

ADVANCING THE SUSTAINABLE DEVELOPMENT GOALS

A KYUNGPOOK NATIONAL UNIVERSITY INITIATIVE

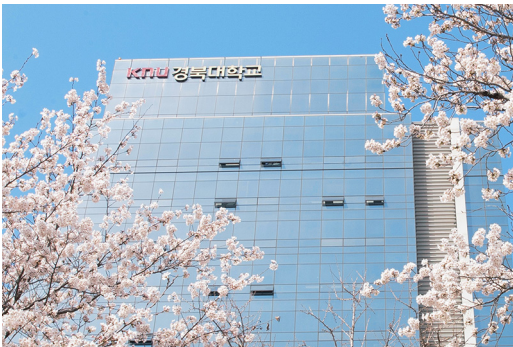
2021-2022





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Credits for the brochure
Sustainable Development Cooperation 2022

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“*Kyungpook National University is one of the most prestigious universities in Korea today, ranked 13th in world and 1st in Korea in the University Impact Rankings 2022 announced on April 27th by Times Higher Education, a global university evaluation agency in the UK.*”

INTRODUCTION TO KYUNGPOOK NATIONAL UNIVERSITY (KNU)

Truth, pride, and service remain the strong values underlying the educational philosophy at Kyungpook National University (KNU). Worldcentric and knowledge-driven, KNU has included innovation as a strong component within its overarching vision. The university strongly emphasizes research and world-class educational facilities, and fosters specialized fields. Established in 1946, KNU places utmost importance on investing in the development of human resources and the production of talented leaders with cultural insight and a strong base in scientific knowledge. KNU continues to inspire the country and the world with its fierce commitment to bringing change and innovation to human life.

SDGs AT KNU

The past year has been a landmark year for KNU, with numerous awards, achievements, and global acknowledgements. The university has ensured that all of its goals are in alignment with the Sustainable Development Goals (SDGs) as adopted by the UN. In the Times Higher Education World University Impact Assessment, KNU was ranked 6th in the world for Sustainable Cities and Communities (SDG 11), 13th for Zero Hunger (SDG 2), and 21st for Industry, Innovation and Infrastructure (SDG 9) as well as Decent Work and Economic Growth (SDG 8). This assessment evaluates the publicness of universities to solve global challenges, and the evaluation criterion is the contribution of the university to the achievement of the 17 SDGs. KNU has contributed to creating employment opportunities, facilitating innovation and corporate growth, and promoting business capacity building, and is actively engaging with the community and local culture. This report details KNU's active practices and commitment to the nation and global community through its programs.



ABOUT KNU





NO POVERTY



01

ENTREPRENEURSHIPS

Kyungpook National University (KNU) has mandated that a share of the required student coursework be dedicated to entrepreneurship. It has moreover opened 60 elective courses on the subject. Annually, KNU operates around 20 startup camps and competitions. At present, KNU is operating about 30 startup clubs, each with a mentor group to nurture their skills.

STARTUPS

KNU students have also been awarded numerous prizes at the 6th Global Innovator Festa, one of the biggest startup contests in Korea. They have also won accolades at the 3 Korean Peninsula Agricultural Life Forum Awards, 2021 Korea Technology Business Model Contest, Korea Expressway Corporation startup contest and the 2021 ClubG-Star League.

657–676 million people around the world are projected to be living in extreme poverty in 2022.

SCHOLARSHIPS

KNU has received an endowment of 505 million won for a scholarship fund from the family of the late Chairman Lee Jong-dae to foster future generations of students from underprivileged families.

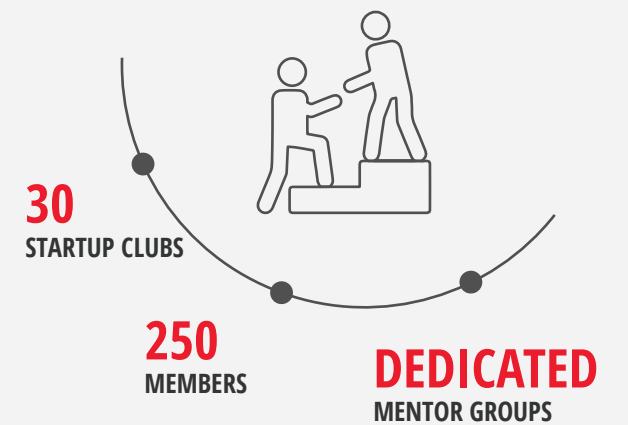
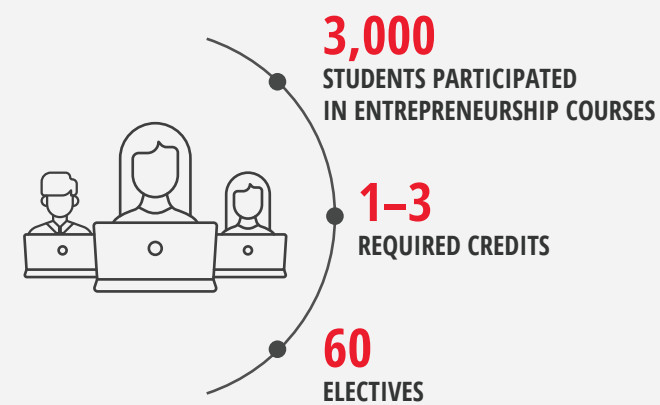
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“In the heyday of startup, KNU recognizes student entrepreneurship as a field of career guidance and supports it in various ways in line with the changing times as a national hub in education.”

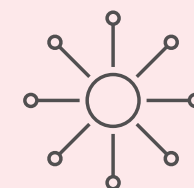
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—Ji-hyeon Kim
Head of Research, Industry, and Academia

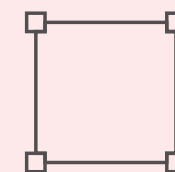
ENCOURAGING ENTREPRENEURSHIP TO ELEVATE PEOPLE OUT OF POVERTY



INCUBATION SPACES TO HELP WITH PLANNING, MARKETING, AND MENTORING



KNU STARTUP HUB CENTER



KNU STARTUP SQUARE



KNU STARTUP VILLAGE



ZERO HUNGER



02

TRAINING

Kyeongpook National University (KNU)'s College of Ecology and Environment has been selected for the "2021 Agricultural University Training Project" organized by the Ministry of Agriculture, Food and Rural Affairs (MAFRA). The project, funded by the government, aims to nurture future professional farmers by providing facilities and equipment necessary for high-tech agricultural education. This includes agricultural school practices and smart farms.

TECHNOLOGY & INNOVATION

The Agricultural Machinery Development and Research Center at KNU is conducting the "1st AI Education for Agricultural Machinery Digitalization" to nurture prospective talent in the field of agricultural machinery.

Co-hosted by the Smart Agricultural Innovation Center, Korea Precision Agricultural Society, and Korea Agricultural AI Research Society, this training will focus on:

- Designing an unmanned agricultural machine platform
- Analyzing and predicting big data based on precision agriculture
- Optimizing agricultural work for fertilization, control, settling, and harvest machines
- Developing intelligent machines through machine learning



Nearly **690 million** people or **8.9%** of the world population go to bed hungry according to current estimates.

RESEARCH

KNU has opened the "College of Agriculture and Life Sciences Building No. 4," which will serve to promote research and development in agricultural life science and related academics.

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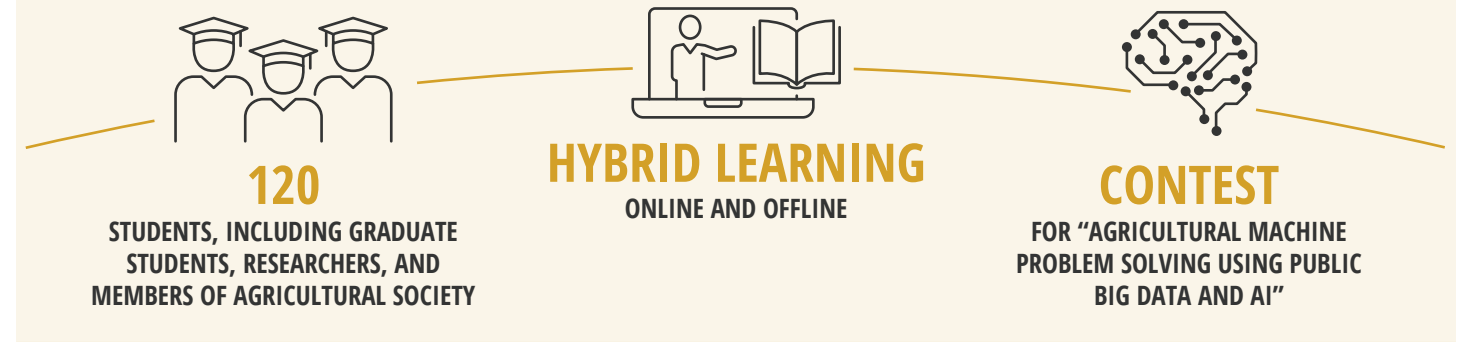
"Building 4 is the result of endless innovation efforts to secure new growth engines in agriculture, and it will become a core foundation for strengthening domestic agricultural competitiveness."

