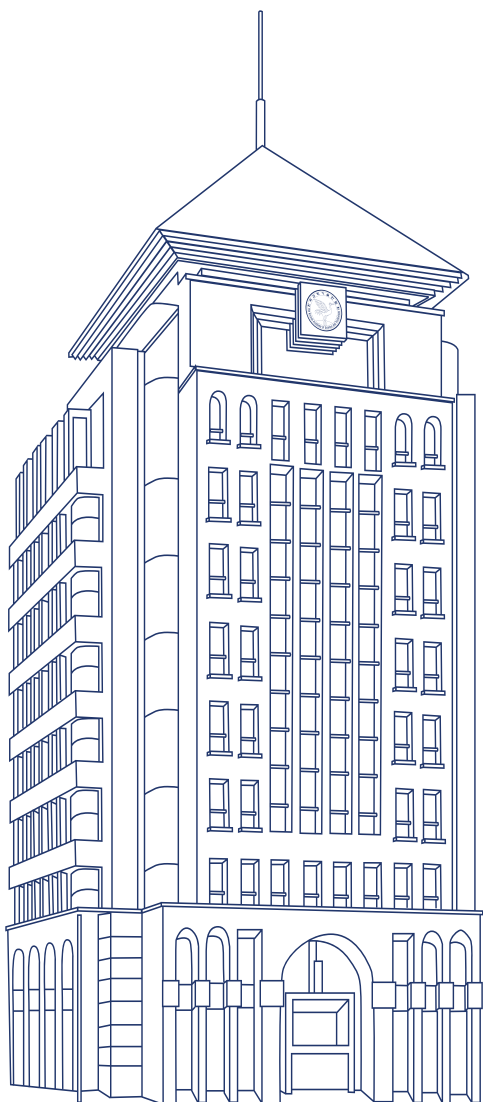


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ANNUAL REPORT

The Korean Academy of Science & Technology



KAST

한국과학기술원

The Korean Academy of Science and Technology

Information



한림원

Symbol Mark

→ In Joseon Dynasty, officials in literary and martial arts wore embroidered badges (胸背) on the front and back of official costumes to differentiate their status and class.

For the design of embroidered badges, dragon, phoenix, giraffe, peacock, crane, wild goose, tiger, turtle, deer, and etc., were used. Since the 18th century, officials in literary wore embroidered badges with the design of crane, which symbolized the elegant spirit of a scholar. For the KAST's symbol mark, the image of crane was adopted as a symbol of scholars devoted to studies based upon ancestors' tradition.

This represents both traditional and modern image of the status and role that the KAST members have as a scholar.

Meaning of Han-lym-won

→ "Han-lym-won" is a Korean word for "Academy." At the time when the KAST was established, Academy was used as a word meaning private educational institutes in Korea.

Thus, Establishment Committee of the KAST looked for an institution that played a role similar to academies in Korean history, and as a result, they found "Han-lym-won (翰林院)," which was a royal academic research institute in Goryeo Dynasty.

Han-lym-won is where scholars and talented persons engaged in studies and writings. In addition, "Han-lym-won" have a meaning of "a place where many scholars get together."

Now Han-lym-won is generally used in Korea as a word meaning Academy in other countries.

Location

KAST Building, 42 Dolma-ro (Gumi-dong), Seongnamsi, Gyeonggi-do, Korea (13630)

Online channels

www.kast.or.kr

Contents



A MESSAGE FROM THE PRESIDENT	06
------------------------------	----

10 HIGHLIGHTS FROM 2021	08
-------------------------	----

STATUS	
Summary	12
Historical Highlights	14
Membership	16
Organization	18

ACTIVITIES	
Advice for Policy Makers and Society	20
People-friendly Science Promotion	28
International Collaboration	32
Awards	42
Support Programs	50

PEOPLE	
New Fellows of the KAST Elected in 2021	60

MESSAGES FROM THE PRESIDENT AND THE EXECUTIVE COMMITTEE



In his article in The Financial Times, Yuval Harari, a famous historian, said, “When people are told the scientific facts, citizens do the right things even without a Big Brother watching over their shoulders.” He emphasized that “a self-motivation and well-informed population” is usually far more powerful and effective than “a policed, ignorant population.” The “motivation” and “information power” created from transparently sharing scientific facts discovered by scientists and engineers with the members of society, and understanding and having faith in scientific facts are more important than any other advanced science and technology.

The Korean Academy of Sciences and Technology (KAST) took a lead in enhancing scientific motivation

and information power of the public by operating a diversified forum composed of experts from all social standings. By regularizing the COVID-19 discussion forum composed of the best quarantine experts, we strived to communicate with the public at every crucial moment of the pandemic and deliver accurate information. To respond to the paradigm shift in science and technology and new social demands, we held a discussion forum participated by the experts representing academia, industry, the National Assembly, the government, and the media. We opened a forum for in-depth discussion and broad insight on topics such as emotional disease patterns in contact-free environments, information education curriculum

improvement in 2022, educational innovation and talent training for future generations, and future science and technology issues.

The KAST promoted science and technology cultural projects that actively utilized online and offline communication channels so our activities pervades the public’s daily life. The KAST YouTube channel, which operated an online conversation program with the world’s greatest scholars including Nobel Prize Laureates, and continuously publishes high-quality scientific and cultural content to communicate with the public, has been rapidly growing after the outbreak of COVID-19 with its number of subscribers increasing 16.5 times. Above all, science and technology and cultural projects for the underprivileged are one of the projects we have been promoting by stressing importance. After publishing 4 books in the “Distinguished Scholars Tell about Science and Technology” series as Braille books and audiobooks, we secured the copyrights and produced 3 tactile books published by NASA. We will lead science and technology cultural projects where anyone including the underprivileged, who are in the blind spot of STEM education, can enjoy science.

