ADVANCING THE SUSTAINABLE DEVELOPMENT GOALS

A KYUNGPOOK NATIONAL UNIVERSITY INITIATIVE

2021–2022
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Kyungpook National University is one of the most prestigious universities in Korea today, ranked 13th in the 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.
657–676 million people around the world are projected to be living in extreme poverty in 2022.

ENTREPRENEURSHIPS

Kyoungpook 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.

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.

“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.”

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

ENCOURAGING ENTREPRENEURSHIP TO ELEVATE PEOPLE OUT OF POVERTY

- 3,000 students participated in entrepreneurship courses
- 1–3 required credits
- 60 electives
- 30 startup clubs
- 250 members
- Dedicated mentor groups

INCUBATION SPACES TO HELP WITH PLANNING, MARKETING, AND MENTORING

- KNU Startup Hub Center
- KNU Startup Square
- KNU Startup Village

SUSTAINABLE DEVELOPMENT GOALS
Kyoungpook 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.

"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 Hwang
President, KNU

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.

INNOVATING AGRICULTURE TO ERADICATE WORLD HUNGER

AGRICULTURAL UNIVERSITY TRAINING PROJECT

- 120 STUDENTS, INCLUDING GRADUATE STUDENTS, RESEARCHERS, AND MEMBERS OF AGRICULTURAL SOCIETY
- HYBRID LEARNING ONLINE AND OFFLINE
- CONTEST FOR "AGRICULTURAL MACHINE PROBLEM SOLVING USING PUBLIC BIG DATA AND AI"

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
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.

“...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

Over 40 percent of all countries have fewer than 10 medical doctors per 10,000 people.
Over 24 million learners globally may never return to school due to the COVID-19 pandemic.

**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.

**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.

“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

**NATIONAL UNIVERSITY LIBRARY ASSESSMENT**

- **382 UNIVERSITY LIBRARIES ASSESSED**
- **3.4 MILLION BOOKS**
  - KNU library selected as the “Best Group” as a part of the top 20% of 69 universities in Group A*
  - 2nd largest collection among universities in the country

*COLLEGES WITH >10,000 STUDENTS
Kyoungpook 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.

DISCOVERY

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.

OUTREACH

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

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

—KNU’s Diversity Committee

DIVERSITY AT KNU

>1,000

15-MEMBER KNU DIVERSITY COMMITTEE

INTERNATIONAL STUDENTS AND FACULTY

COLLECTS OPINIONS ON DIVERSITY PROTECTION

DEVELOPS DIVERSITY EDUCATION PROGRAMS

PROVIDES ADVICE AND SUGGESTIONS FOR POLICYMAKING

GENDER CONFLICT AND THE “IDAENAM” PHENOMENON

“IDAENAM” refers to men in their 20s with negative tendencies toward feminism

DEBATE CONDUCTED ON ‘SPEAKING OF THE “IDAENAM” PHENOMENON: YOUTH LIFE AND POLITICS’

FOCUSING ON COMMONALITIES RATHER THAN DIFFERENCES CAN HELP REDUCE TENSIONS
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.

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**

**PHOTOCATALYST THAT IMPROVES THE EFFICIENCY OF DYE WASTEWATER TREATMENT**

**PHOTOCATALYST TECHNOLOGY HAS LIMITATION IN IMPROVING THE DECOMPOSITION EFFICIENCY**

**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**

**CONVENTIONAL PHOTOCATALYST**

**DEVELOPED PHOTOCATALYST**

**TREATMENT EFFICIENCY OF 98% OR MORE**

**EFFECTIVE WITHIN AN HOUR**

**CONVENTIONAL PHOTOCATALYST**

**TREATMENT EFFICIENCY OF ABOUT 80%**

**REQUIRES SEVERAL HOURS**
A new solution technology to make high-quality thin films of organic-inorganic hybrid materials used in next-generation solar cells and photovoltaic 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-ho 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.

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.
Decent Work and Economic Growth

**Achievement**

Yungpook 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.

“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**

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**Green Remodeling Regional Platform**

**Participating Organizations**

- **Operating Body**: Korea Authority of Land & Infrastructure Safety
- **Representative Body**: KNU
- **Joint Institution**: Dong-A University
- **Cooperative Institution**: Gyeongsang University
Industry, Innovation and Infrastructure

**OUTREACH**

Yungpook 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 (5G & 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

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**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

**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

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

Promoted by the Ministry of Culture, Sports and Tourism

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

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

**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.

“Neighborhood, Let’s Play Up-Go”

Urban regeneration 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

“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
Kyoungpook 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.

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.

“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**

**PET PLASTIC BIODEGRADATION TECHNOLOGY**

- More environmentally friendly than other recycling methods
- PET pieces of relatively low quality can be recycled as 100% PET materials

28,000 tonnes of waste PET produced in Korea were recycled as high-quality PET in 2021

**IMPROVED PRODUCTION EFFICIENCY OF GREEN AMMONIA WITHOUT CARBON EMISSION**

- Conventional ammonia: produced by Haber-Bosch process for over 100 years
- Accounts for more than 2% of the global energy consumption
- Accounts for about 1.4% of global emissions

- Green ammonia: catalyst electrode developed at KNU
- Best for directly using renewable energy
- Can produce ammonia through a catalytic reaction at room temperature
A new approach to the carbon reduction process was suggested by Professor Jinhoon 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 CO$_2$ into high-value chemicals.

**INNOVATION**

**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
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.

“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

Plastic pollution is choking the ocean. Around 17+ million tonnes of plastic entered the ocean in 2021.

MARINE ECOSYSTEM RESEARCH AND INNOVATION

A BIODIVERSITY TREASURE TROVE

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

281 NEW PROTIST SPECIES DISCOVERED

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
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

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.
PARTNERSHIPS FOR THE GOALS

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 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
• 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
• Promote 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

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