”

—**Won-hwa Hong**
President, KNU

INNOVATING AGRICULTURE TO ERADICATE WORLD HUNGER

AGRICULTURAL UNIVERSITY TRAINING PROJECT



LEADING THE ECO-FRIENDLY LIVESTOCK INDUSTRY

A COMBINATION OF ADVANCED ANIMAL WELFARE MANAGEMENT SYSTEM AND ICT SYSTEM



THREE DEPARTMENTS FROM KNU'S COLLEGE OF ECOLOGY AND ENVIRONMENT TO PARTICIPATE: LIVESTOCK, LIVESTOCK BIOTECHNOLOGY, AND EQUINE/SPECIAL ANIMALS

TOTAL PROJECT COST OF **600 MILLION WON**

COLLEGE OF AGRICULTURE AND LIFE SCIENCES BUILDING

- SMART CLASSROOMS
- GLOBAL LOUNGES
- CUTTING-EDGE LABORATORIES



- RESEARCH ROOMS
- OUTDOOR GARDEN
- OPEN COURTYARD

TOTAL PROJECT COST OF **26 BILLION WON**



GOOD HEALTH AND WELL-BEING

03

DISCOVERY

Medical Professor Bae Jae-seong, Veterinary Medicine Professor Jin Hee-kyung, and Pharmacy Professor Song Im-sook at Kyungpook National University (KNU) have discovered a small molecule, KARI 201, that improves the neurological abnormalities of Alzheimer's disease and is effective in memory recovery. This study was published on the 18th of January in the international academic journal *Proceedings of the National Academy of Sciences of America (PNAS)*.

ACHIEVEMENTS

Six KNU professors have been elected as full members of the National Academy of Medicine. The six elected this time include Kim Yong-rim, Lee Je-cheol, and Park Jae-chan of the College of Medicine, Bae Yong-cheol and Jeon Young-hoon of the College of Dentistry, and Jin Hee-kyung of the College of Veterinary Medicine. The National Academy of Medicine is the most prestigious academic organization in the field of medicine in Korea. Only medical scientists with remarkable achievements in the fields of Korean medicine and public health are elected as members.

Over 40 percent of all countries have fewer than **10 medical doctors per 10,000 people.**

“

"If the KARI 201 discovered through this research is put to practical use, it will show unrivaled efficacy as a drug to improve memory by normalizing various neuropathological features of Alzheimer's disease in the future."

”

—Jae-seong Bae
Medical Professor, KNU

CONTRIBUTING TO GLOBAL HEALTH THROUGH NEW DISCOVERIES IN MEDICINE

RESEARCH AND DISCOVERY TOWARDS BATTLING ALZHEIMER'S DISEASE



CAUSE

ALZHEIMER'S DISEASE IS CAUSED BY THE ACCUMULATION OF BETA-AMYLOID PROTEIN IN THE BRAIN, RESULTING IN DECREASED MEMORY ABILITY



RESEARCH

THE RESEARCH TEAM AT KNU DISCOVERED 'KARI 201'



TRIALS

ACID SPHINGOMYELINASE (ASM) HYPERACTIVITY WAS SUPPRESSED IN ALZHEIMER'S ANIMALS INJECTED WITH KARI 201



RESULTS

KARI 201 IMPROVES THE NEUROLOGICAL ABNORMALITIES OF ALZHEIMER'S DISEASE AND IS EFFECTIVE IN MEMORY RECOVERY

PRESTIGIOUS NATIONAL ACCLAIM AND RECOGNITION FOR KNU PROFESSORS

6 KNU PROFESSORS ELECTED AS FULL MEMBERS OF THE NATIONAL ACADEMY OF MEDICINE



450+ PAPERS PUBLISHED BY SELECTED PROFESSORS

MULTIPLE NATIONAL R&D PROJECTS



MULTIPLE DOMESTIC AND FOREIGN PATENTS



OUTREACH

The 2021 East Asia IB International Conference will be conducted online on October 30th by the College of Education, Kyungpook National University (KNU) and the Conference’s Organizing Committee in collaboration with the Japan IB Education Association. The focus of this conference will be the introduction and application of the International Baccalaureate (IB) program and the future direction of education in Korea, Japan, China, and Hong Kong. The IB program is an internationally accredited educational program offering an innovative curriculum that differs from traditional education. It is currently recognized as a national curriculum in Korea.

ACHIEVEMENTS

The Kyungpook National University (KNU) library has been selected as the “Best Group” in the “2020 National University Library Assessment,” which is organized by the Ministry of Education and conducted by the Korea Education and Research Information Service. The library was evaluated on the basis of 24 indicators in 4 areas and was awarded excellent grades in research support service, education support service, academic information access and inclusive service, and library cooperation.



Over 24 million learners globally may never return to school due to the COVID-19 pandemic.

“

“This conference is expected to have important implications for the innovation of training at schools that nurture current and future teachers.”

”

—Hyung-seop Hyun
Head, Affiliated Secondary Education Research Institute

OUTREACH AND RESOURCE SHARING FOR QUALITY EDUCATION

2021 EAST ASIA IB INTERNATIONAL CONFERENCE



3 SPECIAL GUESTS
KANG EUN-HEE, SUPERINTENDENT, DAEGU METROPOLITAN CITY
LEE SEOK-MOON, SUPERINTENDENT, JEJU GOVERNING PROVINCE
KANDO ERIGUCHI, PRESIDENT, JAPAN IB EDUCATION ASSOCIATION

2 PRESENTATION SESSIONS
MAJOR IB-RELATED RESEARCHERS FROM KOREA, CHINA, JAPAN, AND HONG KONG



NATIONAL UNIVERSITY LIBRARY ASSESSMENT

382
UNIVERSITY LIBRARIES ASSESSED



KNU LIBRARY SELECTED AS THE “BEST GROUP” AS A PART OF THE TOP 20% OF 69 UNIVERSITIES IN GROUP A*

*COLLEGES WITH >10,000 STUDENTS



3.4 MILLION
BOOKS



2ND LARGEST COLLECTION AMONG UNIVERSITIES IN THE COUNTRY



GENDER EQUALITY

05



Women's share in national parliaments has increased at a dismal rate from 22.4% in 2015 to **26.2%** in 2022.

DISCOVERY

Kyungpook National University (KNU)'s Diversity Committee, which was inaugurated in November 2021, issued a statement of commitment "toward a future of mutual respect and coexistence through diversity." KNU, which is a leading university on the global stage, has more than 1,000 international students, teachers, and researchers from varied backgrounds. The Committee emphasized that it will strive to improve the awareness of all parties in the university, develop policies to protect and promote diversity within the university, and create a university culture that contributes to social harmony and development. The Committee has been playing a role in collecting opinions on diversity protection, such as promoting gender equality, developing educational programs to spread the value of diversity, and providing advice and suggestions on related policies.

OUTREACH

The Korea Humanities Promotion Center at KNU organized a discussion on "Speaking of the *Idaenam* Phenomenon: Youth Life and Politics." This discussion was hosted by the Democracy Professors Association of KNU. In the presentations and discussions, participants criticized and debated the analysis of gender conflict. The need for diversified discussions to resolve conflicts was also raised.

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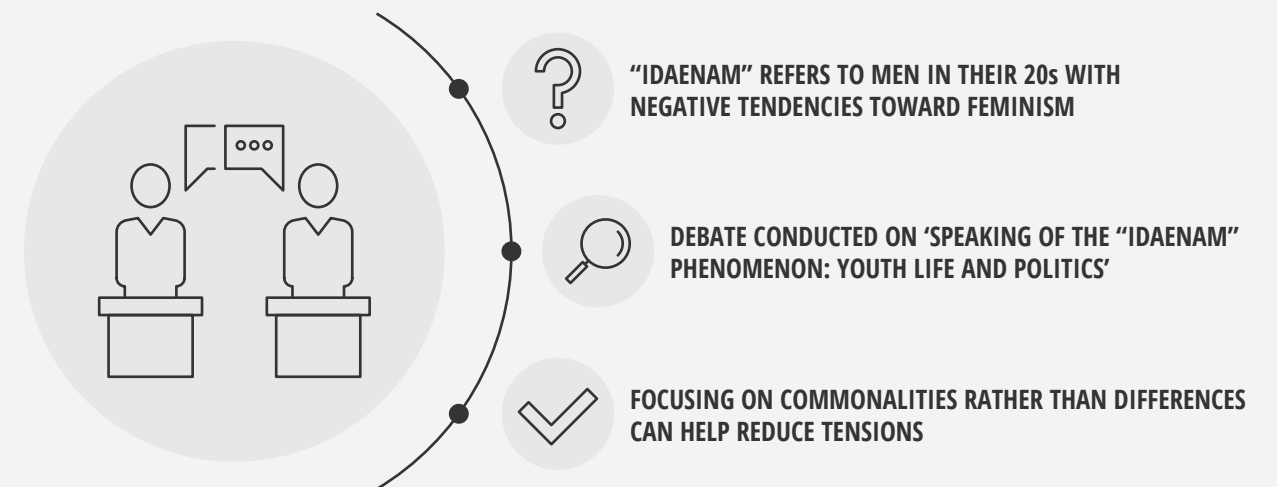
"The recognition of diversity is a necessary condition for dialogue and compromise to resolve conflicts in a democratic society."