The KAST has been operating the “Platform for Award Programs by Life Cycle of Scientists” to create systematic research results throughout the life of scientists. In 2021, we signed a business agreement with Amgen Korea and established the “Amgen-KAST Biotechnology Award” to promote basic science research and support young researchers in Korea.

Moreover, we are promoting the establishment of the “Science International Cooperation Support Center,” which systematically operates academic exchange events to raise the international recognition of domestic scientists and engineers. We will strive for stable academic support and active science diplomatic projects so that domestic

scientists and engineers can leap forward as world-class researchers.

The COVID-19 pandemic reminds us of the importance of global solidarity and sharing of scientific and technological information. The IAP official statement, “Protection of Marine Environments,” which was proposed and drafted by the KAST, was made public to international scientific and technological organizations around the world on June 1, 2021. The statement in which 75 overseas academies, including the US, the UK, and Germany, participated, urges each country to come up with active solutions for the protection of the marine environment and to cooperate with international organizations. Moreover, we published a report, 『Current Practice and Issues for Improvement in STEM Education up to K12 in Asia and the Pacific』, by being in charge of the responsible operation of science education analysis projects in 10 Asian countries. As well as establishing basic data for the Asian region to conduct ideal STEM education, KAST also sought the way of providing health & welfare and balanced regional development through education by analyzing the circumstance of STEM education of low-incomes in Korea.

Kevin Hicks, an environmental researcher, said at the Korea Science Week 2018 hosted by the KAST, “Humanity is living together in a balloon called the Earth.” The efforts only for a specific individual, society, or country are meaningless inside the balloon. The KAST will do its best for our better future. Thank you.

February 2022

Min-Koo Han President of the KAST
and Members of the 9th Executive Committee

10 Highlights from 2021

01 Preemptive response and convergence of expert opinions to future science and technology issues such as metaverse, mRNA, and neuromorphic chip

To preemptively respond to future science and technology issues, the KAST held a discussion forum and symposium on the subject of “metaverse,” which has been attracting attention as a new platform to realize future value, “mRNA” vaccine and “LNP” technology that will revolutionize future therapeutics, and “neuromorphic chip,” which is viewed as a game changer in the semiconductor industry. A variety of science and technology related people including domestic and foreign scholars, businessmen, government department officials, and field researchers came together to present the latest research and have an intensive discussion about future research directions. The discussion forum was broadcasted in real time through the KAST YouTube channel, and the presenters answered the viewers’ questions through a chat window, opening a forum for collective intelligence.



02 Online conversation series with the world’s best scholars, including Nobel Prize winners

Communication is more important than anything to raise the scientific literacy of the social community and to incorporate the scientific culture into our daily life. The KAST aims to raise public interest in science and technology and cultivate future talents in science and technology through interesting science lectures and special talks for teenagers, university (graduate) students, and related field researchers and experts who dream of becoming future scientists.



In 2021, as the global pandemic of COVID-19 continues, we planned an online special program, invited world-class scholars including Nobel Prize Laureates, and held expert talks or public lectures depending on the topic. The KAST arranged conversations with Prof. Donna Strickland, the Nobel Prize laureate in Physics in 2018, Dr. John Mather, the Nobel Prize laureate in Physics in 2006, MIT Professor Robert Langer, the co-founder of Moderna, and Carnegie Mellon University Professor Alexander Waibel. We increased the ratio of the online viewers’ participation by organizing the live broadcast of the KAST YouTube channel, the collection of questions in advance and Q&A session through the chat window.

03 Leading policy proposals in the international scientific and technological community

On June 1, 2021, the “Protection of Marine Environments” statement, which is the first official IAP statement initiated by the KAST, was simultaneously published at the academies around the world and international organizations related to science and technology. The statement proposes five tasks to restore the integrity of the sea: deterioration of marine health, habitat destruction, environmental contaminants, climate change, and overexploitation. Through the statement, the IAP plans to urge governments, civic groups, and member academies to come up with active solutions to protect the marine environment and to cooperate with international organizations.



The statement was signed by 75 overseas academies, including the US, the UK, and Germany, as participating organizations, and 46 domestic institutions, including the Korea Institute of Ocean Science and Technology, Citizens’ Institute for Environmental Studies, and Seoul National University, expressed their support.

04 Presentation of a policy vision for international scientific exchange cooperation and network expansion

One of the main purposes of the KAST’s establishment is to widely publicize the achievements of domestic scientists and engineers, who stand out worldwide. To effectively raise awareness of basic research achievements in Korea, it is necessary to review the international science and technology exchange projects currently being promoted by each institution and set consistent goals and directions.



For this, the KAST members held a meeting with Lim Hyesook, the Minister of Science and ICT, and discussed ways to inform the international scientific and technological community of Korea’s excellent scientists. Moreover, the KAST has carried out policy tasks for the establishment and operation of “science diplomacy support center,” which systematically promotes various international exchanges, and been actively promoting science diplomacy projects for domestic scientists and engineers to become world-renowned researchers.

05 Joint response to major issues in science and technology with dedicated organizations

The KAST has continuously held a joint COVID-19 discussion forum in which quarantine experts participated in collaboration with the Korean Federation of Science and Technology Societies (KOFST) and the National Academy of Medicine of Korea (NAMOK) to deliver COVID-19 information based on scientific facts. We provided the most reliable COVID-19 information platform to the public by holding a timely discussion forum tailored to the pandemic aspect or the promotion of quarantine policies.



Moreover, we took the lead in discovering issues throughout society and developing effective response strategy by operating a complex forum composed of experts from all social standings. From the subject of the emotional disease caused by the pandemic environment to the subject of the information education curriculum revision in 2022, the KAST cooperated with various experts.

