 맞춤형 교육과 기업 현장 난제 해결 프로젝트를 진행합니다. 특히 학생들은 지도교수와 팀을 이루어 기업의 실제 문제를 정의하고 해결하는 과정을 학습하며, 이를 통해 산업계에서 선도적인 역할을 할 수 있는 역량을 배양합니다. 다양한 배경의 학생 간 네트워킹을 장려하며, 다학제적 접근법과 맞춤형 커리큘럼을 통해 연구 주제와 관심 분야에 최적화된 교육을 제공합니다. 또한, 산업계와 긴밀히 연계된 문제 해결형 교육을 통해 실질적인 기술적 난제 해결 프로젝트를 통해 현장문제 분석과 해결 능력을 배양하며, 복수 교수팀의 지도 아래 공학적 접근방법을 최적화하여 글로벌 경쟁력을 갖춘 인재를 양성합니다.

학과의 연구실에 대해서 알고 싶어요.

DGIST 공학전문대학원 첨단기술공학과에서는 학생들이 자신의 연구 관심 분야와 기업에서 수행하는 프로젝트에 맞춰 최적의 연구 환경에서 학습할 수 있도록 다양한 분야의 지도교수를 학생과 매칭하고 있습니다. 예를 들어 본 학과의 대학원생은 DGIST 교수진(교수/연구원) 전체를 대상으로 지도교수를 선정할 수 있으며, 학생의 전공 및 기업 연구 분야와의 연계를 고려하여 적절한 연구실과의 매칭이 이루어집니다. 연구실에서는 산업 현장의 실질적인 문제 해결을 중심으로 연구가 진행되며, 학생들은 지도교수 및 연구팀과 협력하여 기업 현장의 문제를 핵심으로 하는 난제 해결 프로젝트 연구를 수행합니다. 위의 중점 교육 및 연구분야에서 언급되었듯이 현재 학과에서 연구할 수 있는 주요 분야는 반도체·디스플레이, 인공지능·기계학습, 의료공학, 첨단로봇공학, 나노시스템공학, 신소재공학, 기계·전자공학, 소재·부품·장비 공학, 바이오공학, 모빌리티공학, 에너지시스템공학, 기타 지역산업에 특화된 분야로, 지도교수가 운영 하는 연구실에서는 해당 분야의 최첨단 연구와 교육이 활발히 진행되고 있습니다.



IX Graduate School of Technology and Innovation Management

02

Departments and Majors

D & M

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IX

Graduate School of Technology and Innovation Management

TIM

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Program Overview

The Department of Technology and Innovation Management(TIM) at DGIST is a master's program designed to cultivate professionals who will lead management innovation in the AI era by integrating science, technology, and management.

Going beyond the limitations of traditional MBA programs, the curriculum offers a balanced education combining management studies, mathematical and analytical methodologies, artificial intelligence and advanced engineering, and technology management.

Students develop into managers who understand technology and engineers who understand management, gaining the capability to connect technological innovation with real-world business and industrial applications.

Vision

The vision of the DGIST Department of Technology and Innovation Management is to nurture globally competitive, interdisciplinary leaders who spearhead science- and technology-driven management innovation.

By educating talents who can understand AI and advanced engineering and translate them into strategic management and innovation, the program aims to cultivate future leaders who create new value in rapidly changing industrial environments.

Key Areas of Education

- (1) Technology management and innovation strategy
- (2) AI-driven management and data analytics
- (3) Quantitative and analytical decision-making methodologies
- (4) Technology commercialization, R&D strategy, and new business development
- (5) Integration of advanced engineering(AI, robotics, etc.) and management
- (6) Practice-oriented education through industry-academia collaboration projects
- (7) AI utilization capabilities and data-driven problem-solving skills

Career Paths After Graduation

- (1) Strategy, planning, R&D management, and technology planning roles in large corporations and mid-sized enterprises
- (2) AI- and data-driven new business development and digital transformation roles
- (3) Technology startup entrepreneurship and technology commercialization
- (4) Consulting, venture capital(VC), and technology policy or planning roles in public and research institutions
- (5) Doctoral studies and careers in research and education

Interview Evaluation

- (1) The interview evaluates applicants comprehensively based on their academic fit, learning and research potential, career goals, and interdisciplinary thinking.
- (2) The interview focuses on applicants' interest and understanding of AI and technology management, motivation for applying, academic and career plans, and approaches to problem-solving.
- (3) Rather than specific disciplinary knowledge, greater emphasis is placed on applicants' potential and willingness to bridge technology and management.

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What Does the Department Research?

The Department of Technology and Innovation Management conducts research on how technological innovation impacts firms and industries, and how such innovation can be effectively translated into management strategies. The department emphasizes research that goes beyond theory and is closely linked to solving real-world industrial problems.

- **Key Research Topics :**
AI- and data-driven managerial decision-making, analysis of technological innovation and industrial transformation, technology commercialization and new business creation, R&D strategy and technology portfolio management, and integration models of engineering and management.

Q) About Research Labs.

Unlike typical engineering graduate programs, the Department of Technology and Innovation Management does not operate a single-lab affiliation system. Students are not assigned to a specific laboratory; instead, they freely take courses from faculty members with diverse academic backgrounds and participate in industry-academia collaboration projects, research initiatives, and technology commercialization projects according to their interests. This structure enables flexible, personalized learning and research tailored to each student's career goals and interests.



CAMPUS MAP

- E 1** Main Administration Building
- E 2** Department of Physics and Chemistry
- E 3** Department of Electrical Engineering and Computer Science
- E 4** Department of Brain Sciences
- E 5** Department of New Biology
- E 6** Department of Robotics and Mechatronics Engineering

- E 7** Department of Energy Science and Engineering
- E 8** Interdisciplinary Studies Department
- E 14** Central Library
- E 15** Green House
- E 16** Outdoor Concert Hall
- R 1** Student Clubs Building

- R 2** Research Administration Building
- R 3** Nano-Bio Technology Research Building
- R 4** Energy Research Building
- R 5** Robotics System and IT Convergence Research Building
- R 6** Center for Next-Generation Convergence Research

- R 7** Institute of Next-Generation Semiconductor Convergence Technology
- S 1** University-Industry Cooperation Center Sports Complex
- H 201-297** Student Dormitory
- H 501** Global Residence

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