—KNU's Diversity Committee

”

DIALOGUE AND DISCUSSION TOWARD GENDER EQUALITY

GENDER CONFLICT AND THE "IDAENAM" PHENOMENON



DIVERSITY AT KNU



CLEAN WATER AND SANITATION



06

RESEARCH

In a joint research effort, Professor Changmin Park of Kyungpook National University (KNU), Korea, and Professor Yeomin Yoon of the University of South Carolina, USA, have recently developed an advanced water treatment technology that can decompose 99.9% of naproxen—an anti-inflammatory and analgesic drug—in an hour using hybrid nanoflower materials. This can greatly boost existing sewage treatment facilities, which cannot filter naproxen effectively. The research was carried out in the Talent Nurturing Center of the 4th stage of the BK21 Smart Circulation and Environmental System at KNU and the Environmental Nano Convergence Lab. It received funding from the National Research Foundation of Korea’s support project for university research institutes in science and engineering, and a support project for senior researchers.

INNOVATION

A research team led by Professor Woong Kim of the Graduate School of Construction, Environment, and Energy Engineering at KNU has developed, in collaboration with King Saud University in Saudi Arabia, a photocatalyst that decomposes >98% of colored dye wastewater in just an hour. The designed catalyst is recyclable and, therefore, eco-friendly. Moreover, its application is not limited to organic dyes but can potentially be extended to other organic substances in wastewater.



In 2030, 1.6 billion people will lack safely managed drinking water and 2.8 billion people will lack safely managed sanitation.

“

“If the next-generation water treatment technology is actively used, the enormous cost, time, and energy required to treat naproxen remaining in the environment will be dramatically reduced. In particular, this study is expected to apply to the removal of other water-based pharmaceutical substances.”

”

—Changmin Park
Department of Environmental Engineering, KNU

INNOVATING WATER TREATMENT SOLUTIONS FOR CLEAN WATER

COST-EFFECTIVE ADVANCED WATER TREATMENT SYSTEM



SONO-PHOTOCATALYTIC DEGRADATION PROCESS APPLIED TO MULTI-COMPONENT HIERARCHICAL HYBRID CATALYST MATERIAL

SYNTHESIZED BY DOPING MOLYBDENUM DISULFIDE (MoS₂) NANOSTRUCTURES WITH CERIUM OXIDE-ZIRCONIA (CeO₂-ZrO₂) DOUBLE METAL OXIDE CRYSTALS



MULTI-COMPONENT HYBRID NANOPARTICLES ABSORB PHOTO-ULTRASONIC ENERGY

MAXIMIZES THE GENERATION OF REACTIVE OXYGEN SPECIES AND REMOVES 99.9% OF NAPROXEN WITHIN ONE HOUR



PHOTOCATALYST THAT IMPROVES THE EFFICIENCY OF DYE WASTEWATER TREATMENT

PHOTOCATALYST TECHNOLOGY HAS LIMITATION IN IMPROVING THE DECOMPOSITION EFFICIENCY



MoS₂, A PHOTOCATALYST DEVELOPED BY THE RESEARCH TEAM, PHOTO-DECOMPOSES WATER WHEN EXPOSED TO LIGHT. IT ALSO CREATES OH RADICALS WITH STRONG OXIDIZING POWER, WHICH DECOMPOSES POLLUTANTS

DEVELOPED PHOTOCATALYST

CONVENTIONAL PHOTOCATALYST



TREATMENT EFFICIENCY OF
98%
OR MORE

TREATMENT EFFICIENCY OF
ABOUT
80%

EFFECTIVE WITHIN AN HOUR

REQUIRES SEVERAL HOURS



AFFORDABLE AND CLEAN ENERGY

07

RESEARCH

A new solution technology to make high-quality thin films of organic-inorganic hybrid materials used in next-generation solar cells and photoelectric devices has been developed by a research team from Kyungpook National University (KNU). The team from the Department of Materials Science and Engineering—led by Professor Sang-wook Lee of KNU and Professor Dong-hoe Kim of Korea University—conducted a joint study that resulted in the development of a technology for producing high-quality organic-inorganic hybrid perovskite thin films using new solvents. This study was carried out with support from the National Research Foundation of Korea's material convergence technology development project and the senior researcher support project.

OUTREACH

In a bid to accentuate and support the government's efforts to achieve carbon neutrality by 2050, KNU declared the creation of a "2040 carbon-neutral campus" in partnership with Daegu Metropolitan City, Hyundai Electric, and Taeyoung E&C. KNU has set the tone for the promotion of carbon neutrality and the local energy industry by being the first national university to declare and execute the "Carbon Neutral Campus Project." With administrative support from local government and funding from the private sector, plans are underway for the establishment of a new and renewable energy-based carbon-neutral campus by 2040.

Progress in energy efficiency is currently **1.9%** but it needs to speed up to **3.2%** to achieve global climate goals.

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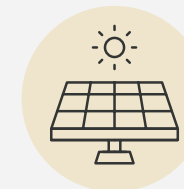
"For the place we live in to be a good place for future generations, we must place great value on saving the earth. To this end, KNU will create a carbon-neutral campus that makes actual carbon dioxide emissions '0' for the first time in a public university through specific practices."

”

—**Won-hwa Hong**
President, KNU

COMMITTING TO A CARBON-FREE FUTURE

NEXT-GENERATION SOLAR CELL



PEROVSKITE SOLAR CELL (PSC) USES AN ORGANIC-INORGANIC HYBRID HALIDE WITH A PEROVSKITE CRYSTAL STRUCTURE AS A LIGHT-ABSORBING MATERIAL



EXCELLENT PHOTOELECTRIC
CONVERSION EFFICIENCY



LOW PRODUCTION COST



SIMPLE PROCESS

CARBON-NEUTRAL CAMPUS

PILOT PROJECT TO CREATE PRIVATE-LED NEXT-GENERATION ENERGY INDUSTRY ECOSYSTEM



KNU'S AIMS



CONSTRUCTION OF ZERO-ENERGY BUILDINGS
AND CAMPUS MICROGRIDS



NURTURE **1,000** EXPERTS IN ENERGY
CONVERGENCE FOR CARBON NEUTRALITY



CREATING A LOW-CARBON ENERGY ENVIRONMENT



FOSTERING TALENT AND INDUSTRIALIZATION



NET ZERO EMISSION BY **2040**



08

ACHIEVEMENT

Kyungpook National University (KNU)'s Incubation Center has received the best grade in the “2021 Startup Incubation Center Management Evaluation of the Ministry of SMEs and Startups,” which is conducted annually for startup incubators across the nation to support and review the performance of small and medium-sized enterprises (SMEs) in the early stages of their business. KNU’s Incubation Center has been awarded the S grade for 17 consecutive years since 2005, including this year. It facilitates a one-stop support program in various fields such as investment, global expansion, distribution, government R&D connection, and marketing, for innovative companies.

OUTREACH

KNU launched the “Green Remodeling Regional Platform for the Gyeongsang Area” to create a regional industrial ecosystem and strengthen the capabilities of the green remodeling project for public buildings. The Green Remodeling regional platform project is operated and supported by the Korea Authority of Land & Infrastructure Safety, and the regional platforms (Gangwon, Seoul, Chungcheong, Jeolla, and Gyeongsang) will successfully implement the project and promote business-related awareness and project expansion. This project aims to improve public and medical facilities for the socially underprivileged as well as indoor air quality and energy efficiency.



Global unemployment is expected to remain above pre-COVID-19 levels at 6.2% until at least 2023.

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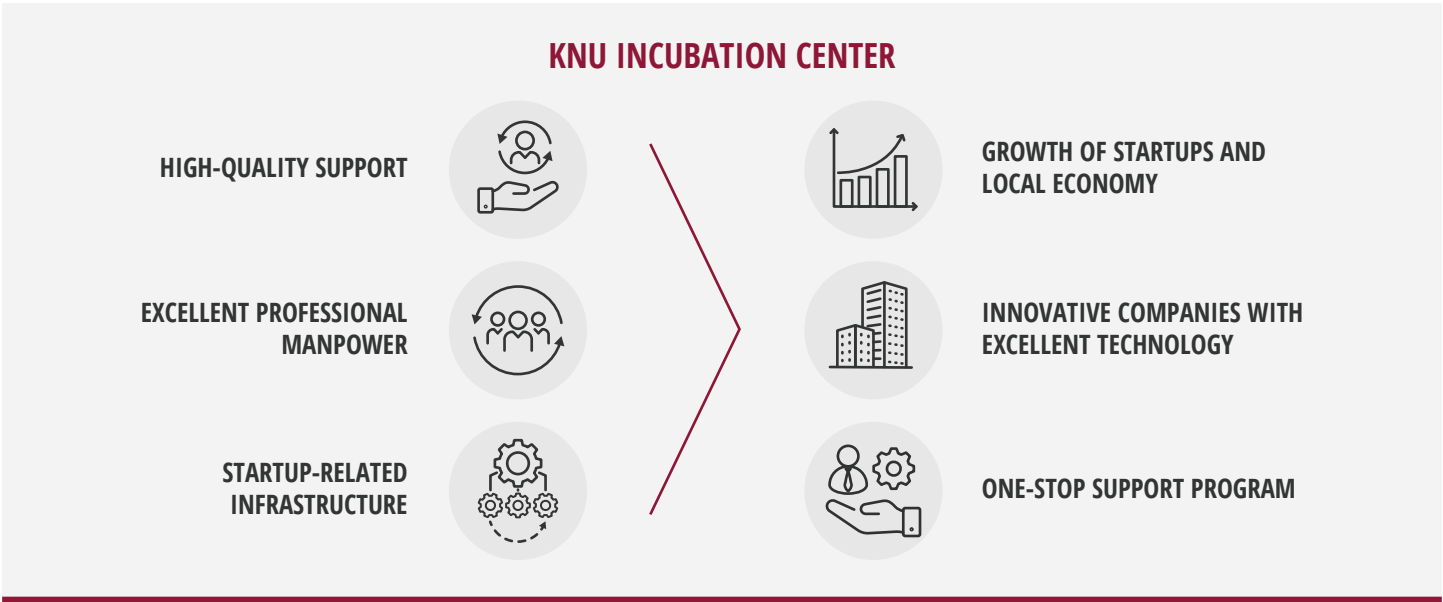
“For the eco-friendly modification of public buildings, the resources and knowledge possessed by various institutions must be flexibly utilized, and cooperative governance between participating parties needs to be systematically established. We will spare no effort in nurturing human resources and providing technical support for the successful implementation of this project”