06 Business operation in accordance with the post-COVID-19 era

The KAST promotes active communication with the general public as well as the science and technology community through online PR channels. The KAST YouTube channel, which opened in 2017, has gained recognition by consistently posting reliable information on the latest science and technology, lectures and talks by domestic and foreign scholars, and public-friendly content that the public can easily enjoy. The number of YouTube subscribers, which was 150 in March, 2020, has grown rapidly, surpassing 16,000 in December, 2021.



07 Cultivation of talents and proposal of proactive leadership in education and culture

In 2020, the KAST reorganized various award programs and built a "Platform for Award Programs by Life Cycle of Scientists" and has been continuously expanding and improving it since. The award program operated by the KAST aims to create systematic research results throughout the lifespan of scientists and engineers. It promotes support projects specialized for the growth stage of scientists and engineers, from teenagers to doctoral students. In 2021, there were 102 beneficiaries of the KAST award program, and the KAST award project platform was introduced as an excellent case in the second Basic Humanities Promotion Plan (draft) (2022-2026) of the Ministry of Education. Moreover, we have been taking the lead in cultivating excellent scientific and technological talents by operating various knowledge sharing activities that utilize the expertise of KAST members.



08 Selected as the best case of active administration for scientific challenge project

The Ministry of Science and ICT selected the science challenge project promoted by the KAST as the best case of active administration. Together with the Request for Proposal (RFP) method, we held online conference to prepare a support system for discovering scientific topics through active exchange of opinions among researchers. It was highly appreciated for introducing an innovative topic discovery and support method that breaks the limitations of the existing R&D support method and overcomes scientific difficulties through the convergence of basic science and engineering.



In selecting and evaluating tasks, we introduced an active contact-free evaluation method through the distribution of pre-announcement videos and Q&A, and provided support for big data analysis-based consulting for selected research groups.

09 Strengthening of science and technology culture projects for the underprivileged

The number of visually impaired in Korea is about 300,000, but Braille books published annually account for only 5% of all publications. Since more than 90% of Braille books are adult-oriented literature, there are no popular science books for children or adolescents. STEM education, which is convergence talent education, has become an essential element to prepare for the future society, but it is not accessible for students with disabilities.



In 2021, we have secured the rights to three tactile books published by NASA for the visually impaired and has created both braille commentary and general commentary in Korean. We plan to distribute the NASA tactile books to general elementary and middle schools to strengthen science and technology culture projects enabling anyone to enjoy science.

10 Establishment of a new award project for young scientists

On June 14, 2021, Amgen Korea and the KAST signed a business agreement for the "Amgen-KAST Biotechnology Award" to revitalize domestic basic science research and support young researchers. The Amgen-KAST Biotechnology Award, which the KAST is in charge of business operation, is awarded to one postdoctoral researcher and one next-generation scientist under the age of 45, who have achieved outstanding research achievements in life science and biotechnology, and the each winners are awarded the prize of 20 million won and 40 million won with a plaque.