”

—Won-hwa Hong

President, KNU

STARTUP SUPPORT TO REVITALIZE THE ECONOMY





INDUSTRY, INNOVATION AND INFRASTRUCTURE

09



2 in 3 small manufacturers have been negatively impacted by the global crisis due to a lack of access to financial support for recovery.

OUTREACH

Kyungpook National University (KNU) has entered an agreement with the Daegu Convention Bureau to foster the local “Meetings, Incentives, Conferences and Exhibitions (MICE)” industry and revitalize the local economy. This agreement includes concrete details to foster the MICE industry via educational courses, encouraging student participation in international conferences and promoting the MICE industry R&D projects. The two parties will collaborate on nurturing and boosting employment in the local MICE industry and work with various projects to vitalize the international conference complex.

RESEARCH

A research team from KNU has developed a next-generation semiconductor electronic device with the world's highest operating speed that can be used as a core material and component in next-generation mobile communication technology (B5G & 6G) and quantum computing technology. The research was presented last year at the International Electron Devices Meeting (IEDM), the world's most prestigious semiconductor-related academic conference. The Ministry of Science and ICT's Global Talent Cultivation Project and the Civil-Military project of the Civil-Military Technology Cooperation Institute supported this project.

“

“This research is expected to advance the miniaturization, integration, and performance of electronic systems in the terahertz (THz) band as well as constitute a core semiconductor component in quantum computing systems.”

”

—Daehyun Kim

Professor, School of Electronics Engineering, KNU

RESEARCH AND INNOVATION TO PAVE THE WAY FOR A NEW FUTURE

DEDICATED CONFERENCE COMPLEX

DAEGU CONVENTION BUREAU

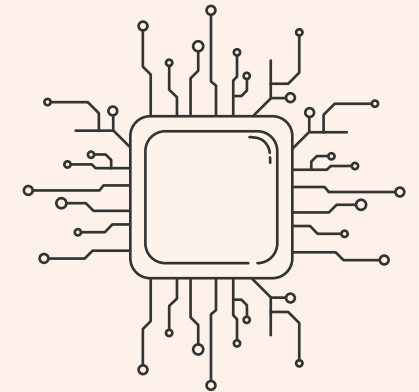
- ✓ FIRST ORGANIZATION IN THE COUNTRY TO ATTRACT AND HOLD INTERNATIONAL CONFERENCES
- ✓ CONTRIBUTION TO THE DEVELOPMENT OF LOCAL INDUSTRIES BY HOSTING GLOBAL INTERNATIONAL CONFERENCES
- ✓ ONLY INTERNATIONAL CONFERENCE COMPLEX IN THE COUNTRY TO INCLUDE A UNIVERSITY



KNU AND DAEGU EXCO AREA HAS BEEN SELECTED AS THE
“INTERNATIONAL CONFERENCE COMPLEX”

PROMOTED BY THE MINISTRY OF CULTURE, SPORTS AND TOURISM

WORLD'S FASTEST SEMICONDUCTOR ELECTRONIC DEVICE



738 GIGAHERTZ (GHz) CLASS
HIGH-ELECTRON-MOBILITY TRANSISTOR (HEMT)



10 TIMES FASTER POTENTIAL COMMUNICATION
THAN THE CURRENT 5G SYSTEM

REDUCED INEQUALITIES



ACHIEVEMENT

Established in 2008, the Center for Students with Disabilities at Kyungpook National University (KNU) has provided various support systems and specialized programs to strengthen the capabilities of students with disabilities and enable them to experience a fulfilling college life. In the “2020 Evaluation of Educational Welfare Support for Students with Disabilities” survey conducted by the National Institute of Special Education, KNU was selected as the best university. This evaluation is conducted to promote the improvement of conditions at higher education institutions for students with disabilities.

AWARD

The Ministry of Education and the National Institute for Lifelong Education evaluate and award projects that raise awareness, expand opportunities, and support educational activities for students with disabilities. The contest is divided into the areas of students with disabilities, educational support personnel, and persons in charge of support for students with disabilities. KNU student Ju-yeon Yoo received the Special Prize for Disabled University Students from the Chairman of the National Assembly Education Committee.



Currently, **71%** of the world’s population live in countries with growing inequalities.

“

“KNU continues to work to raise awareness and understanding of people with disabilities by operating various programs to improve the awareness of people with disabilities and guaranteeing the right to learning for students with disabilities.”

”

—Seon-young Park
Director, Center for Students with Disabilities

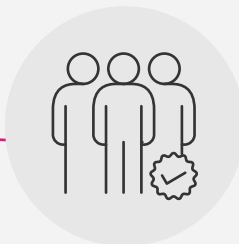
EMPOWERING STUDENTS WITH DISABILITIES TO REDUCE INEQUALITY

2020 EVALUATION OF EDUCATIONAL WELFARE SUPPORT FOR STUDENTS WITH DISABILITIES



TOTAL NUMBER
OF UNIVERSITIES

348



SELECTED
UNIVERSITIES

KNU DAEGU

CAMPUS ALONG WITH 39 UNIVERSITIES
SELECTED AS THE BEST UNIVERSITIES



PARTICIPATING
CAMPUSES

423

98.8% OF 348 UNIVERSITIES

EVALUATION BASED ON UNIVERSITY SELF-EVALUATION REPORT

THREE AREAS



- SELECTION
- TEACHING/LEARNING
- FACILITIES/EQUIPMENT

THREE STAGES



- WRITTEN EVALUATION
- ON-SITE EVALUATION
- COMPREHENSIVE EVALUATION

SUSTAINABLE CITIES AND COMMUNITIES



Urban regeneration may offer a sustainable solution in re-building waste spaces in urban areas that can provide low-income housing to over **1 billion** slum dwellers globally.

URBAN REGENERATION

The exhibition “Sangyeok 3-dong, 6-1: University-city revival through art,” organized by the Kyungpook National University (KNU) Art Gallery, examines the urban regeneration project near KNU from a cultural point of view. In connection with this exhibition, numerous events will be facilitated free of charge for all local residents.

REVITALIZATION OF CULTURE

The “KNU Concert” has established itself as a representative cultural event where the university and local residents come together with diverse and high-quality performances every year. The “2021 KNU Concert” was held in compliance with COVID-19 guidelines and was free for everyone. The aim was to alleviate the after-effects of the pandemic and to revitalize the local culture and arts scene.

ENCOURAGING VOLUNTARY CULTURAL ACTIVITIES

The KNU Museum was singularly selected from the Daegu and Gyeongbuk area for the “cultural representative program, *Pumasi*.” This program is sponsored by the Ministry of Culture, Sports and Tourism (MCST) and hosted by the Federation of Korean Cultural Center. Through *Pumasi*, the Federation of Korean Cultural Center seeks to encourage citizens to engage in voluntary cultural activities for the development of cultural communities.

“

“It will be an opportunity to think about the way citizen-led urban regeneration should be going and the practical methods for achieving the same. I hope future generations will learn about urban regeneration and think about how to make our neighborhood a better place to live.”

”

—Young-min Jin
Director, KNU Art Gallery

URBAN REJUVENATION AND REVITALIZATION

CULTURAL URBAN REGENERATION SEMINAR



LECTURES ON THE PARTICIPATION OF LOCAL COMMUNITIES AND YOUNG PEOPLE IN URBAN REGENERATION

“NEIGHBORHOOD, LET’S PLAY UP-GO”

URBAN REGENERATION CLASS FOR MIDDLE SCHOOL AND HIGH SCHOOL STUDENTS IN DAEGU



NATIONAL FOLK MUSEUM OF KOREA'S FOLK ART THERAPY PROGRAM

COOPERATION NETWORK PROJECT



PARTICIPANTS



10 SCHOOLS



150 WELFARE INSTITUTIONS

RESPONSIBLE CONSUMPTION AND PRODUCTION



12

INNOVATION

Kyungpook National University (KNU) has entered a technology transfer contract and a business agreement for joint research with the Korean food company CJ Cheiljedang and has transferred the “PET plastic biodegradation” technology developed by Professor Kyung-jin Kim of the Division of Life Sciences. This technology decomposes PET plastics by improving enzymes discovered from biological resources and is more environment friendly than other recycling methods. The Ministry of Science and ICT facilitated this research as an eco-friendly, bio-based technology development project. The technology transfer agreement was sponsored by the Korean Intellectual Property and the National Research Foundation.

RESEARCH

Professor Hye-jin Lee and his research team at the Department of Chemistry at KNU have developed a new catalyst electrode that can increase ammonia productivity through an eco-friendly process. The research presents a possibility for mass supply of green ammonia—which is used in fertilizers, urea solution, and nitric acid owing to high productivity and zero carbon emission—a core ingredient for carbon neutrality. It was conducted jointly with Professor Jae-young Lee from the Department of Earth and Environmental Engineering at Gwangju Institute of Science and Technology and Dr. Hyung-guk Joo from the Hydrogen Research Department at Korea Institute of Energy Research.



Nearly **300 million tonnes** of plastic wastes are produced every year with over **50%** of these being from single-use plastics

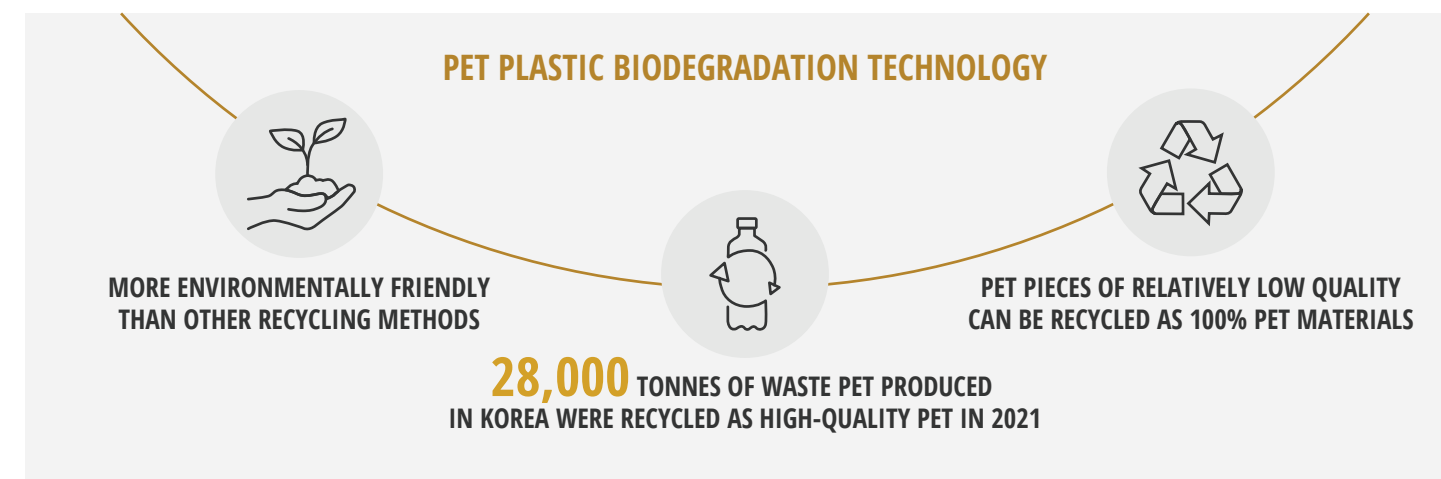
“

“The technology transfer is first step for universities and companies to work together to industrialize domestic recycled PET, and it is expected to become one of the core projects to realize carbon neutrality through resource circulation.”

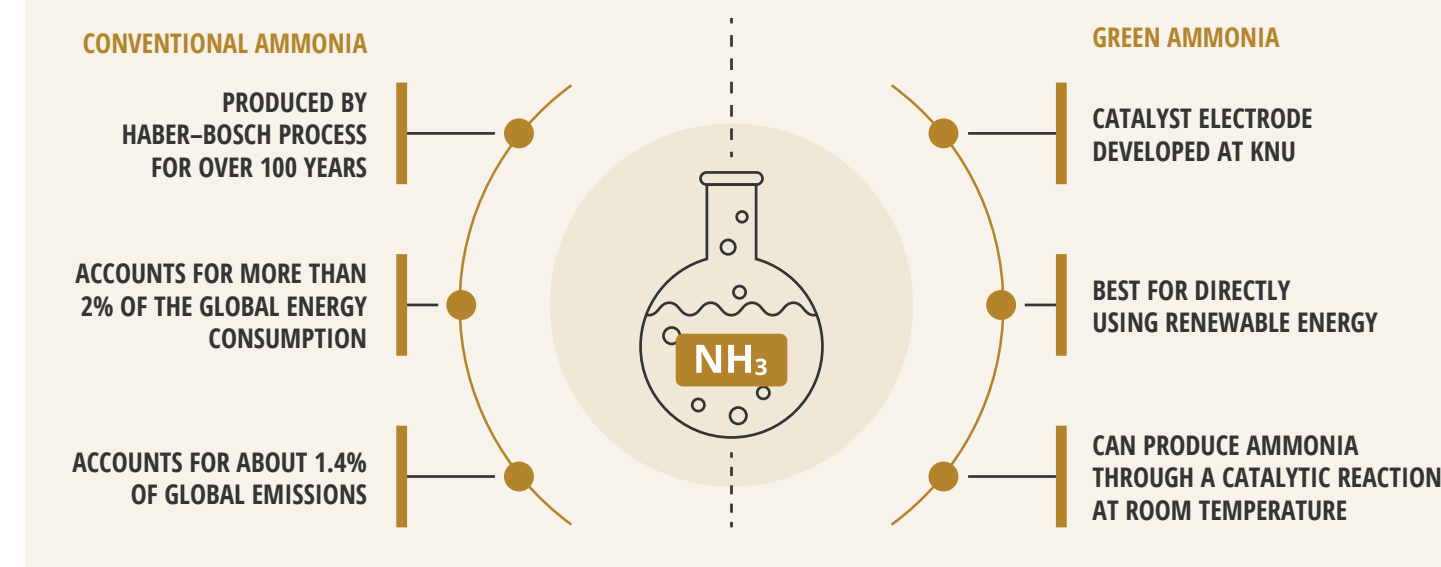
—Won-hwa Hong
President, KNU

”

COLLABORATIVE RESEARCH FOR DECOMPOSITION AND ECO-FRIENDLY PROCESSES



IMPROVED PRODUCTION EFFICIENCY OF GREEN AMMONIA WITHOUT CARBON EMISSION





CO₂ emissions from the energy sector increased to 36.3 gigatonnes in 2021, a record high.

INNOVATION

A new approach to the carbon reduction process was suggested by Professor Jihoon Lee’s team in the Department of Materials Science and Engineering at Kyungpook National University (KNU) after a joint research project with Professor Jingguang G. Chen of Columbia University, USA. The team developed polymer adhesives that can upcycle CO₂ into high-value chemicals.

RESEARCH

KNU inaugurated the “Leading Research Center for Regional Innovation in Carbon-Neutral Intelligent Energy Systems,” which has been selected for the “Support Project for Regional Leading Research Centers (RLRC) for Innovative Growth” by the Ministry of Science, Technology, Information and Communication. The Center will receive 12.7 billion won of national and local research funds over the next seven years to develop highly efficient, eco-friendly energy platforms through multidisciplinary research between nanotechnology, information technology, and energy technology.

COLLABORATION

An international joint research project between KNU and the University of Bristol in the UK has identified that the emission of Freon gas (CFC-11), which had been increasing in eastern China, decreased in 2019 and returned to the pre-2013 levels. The team was led by Professor Seon-young Park from the Department of Earth System Sciences, KNU.

“

“Due to the immediate response of academia, the international community, and the (Chinese) government—based on a series of academic research papers on the increase of Freon gas emissions—the estimated time for ozone layer restoration has not been delayed, and international regulations under the Montreal Protocol have returned to normal.”