Summary

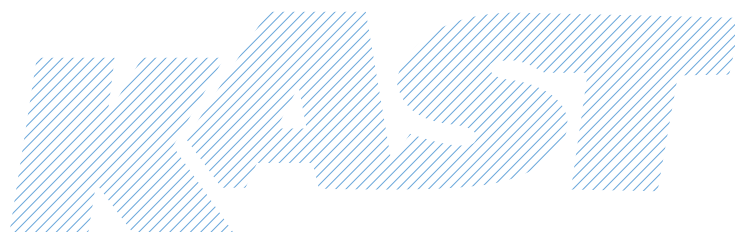


Date of Establishment

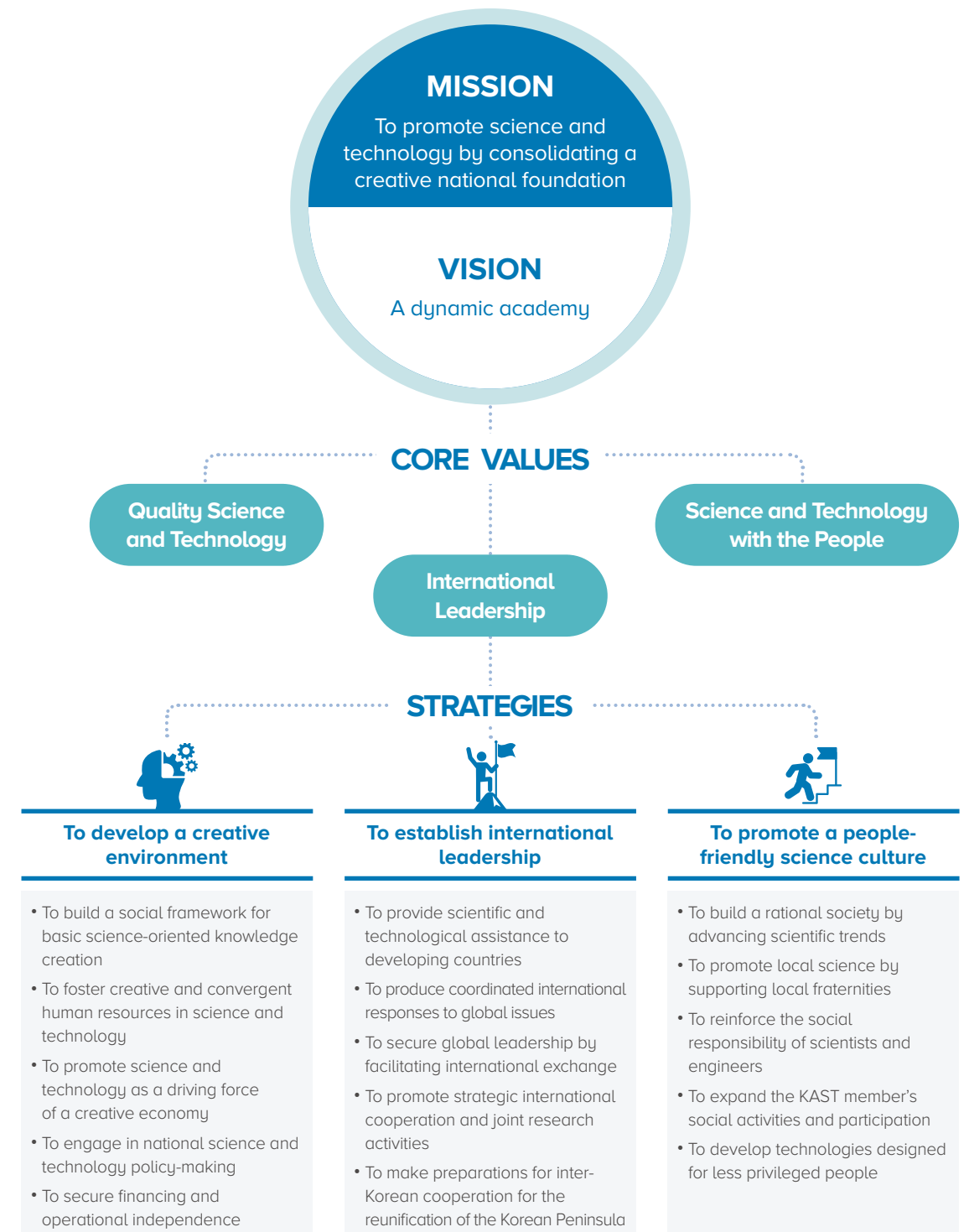
→ November 22, 1994

Objectives

- The KAST contributes to progressing science in Korea supported by its members' exceptional professional competence. Its members are elected by peers in recognition of distinguished achievements in their respective fields.
- As the leading science institution of the country, the KAST plays an integral role in strengthening the foundation of science and technology and in preparing to meet the challenges of future needs of our nation and the global society. The KAST is also an independent, autonomous, and nonprofit academic organization. It provides the nation with professional and objective analysis and scientific advice to lead policymakers to make sound policy decisions.
- The KAST actively seeks international academic collaboration and interacts with counterparts to reach the highest standards of excellence and carries out responsibilities as nongovernmental diplomacy to advance science and technology in Korea.



Vision and Strategy



Historical Highlights

1900 >>



1994

- The Korean Academy of Science and Technology was established
- The 1st President Wan Kyoo Cho inaugurated

1995

- KAST policy study report published
- International symposium celebrating the establishment of KAST held

1996

- KAST roundtable discussion launched
- The 1st KAST distinguished scholars lecture held

1997

- KAST colloquium launched
- Young Scientists Awards established and awarded

1998

- The 2nd President Mu Shik Jhon inaugurated



1999

- KAST Science and Technology Awards established
- KAST International Symposium launched

2000 >>

2000

- Signed an MOU with the Royal Swedish Academy of Sciences
- The Association of Academies and Societies of Sciences in Asia (AASSA) launched and the secretariat opened

2001

- The 3rd President In Kyu Han inaugurated



2002

- KAST Advisory Committee founded

2003

- New KAST building completed
- The 1st Voice of the KAST announced



2004

- The 4th President Kun Mo Chung inaugurated
- "The Project of "The Korea Science & Technology Hall of Fame" transferred to KAST



2005

- KAST promoted to a statutory organization by a revision to the Act on the Promotion in Researches in Basic Science
- "English/Korean and Korean/English Key Science & Technology Terminology Dictionary" published

2006

- "Distinguished scholars talk about science & technology" series published

2010 >>

2007

- The 5th President Hyun-Ku Rhee inaugurated
- "Ethics Code in Science & Technology" announced



2008

- Mentor Program for Outstanding Students launched

2009

- Launched the memoir project of the deceased members

2010

- The 6th President Kil-Saeng Chung inaugurated
- Joined the Inter Academy Partnership for Science (IAP for Science)
- National Assembly-KAST Society for Science, Technology and Innovation initiated



2011

- The 1st Prestige Workshop held
- The 1st Frontier Scientists Workshop held

2012

- Inter-Academy Seoul Science Forum (IASSF) launched
- The Association of Academies and Societies of Sciences in Asia(AASSA) established and hosted its secretariat



2013

- The 7th President Sung Hyun Park inaugurated



2014

- "Meeting with distinguished scholars of KAST" held
- "20 Years of the KAST History" published

2015

- "Cargill-KAST Bioscience Award," "Daesang-KAST Food Science Award" launched

2016

- The 8th President Myung-Chul Lee inaugurated
- Elected as an Executive Committee member of the IAP for Science
- Organized the project for honorable treatment and support for the persons of distinguished service in science & technology



2017

- Young Korean Academy of Science & Technology (Y-KAST) launched
- Korea Science Week 2017 held
- Nobel Prize Dialogue Seoul 2017 held



2018

- Sejong Science & Technology Forum held

2019

- The 9th President Min-Koo Han inaugurated
- The InterAcademy Partnership (IAP) General Assembly held
- "S-Oil Young Scientist Award" launched



2020

- Joined the International Science Council (ISC)
- "The National Science Challenges Support & Network" launched
- Transferred and reviewed the Korea Science Award and Korea Engineering Award project
- The KAST Award in Physiology or Medicine established and awarded
- Implemented production projects, including science and technology Braille books, audiobooks, and sign language lecture videos for the socially disadvantaged

2021

- Amgen-KAST Biotechnology Award launched
- Proposed and prepared the IAP statement

Membership

The KAST consists of approximately 1,000 members, who together represent the country's foremost expertise in the sciences. The KAST contributes to progressing science in Korea supported by its members' exceptional professional expertise. Its members are elected by peers in recognition of distinguished achievement in their respective fields in both Korea and international communities.

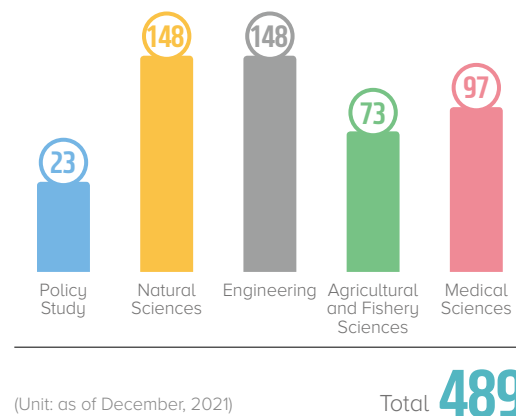


Status of members

The KAST members are categorized into Fellow, Foreign Member, Associate Member, Honorary and Patron Member.

Fellow (Under 70 years of age)

- **Qualification:** Korean scholars who have 25 years or more of experiences in science & technology with an outstanding academic achievements in development of science & technology
- **Term:** Until 70 years of age



Fellow (Over 70 years of age)

- **Qualification:** Retired Fellows
- **Term:** Lifetime

448 (Unit: as of December, 2021)

Associate Member

- **Qualification:** Selected from excellent scientists up to 100 persons
- **Term:** 5 years, possible to be reelected once

27 (Unit: as of December, 2021)

Foreign Member

- **Qualification:** Foreign Scholars who have made outstanding academic achievements

60 (Nobel Prize Laureates: 31)
(Unit: as of December, 2021)

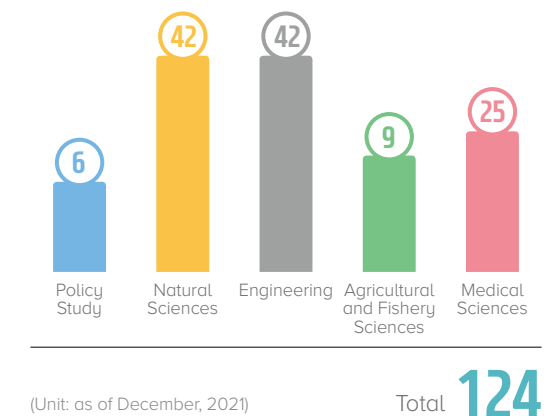
Honorary and Patron Member

- **Qualification:** Individuals, corporations and organizations supporting the KAST programs

9 Honorary member (Unit: as of December, 2021) **1** Patron member (Unit: as of December, 2021)

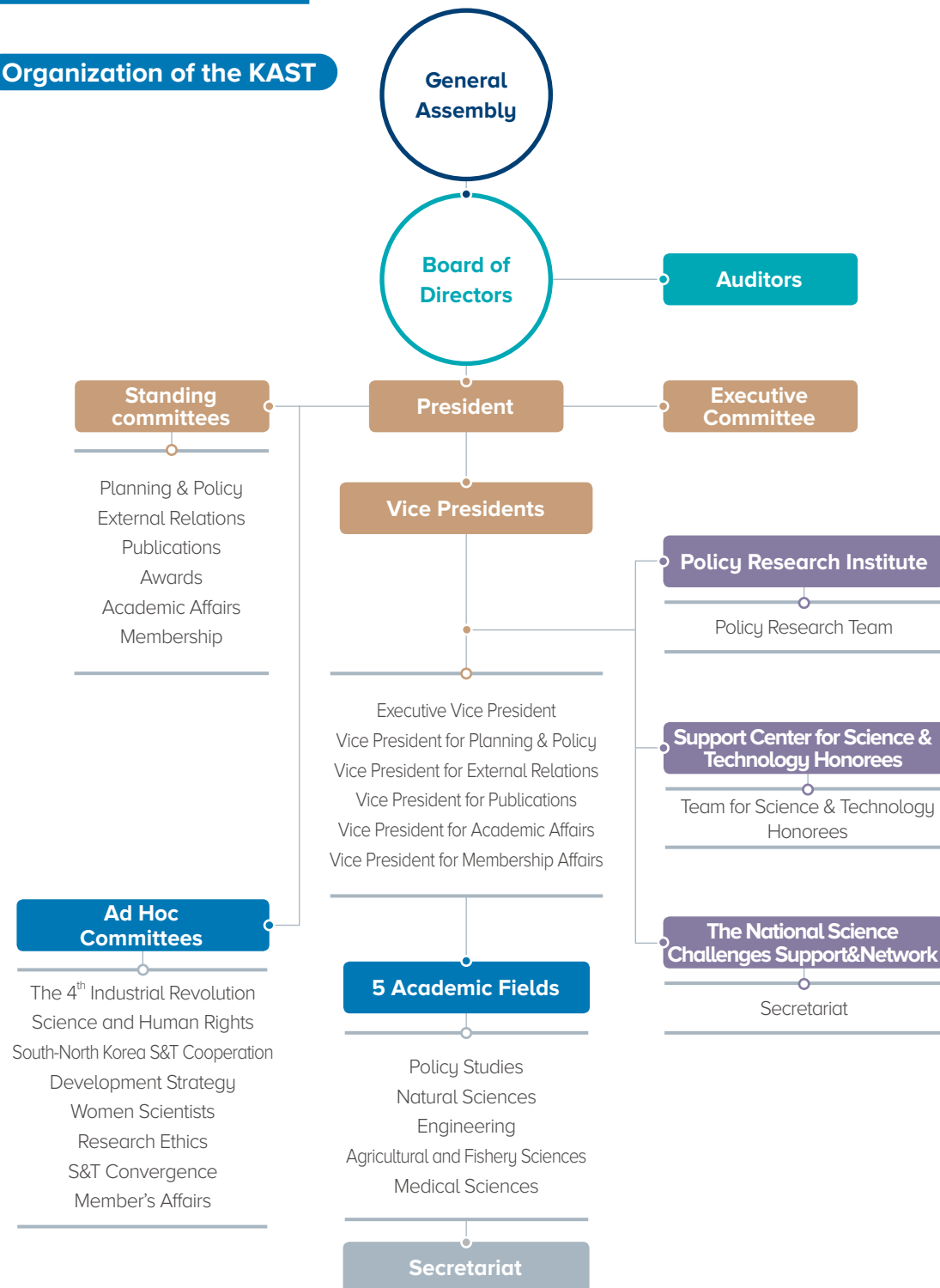
Young Korean Academy of Science and Technology (Y-KAST) Member