”

—Seon-young Park
Department of Earth System Sciences, KNU

CATALYSTS FOR CLIMATE ACTION

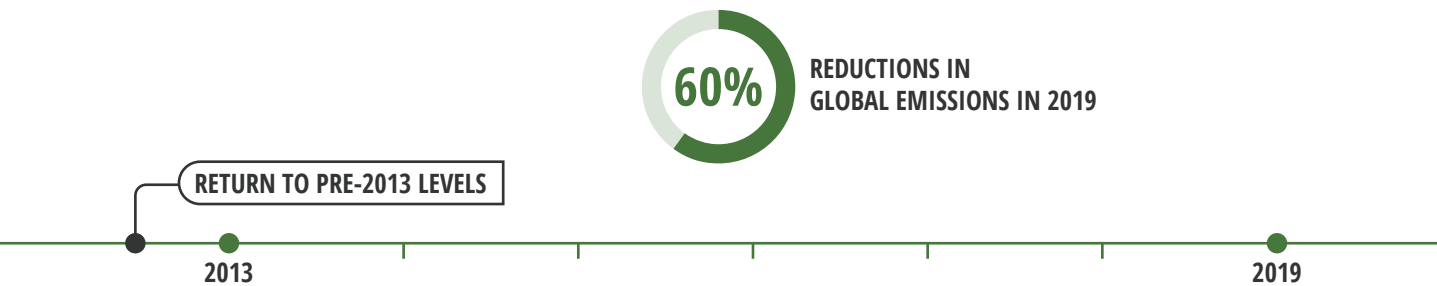
POLYMER ADHESIVE-BASED CARBON REDUCTION

ELECTROCHEMICAL CARBON DIOXIDE REDUCTION



HYDROPHILIC POLYACRYLIC ACID (PAA) OR HYDROPHOBIC POLYVINYLIDENE FLUORIDE (PVDF) POLYMER ADHESIVE

REDUCTION IN FREON EMISSIONS



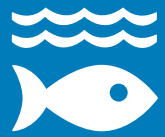
THE LEADING RESEARCH CENTER

FOUNDATIONAL RESEARCH CENTER IN GYEONGBUK PROVINCE

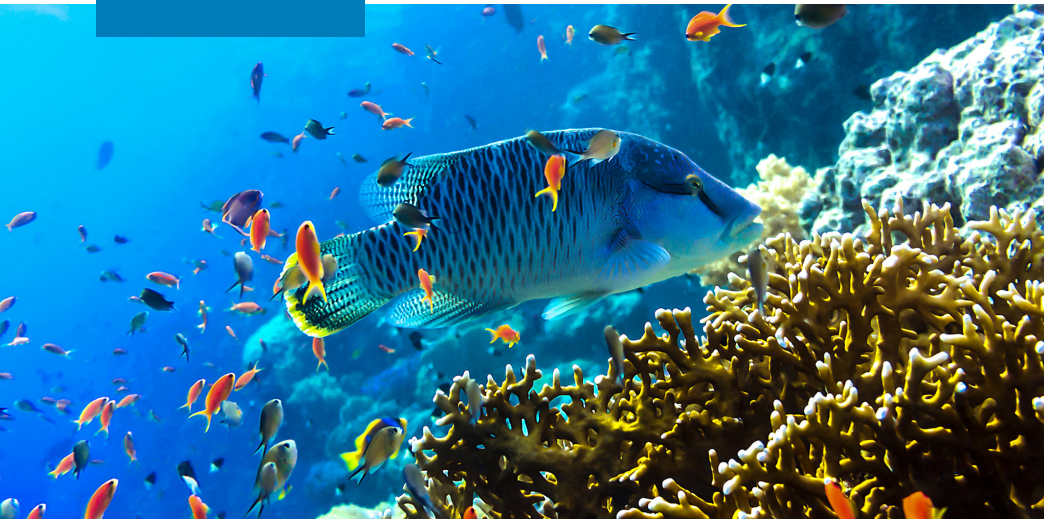
DEVELOPMENT OF NEXT-GENERATION ENERGY MATERIALS AND SYSTEMS

HUB FOR INDUSTRY-ACADEMIC COOPERATION WITH LOCAL COMPANIES

12.7 BILLION WON IN NATIONAL AND LOCAL RESEARCH FUNDS



LIFE BELOW WATER



14

RESEARCH

A team led by Professor Jong-soo Park from the Department of Earth System Sciences at Kyungpook National University (KNU) completed a research study on biodiversity and identified that about 2,000 species of protists inhabit the domestic salt farms that produce sea salt. Protists help control carbon dioxide, are the main predators of marine bacteria, and are a source of energy at the upper trophic level. This research was sponsored by the National Research Foundation of Science and Technology under the Ministry of Science and ICT's "2021 Support Project for Senior Researchers in Science and Engineering" and the National Institute of Biological Resources under the Ministry of Environment's "2021 Unexplored Taxa Professional Training Project Integrated II Field" project.

ACHIEVEMENT

Professor Jong-jin Park of the Department of Earth System Science, KNU, received a commendation from the Minister of Science, Technology and Information for his contribution to the development of the growth engine through his research on underwater gliders. This technology has proven successful on numerous tests and can provide high-quality ocean observation information at a low cost. It will be a valuable tool in acquiring marine environment and underwater spatial data safely and economically.



Plastic pollution is choking the ocean.

Around 17+ million tonnes of plastic entered the ocean in 2021.

“

"Salt farms are our valuable assets to hand down to the future generations, and the degradation of the salt farm environment should be prevented, and more active efforts should be made to preserve the salt farm ecosystem in order to enhance the biological sovereignty state."

”

—Jong-soo Park
Department of Earth System Sciences, KNU

MARINE ECOSYSTEM RESEARCH AND INNOVATION

A BIODIVERSITY TREASURE TROVE



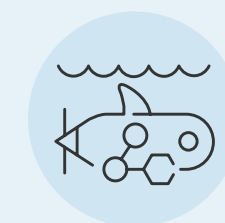
281
NEW PROTIST
SPECIES DISCOVERED



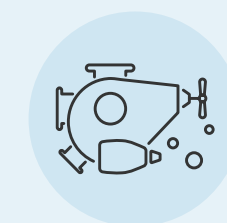
THE RESEARCH RESULTS WERE PUBLISHED IN
"MICROBIAL ECOLOGY,"
THE TOP ACADEMIC JOURNAL IN THE FIELD OF
MICROBIAL ECOLOGY

MARINE INFORMATION SYSTEM

KNU RECEIVED A TOTAL PROJECT COST OF **22.74 BILLION** WON FROM THE MINISTRY OF OCEANS AND FISHERIES



TO PROMOTE THE ESTABLISHMENT OF A
MAINTENANCE AND CONTROL CENTER FOR THE
LOCALIZATION OF KEY PARTS AND EQUIPMENT
FOR UNDERWATER GLIDERS



FOR THE DEVELOPMENT OF A MARINE INFORMATION
AGENCY PRODUCTION SYSTEM TO SECURE ADVANCED
UNMANNED OBSERVATION TECHNOLOGY AND
SPECIALIZED INFRASTRUCTURE USING MARINE ROBOTS



Around 40,000 species are documented to be at risk of extinction over the coming decades.

COMMUNITY OUTREACH

The Kyungpook National University (KNU) Tree Diagnostic Center was established by the Korea Forest Service in 2014 as part of the public tree treatment system for diagnosing damage to trees in the living areas of the Daegu Gyeongbuk region. The Center and the National Tree Hospital will collaboratively conduct two workshops on the topics “Tree damage caused by wild birds” and “Vines and tree protection.” The workshops are open to tree doctors, students, local government officials, and citizens interested in tree treatment and will include lectures and field experiences.

RESEARCH

Professor Hwang Eui-wook of the Department of Biological Education at KNU has published a photobook titled “Dokdo’s Biodiversity I and II,” which contains miniature paintings and photos of about 300 representative species (flora and fauna) of Dokdo. As the director of the National Institute of Biological Resources of the Ministry of Environment’s “Comprehensive Inventory Building for Establishment of Biological Sovereignty of Dokdo (2014–2019)” project, Professor Hwang has been investigating the creatures living on Dokdo over the last 20 years, and this book contains some of his research results.