- **Qualification:** Brilliant young Korean scientists who are 45 years old or less
- **Term:** 3 years, possible to be reelected until 45 years of age



Organization

Organization of the KAST



Board of Directors

Chairman



Myung-Chul Lee
Prof. Emeritus of Seoul National University

Director



Dohan Kim
Prof. Emeritus of Seoul National University



Jin Hyung Kim
President of Artificial Intelligence Research Institute



Choon-Sik Park
Prof. of Soonchunhyang University



Kee-Yeoup Paek
Distinguished Prof. of Chungbuk National University



Kong-Rae Lee
President of Asia Innovation Research Institute



Mooha Lee
Prof. Emeritus of Seoul National University



Yong-Hee Lee
Prof. of KAIST

Auditor



Jin-Ho Seo
Prof. Emeritus of Seoul National University



Changhee Lee
Prof. Emeritus of Hanyang University



Jeongbin Yim
Chair Prof. of Soonchunhyang University



Ki Ryun Choi
Prof. Emeritus of Ajou University



Seung-Bok Choi
Prof. Emeritus of Inha University



Hunjoo Ha
Prof. of Ewha Womans University



Min-Koo Han
Prof. Emeritus of Seoul National University



Sangwook Kang
Director General of Future Talent Policy Bureau of Ministry of Science and ICT



Jong-Yil Chai
Prof. Emeritus of Seoul National University

Executive Committee



Min-Koo Han
President
Prof. Emeritus of Seoul National University



Jin-Ho Chung
Executive Vice President
Prof. of Seoul National University



Soon Hyung Hong
Vice President for Planning & Policy
Prof. Emeritus of KAIST



Doo Sung Lee
Vice President for External Relations
Prof. of Sungkyunkwan University



Hoguen Kim
Vice President for Publications
Prof. of Yonsei University



Sung-jin Kim
Vice President for Academic Affairs
Prof. of Ewha Womans University



Yun Jaie Choi
Vice President for Membership
Prof. of Seoul National University



Tae-Eog Lee
Division Chair for Policy Studies
Prof. of KAIST



Woo Young Lee
Division Chair for Natural Sciences
Prof. of Seoul National University



Tai Hyun Park
Division Chair for Engineering
Prof. of Seoul National University



Myung Ho Jeong
Division Chair for Medical Sciences
Prof. of Chonnam National University



Dae Young Kwon
Division Chair for Agricultural and Fishery Sciences
Senior Researcher of Korea Food Research Institute



Youngsook Lee
Director for Domestic Cooperation
Prof. of POSTECH



Haechon Choi
Director for International Cooperation
Prof. of Seoul National University



Byoung-ho Lee
Chair of Y-KAST
Prof. of Seoul National University



Jea-Gun Park
Director for Domestic Academic Affairs
Prof. of Hanyang University



Mi-Ock Lee
Director for International Academic Affairs
Prof. of Seoul National University



Jang-Ryol Liu
Support Center for Science & Technology Honorees / Director
Honor Researcher of Korea Research Institute of Bioscience and Biotechnology



Changmo Sung
National Science Challenges Support & Network / Director
Prof. of Korea University Green School

Advice for Policy Makers and Society

The research and advice of the KAST serve as a compass which guides policymaking on science and technology in the country. Armed with experts of every distinctive field, the KAST proposes a science and technology-based approach to address pending social issues. The members also gather insights and experiences to seek ways to bring innovation to science and technology.

KAST Roundtable Discussions

As the institution's most representative forum for policy discussion since 1996, the KAST's Roundtable Discussions is established to formulate long-term visions and development strategies, and to explore solutions for pending issues in science & technology. Distinguished scholars of the KAST and other experts in diverse areas discuss in depth about extensive issues, which directly affect the people's lives as well as policies in science and technology. In 2021, a total of 32 discussion meetings were held for science and technology experts to present their opinions on social issues.

The flood of infodemic in the pandemic era is a social terror that not only disrupts quarantine or creates social anxiety, but also poses a serious threat to the lives of the people. Thus, the KAST has strived to deliver the most necessary information to the people by holding a joint discussion forum in which experts participated to deliver COVID-19 information based on scientific facts.

Moreover, we analyzed various emotional disease patterns induced by contact-free environment by

holding a joint forum with KOFST and the Korea Brain Research Institute (KBRI), sought public health promotion through brain science, and hosted the "Science & Technology Powerhouse Forum" with the goal of operating a "science-first" government policy by uniting the minds of the members of the both ruling and opposition parties, who are the main body of legislation. Furthermore, ahead of the 2022 curriculum revision, the KAST gathered the experts representing education, industry, the National Assembly, government and media to discuss curriculum improvement to strengthen information education. In addition, the discussion was expanded to include "talent cultivation in the age of AI," "government-funded research institutes," and "Korean universities' research competitiveness," and continued policy proposals for education innovation and enhancement of science and technology competitiveness for future generations. With young scientists as the key members, we proposed necessary policies while looking at the changes that advanced science and technology such as "metaverse," "autonomous driving vehicles," "neuromorphic chip," etc., will bring to our society.



Exclusive KAST open forum

Fourteen open forums were held with the experts in the field on the subject proposed by the KAST members.

Date	Theme
Feb. 19	Objectivity analysis of world university ranking and suggestions for domestic universities
Apr. 2	Nurturing talent in the era of AI
Apr. 7	Science and technology challenges and suggestions for the achievement of Carbon Neutrality 2050
Apr. 15	Present and future of government supported research institutes
Apr. 30	Metaverse, the future value of a new virtual convergence platform
May 27	Telemedicine: present and future
Jun. 17	Cultured meat: Is it the food of the future?
Jun. 30	Support for foreign national researchers in Korea and improvement plan
Jul. 6	The present and future of domestic university research competitiveness
Jul. 16	Children's future put to the curriculum revision in 2022: Is digital transformation possible without information education?
Oct. 15	A self-thinking car beyond self-driving
Nov. 18	Asking the next government about the policy for women scientists and engineers (KAST, the Korea Federation Women's Science & Technology Associations (KOFWST), the Korean Federation of Science and Technology Societies (KOFST), the Association of Korean Woman Scientists & Engineers (KWSE))
Dec. 6	The next government's task for a leap to a science and technology-based society (KAST, KOFST)
Dec. 13	Neuromorphic chip, a future semiconductor containing the human brain

Joint Discussion with relevant organizations

The KAST prepared an event for science and technology experts to discuss major issues, such as COVID-19, and held an open forum to collect opinions from the field on major policies promoted by the government and national organizations. Ministry of Science and ICT, Korean Federation of Science & Technology Societies (KOFST), National Academy of Medicine of Korea (NAMOK), National Academy of Engineering of Korea (NAEK), Korea Brain Research Institute (KBRI) participated in the event.

Subject	Date	Theme
COVID-19	Jan. 29	COVID-19 vaccine update
	Feb. 26	Is COVID-19 a prelude to a fourth pandemic?
	Apr. 9	COVID-19 and the future of Korea's health care
	May 7	Prolonged impact of COVID-19 on mental health and society
	Jun. 4	Is the COVID-19 vaccination really safe?
	Jul. 7	Should we really get the COVID-19 vaccine? - Vaccine hesitation and what we need to know
	Sep. 2	Mutant COVID-19 (novel Corona) infection and countermeasures
	Nov. 11	Adverse reaction of COVID-19 vaccines
	Nov. 30	Will I be okay this winter from COVID-19 infection?
	Dec. 7	What are our countermeasures to the increase in the number of critical patients of COVID-19?
Brain Research	Mar. 25	Emotional disease and brain research in the era of COVID-19
	Jun. 11	Addiction and brain research in the post-COVID-19 era
	Sep. 3	Beyond BCI: the future of humanity that the brain-computer interface will change
	Dec. 22	The present and future of brain research using big-data in the era of brain new deal
Science & Technology Powerhouse Forum	Jun. 29	The 1 st Science & Technology Powerhouse Forum: National strategy based on science and technology
	Dec. 2	The 2 nd Science & Technology Powerhouse Forum: Science and technology policy direction of the next government
Others	Aug. 11	Calling for the curriculum reform for the future generation in the era of SW/AI
	Nov. 26	Measures to strengthen the special research agent system for a leap forward in global science and technology

Policy Study Reports

The KAST members conduct research and write reports on Korea's mid-to long-term policies in science and technology, and suggest to the government to reflect the research results into national science and technology policies. These suggestions primarily cover following issues;

- ▲Creating the foundation for promoting research in basic science
- ▲Assessing and advising policies in science and technology
- ▲Encouraging young talents to study science, and etc.

In 2021, 5 research reports were published.

No.	Title
139th	Current status and issues of science and technology for telemedicine in Korea
140th	Policy suggestion on how to assess scholars in science and technology
141th	Current status and future policy direction on “Protection of Marine Environments” activity
142th	Diversifying career paths of women in science and technology
143th	Developing science & technology policies for improved quality of life



Voice of the KAST

The “Voice of the KAST” is designed to provide a long-term vision and development strategy for national science and technology, provide scientific and technological approaches to the current issues of the nation/society and derive solutions thereof.

Based on the expert analysis and opinions of scholars in related fields, improvement schemes for policies, related laws and regulations are proposed

and also distributed to the Korean government, the National Assembly, and related organizations.

Started off with the first edition titled “Korean students avoiding science and engineering | How to elevate status of the Korean science and technology,” publications had been made about 5 to 10 times a year. In 2021, eight editions were distributed, totaling 96 editions thus far.

No.	Title
89th	Analysis of the objectivity of global university evaluation institutions and suggestions to raise the global status of domestic universities
90th	Trends in the international community and the direction of science and technology policy for the achievement of Carbon Neutrality 2050
91th	Four strategic suggestions for a leap of government supported research institutes
92th	What are the overcoming tasks and solutions for the realization and positive use of the metaverse?
93th	Educational innovation plan for cultivating talent in the era of AI
94th	How should telemedicine care be realized in the contact-free era? The current status of domestic science and technology and tasks to overcome for the realization of telemedicine care
95th	In the age of thinking automobiles, what should we prepare?
96th	Development of science and technology policies for a leap to a science and technology-based society



Next-generation Reports

“Next-generation Reports” is policy recommendation based on the thoughts and ideas of young scientists, mainly the members of the “Young Korean Academy of Science and Technology (Y-KAST).”