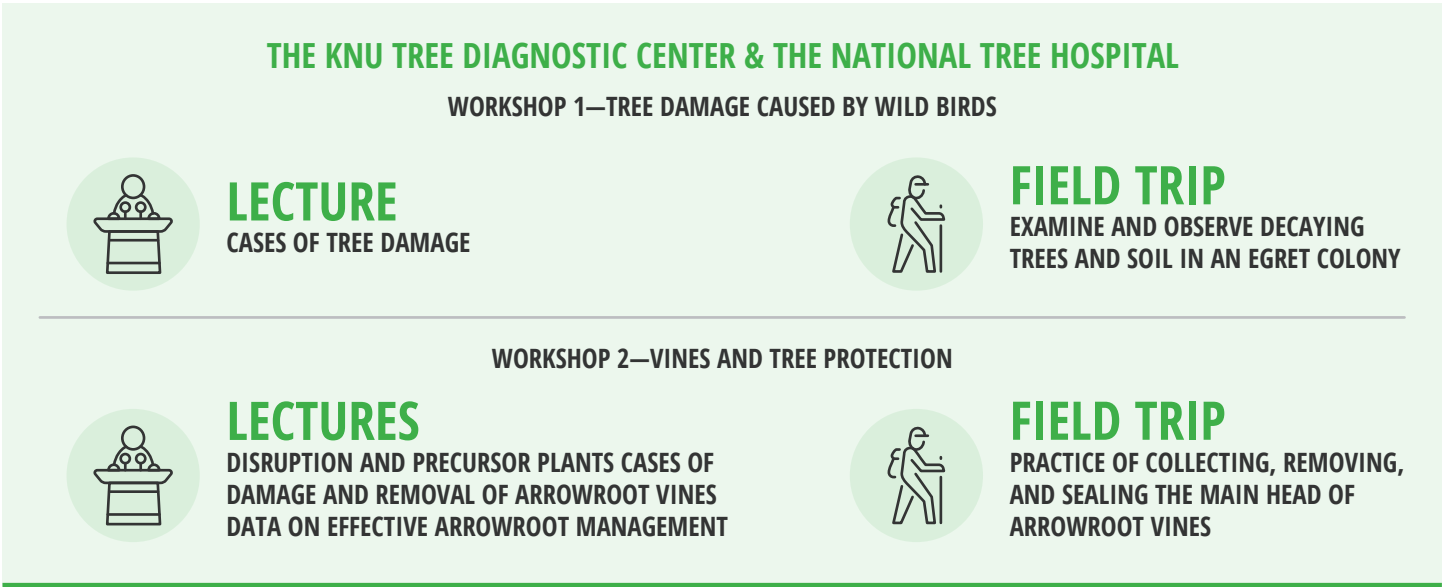
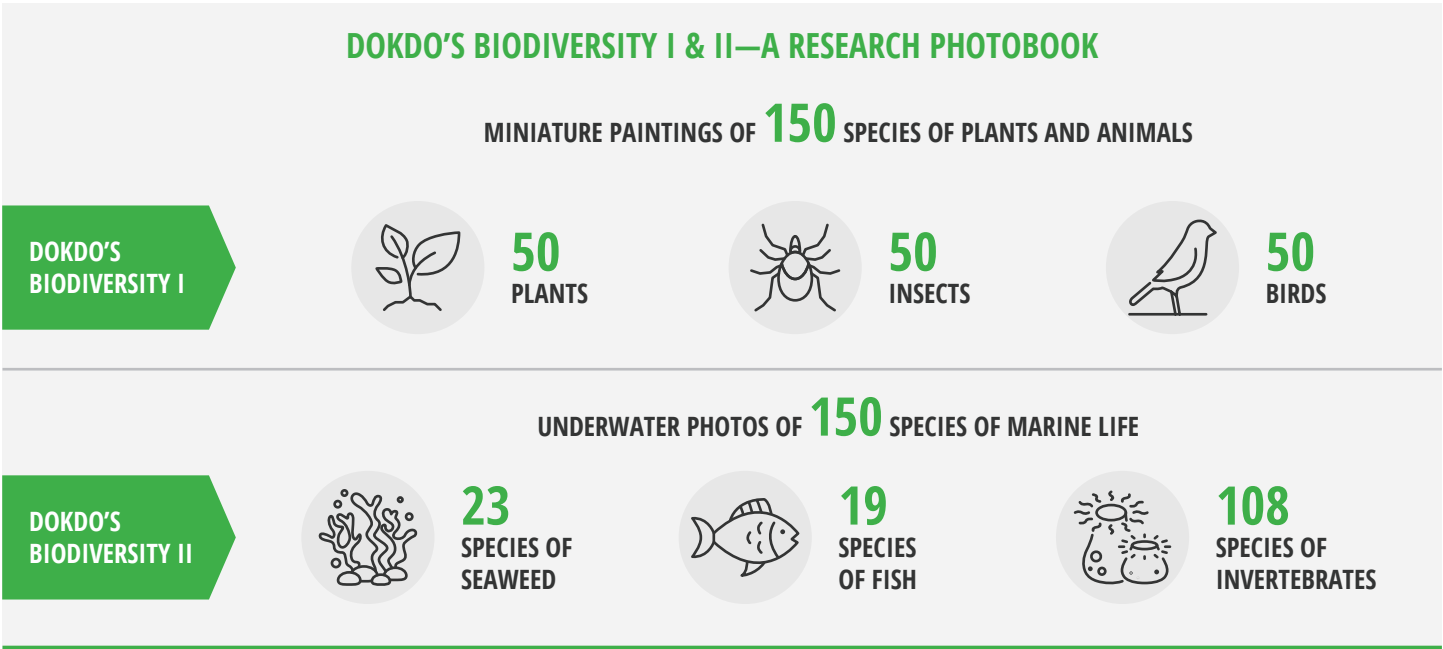
“

“Many wild birds, including egrets, inhabit trees in residential areas and cause damage. It is important to understand and supplement management measures when the urban environment is changing and there is growing interest in trees among the public.”

”

—Ki-woo Kim
Director, KNU Tree Diagnostic Center

RAISING ECOLOGICAL AWARENESS VIA RESEARCH AND OUTREACH



PEACE, JUSTICE AND STRONG INSTITUTIONS



16

CONFERENCE

The Kyungpook National University (KNU) Humanities and Korea Promotion Center will host a joint academic conference on the theme of “COVID-19 and Europe.” Humanities and legal scholars from five institutions, namely the European Constitutional Society, KNU Law Research Institute, KNU American and European Research Institute, Ministry of Legislation, and Research Forum of the Korean Public Law Society, will meet to discuss the measures and implications of European countries’ response to COVID-19.

AGREEMENT

An important business agreement was signed by the Korea Conflict Resolution Center and the BK Plus Project Team of the Department of Philosophy at KNU, with the aim of fostering professional talent. The agreement was signed at the Humanities and Korea Promotion Center at KNU and saw both organizations commit to make a joint effort to nurture experts in conflict resolution who can analyze various conflicts and suggest alternatives.



The world is witnessing the largest number of conflicts since 1946. According to the United Nations, 25% of the world’s population now lives in conflict-affected areas.

“

“In a situation where a catastrophe caused by an infectious disease has become a constant premise in our daily lives, it is worthwhile to discuss and ponder how each country in Europe has responded and what implications it has for us.”

”

—Jeon Hoon

President, European Constitutional Society, and Professor, Faculty of Public Administration, KNU

COOPERATION TOWARD BETTER PLANNING AND RESOLUTION

JOINT ACADEMIC CONFERENCE ON “COVID-19 AND EUROPE”



SESSION ONE

COVID-19, CONFUSION, AND ETHICAL ISSUES IN THE FRENCH VACCINATION PLAN

ROLE OF THE BRITISH SCIENTIFIC ADVISORY SYSTEM DURING THE CORONAVIRUS PANDEMIC: IS IT A SCIENCE OF CRISIS? IS IT A CRISIS OF SCIENCE?

EMERGENCY STATE OF FRANCE AND THE CORONARY RESPONSE LEGISLATIVE SYSTEM



SESSION TWO

LEGAL JUSTIFICATION AND LIMITATIONS OF SOCIAL DISTANCING MEASURES

REVIEW OF SOME PUBLIC LEGAL ISSUES IN NATIONAL LAWSUITS RELATED TO VIOLATION OF COVID-19 PREVENTION

BUSINESS AGREEMENT TO FOSTER PROFESSIONAL TALENT

BK PLUS PROJECT TEAM
DEPARTMENT OF PHILOSOPHY, KNU

KOREA CONFLICT
RESOLUTION CENTER



COOPERATION TO HOLD CONFLICT RESOLUTION EXPERT TRAINING PROGRAMS REGULARLY

COOPERATION TO FOSTER CONFLICT RESOLUTION EXPERTS

ACTIVE TALENT EXCHANGE AND COOPERATION BETWEEN ORGANIZATIONS

PARTNERSHIPS FOR THE GOALS



Rising debt burdens are threatening developing countries' pandemic recovery. The official developmental assistance for SDG data declined by more than 18% in 2020.

COOPERATION

The “2022 regional innovation project based on cooperation between university and local government (RIS)” is a project where the Ministry of Education supports local governments and universities in establishing a “regional innovation platform.” This platform will help them identify key areas that meet local mid- to long-term development goals and promote regional innovation. The “Daegu-Gyeongbuk Regional Innovation Platform,” in which Kyungpook National University (KNU) participates as a general university, has been selected for the 2022 RIS.

INNOVATION

The Campus Innovation Park Project is a joint project led by three government ministries, namely the Ministry of Education, the Ministry of Land, Infrastructure and Transport, and the Ministry of Small to Medium Enterprises (SMEs) and Startups, which fosters universities as bases. KNU was selected for this prestigious joint government-ministerial project in 2021. KNU aims to make the Campus Innovation Park the cradle of innovation, where companies and talents look first, by focusing on core technology innovation infrastructure, R&D facilities, nurturing innovative talent, building support systems for startups, and facilitating corporate growth.

“

“The Campus Innovation Park will position itself as a regional hub for innovation, where universities, local governments, and companies grow together, and will be a leader of future technology and startup. We will spare no effort to develop the Campus Innovation Park into a new beginning for KNU and a successful model for regional innovation.”

”

—Won-hwa Hong
President, KNU

REGIONAL COLLABORATION & INNOVATION LEADING TO GLOBAL GROWTH

DAEGU-GYEONGBUK REGIONAL INNOVATION PLATFORM

PARTICIPATING PARTNERS

- DAEGU CITY

• KNU
- GYEONGBUK PROVINCE

• YEUNGNAM UNIVERSITY

23
UNIVERSITIES

14
REGIONAL INNOVATION
INSTITUTES

200
LOCAL
COMPANIES

TOTAL INVESTMENT OF 331.6 BILLION WON

AIMS

- ESTABLISH DAEGU GYEONGBUK INNOVATION UNIVERSITY
- ESTABLISH JOINT DEPARTMENTS BETWEEN UNIVERSITIES
- OPERATE FIELD/SHARED CAMPUSES
- OPERATE META-CAMPUS
- PROMOTION OF MAJOR EDUCATION INNOVATION
- CUSTOMIZE TALENT CULTIVATION
- SUPPORT FOR LOCAL SETTLEMENT
- DEVELOP LEADING TECHNOLOGY AND PRODUCT
- CARRY OUT TASKS FOR EACH CORE FIELD

DAEGU-GYEONGBUK INNOVATION UNIVERSITY TO PRODUCE

1,100

CORE LEADERS FOR REGIONAL INNOVATION

CAMPUS INNOVATION PARK PROJECT

TOTAL INVESTMENT OF 120.4 BILLION WON

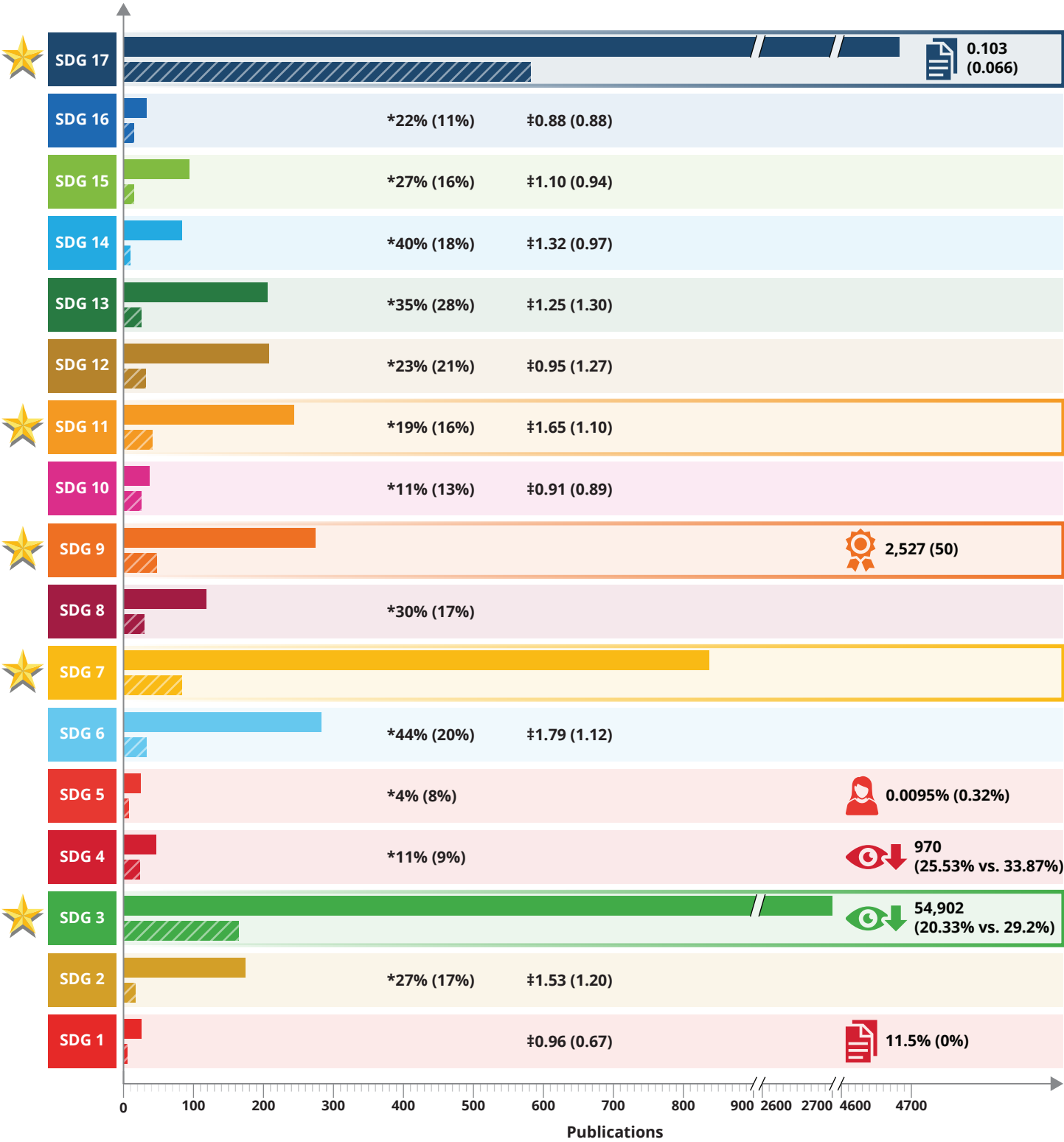
TOTAL AREA OF 32,000 M²

3,000
NEW JOBS

500+
ASSISTANT JOBS

AIM TO ACHIEVE
65%
EMPLOYMENT RATE FOR
YOUNG PEOPLE IN THEIR
20s AND 30s

RESEARCH OUTPUT TOWARDS MEETING THE SDGs



Worldwide median

KNU

* Publications in top journals (%)

† Clinical citations

‡ Field-weighted citation index (FWCI)

Views and downloads
(Percentage per publication for KNU vs. the worldwide median)

Percentage of publications co-authored with low-income countries

Number of patents citing KNU research (Worldwide median)

Percentage of female authors

Exceptional performance towards meeting the SDG

HUMAN RESOURCE CONTRIBUTIONS TOWARDS THE SDGs

SDG	Contribution	Percentage	Other Metrics
SDG 16	KNU	6%	Percentage of graduates
SDG 16	Worldwide median	6%	
SDG 10	KNU	71%	Percentage of first-generation students
SDG 10	Worldwide median	36%	
SDG 8	KNU	100%	Percentage of employees on secure contract
SDG 8	Worldwide median	81%	
SDG 5	KNU	62%	Percentage of female first-generation students
SDG 5	Worldwide median	36%	
SDG 4	KNU	8%	Percentage of graduates
SDG 4	Worldwide median	9%	
SDG 3	KNU	16%	Percentage of graduates
SDG 3	Worldwide median	15%	
SDG 2	KNU	33%	Percentage of graduates
SDG 2	Worldwide median	3%	
SDG 1	KNU	37%	Percentage of students receiving financial aid
SDG 1	Worldwide median	19%	

SDG 3: Number of graduates (576)

SDG 4: Number of graduates qualified to teach at primary school level (1,116)

	SDG 4		★ SDG 8		SDG 10	
	KNU	Worldwide median	KNU	Worldwide median	KNU	Worldwide median
Percentage of first-generation students	71%	35%	-	-	-	-
Percentage of students from developing countries	-	-	-	-	10%	1%
Percentage of students with disabilities	-	-	-	-	1%	1%
Percentage of employees with disabilities	-	-	-	-	2%	2%
Percentage of students on work placement	-	-	7%	14%	-	-

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KYUNGPOOK

NATIONAL UNIVERSITY

@Daegu, South Korea



THE IMPACT RANKINGS 2022

Ranked 13th in the World

11 SUSTAINABLE CITIES AND COMMUNITIES

6th
in the World

2 ZERO HUNGER

13th
in the World

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

21st
in the World



KYUNGPOOK
NATIONAL UNIVERSITY

SUSTAINABLE DEVELOPMENT GOALS



Kyungpook National University
RANKED 13th in the world and **1st** in Korea



www.thewur.com

26 Billion
won investment to promote R&D in
agricultural life science

Kyungpook National University
RANKED 13th
FOR SDG 2: ZERO HUNGER

Kyungpook National University
KNU's Incubation Center ranked
RANKED 21st
FOR SDG 8: DECENT WORK
AND ECONOMIC GROWTH

S Grade for
17th year
in a row



3,000
new jobs

due to KNU's
Campus Innovation
Park Project

Kyungpook National
University

RANKED 38th
FOR SDG 17: PARTNERSHIPS
FOR THE GOALS



www.thewur.com

Workshops on
diagnosis
and
mitigation
of damage
to trees

281 new
species of protists
discovered

Nearly 2x female
first-generation students
as the worldwide median

New process for
green ammonia
production

Carbon-neutral campus project for
net zero **emissions by 2040**

20 startup camps
and **30 startup**
clubs annually

6 KNU professors
elected as
full members
of the
National Academy
of Medicine

Selected in the **best**
group among the top
20% of universities in Korea
with over 10,000 students

12.7 BILLION
won funding to
develop highly
efficient, eco-friendly
energy platforms

6x higher
research publications than
worldwide median

Kyungpook National University
RANKED 6th
FOR SDG 11: SUSTAINABLE CITIES
AND COMMUNITIES



www.thewur.com

2x papers published
in top journals
compared to the
worldwide median

New technology
for **99.9%**
removal of
naproxen
from wastewater

New HEMT for up to
10x faster potential
communication than current
5G systems

Kyungpook National
University

RANKED 21st
FOR SDG 9: INDUSTRY,
INNOVATION AND
INFRASTRUCTURE



www.thewur.com

Selected as **best university** in the
2020 evaluation of Educational Welfare
Support for **Students with**
Disabilities





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