Each report contains policy approaches to support promising science and technology research areas and core technologies to strengthen national competitiveness on the global stage.

No.	Title
Vol.05	Thinking cars, the mobility beyond self-driving
Vol.06	Science and technology 2050, seeing through the eyes of a young scientist
Vol.07	The way forward for universities when facing the era of the school-age demographic cliff
Vol.08	How to prepare for a new pandemic?



Infographic Book

The KAST publishes “Infographic Book” containing highlights of Policy Study Reports and Next-generation Reports, and distributes them to middle and high schools and decision makers to help them

understand our suggestions and recommendations more easily. Infographic Books are also available online via the KAST website and other channels.



Other Entrusted Projects

The KAST has been operating the “National Science Challenges Support & Network (NSCN)” for the successful execution of the “National Convergence Research of Scientific Challenges Project,” which is a leading convergence R&D project that approaches unresolved scientific challenges with creative and innovative ideas.

We are in charge of discovering and selecting candidates for scientific challenges, and planning customized scientific challenges. We support conferences, annual reports, and international cooperation activities where researchers can exchange knowledge and experiences accumulated through challenging scientific research.

Overview of Scientific Challenges Convergence R&D Project and NSCN

Science Challenge Convergence Research Development Project

- **(Purpose)** Discover and define scientific challenges through the collective intelligence of researchers, and present the possibility of solving them through unprecedented approaches and convergence between fundamental science and engineering
- **(Promotion strategy)** ① Collective intelligence, ② Openness / sharing, ③ Challenging Convergence
- **(Period and scale)** 2020 - 2025 (6 years)/Around 48 billion won

National Science Challenges Support & Network (NSCN)

- **(Goal)** Successful launch and foundation of the science challenge convergence research project
- **(Roles and tasks)**

Establishment and operation of the scientific challenges discovery system

Planning of Korean-style scientific challenges

Support for research performance (operation of a specialized committee)

Support for international cooperation

Dissemination of research results



National Science Challenge Initiatives of 2021



Center for Gravitational Wave Universe

Revealing of the nature of dark energy through multi-messenger astronomy and artificial intelligence

- **Principal Investigator** : Professor Lee Hyung-mok Seoul National University



Center for ST Magnetic Fusion Metawear

Solving the difficulties of fusion by implementing virtual fusion furnaces combining GPU parallel computing and artificial intelligence and securing the foundation for construction with small ST fusion power generation

- **Principal Investigator** : Professor Hwang Yong-seok Seoul National University



Center for Targeted Neural Networks Reconstruction

Development of multi-sequential magnetic multibot-based platform for reconstruction of neural network

- **Principal Investigator** : Professor Choi Hong-soo DGIST

People-friendly Science Promotion

The KAST takes the initiative in nurturing talents in science and technology to strengthen the national competitiveness in the future. All members of the KAST are committed to sharing their expertise and knowledge with the public to fulfill their noblesse oblige. The KAST tries to create a society where everyone can enjoy science. To this end, the academy carries out a variety of activities, factoring in the specific needs of target recipient. The KAST aims to build a science and technology society without discrimination by reinforcing scientific and cultural activities for the socially underprivileged.



Meeting with Distinguished Scholars of the KAST

This is a nationwide science lecture program in which the KAST members directly visit young students under the slogan of “Meeting between leading scientists of the country and young talents who will lead the future.”

If schools apply for the program, distinguished scholars of the KAST will visit schools, deliver lectures on latest science and technology, and provide students with counseling on their career paths.

With the exceptional responses from the participating schools, the program was further expanded in 2014.

KAST has been selecting schools in areas where scientific, technological, and cultural benefits, and information are weak, compared to those of Seoul.

In 2021, the lectures were held at 90 schools with the timely topics that satisfy the intellectual curiosity of students, such as “new materials engineering in the new normal era,” “AI and big data,” “agricultural life science in the Fourth Industrial Revolution Era,” “precision medicine and COVID-19,” “environmental engineering,” etc., and 83 of them were non-metropolitan schools.

2021 statistics



No. of lectures

90 times



Attendees

Approximately 7,695 students



Number of lectures targeted at schools located in rural areas

83



Mentoring Program for Outstanding Students

This is a mentoring program which provides an opportunity of 1:1 mentoring with distinguished scholars in science & technology of Korea. It was designed for scientifically talented 1st and 2nd year high school students to further develop their talents in science and technology. This program motivates creative students to grow into excellent scientists through 5-month long systematic mentoring.

In order to help students to carry out their own projects, their mentors are those from among the top scholars in the fields of mathematics, physics, chemistry, life sciences and bioengineering. The program application rate is increasing every year

because of its reputation for effective learning methods focused on experimentation and practice, as well as the enthusiastic mentees.

In particular, the KAST focused on striking a balance between regions and realizing gender equality by prioritizing the selection of students from rural areas and female students as mentees.

Moreover, in 2021, special lecture and mentoring session by Professor Young-Kee Kim of the University of Chicago, who was the first Korean to be elected to the American Physical Society (APS) presidency, were held, and the best mentee was selected and given a research presentation.

2021 statistics



No. of mentees

31 mentees



No. of mentors

30 mentors



Proportion of students
from rural areas

65% (20persons)



Proportion of female
students

55% (17persons)

Publication of NASA Braille and Tactile Books (Korean)

As part of the social contribution project in 2021, the KAST has published a general science book that easily explains three types of tactile books published by NASA in Korean. It consists of a package of tactile material to feel the real universe with the sense of touch, a Braille guidebook for the visually impaired

and a guidebook for general elementary and middle school students, and has been distributed to special schools for the disabled and Braille libraries. We aim to provide opportunities for visually impaired, to explore the universe and astronomy with the sense of touch.



1. TOUCH THE UNIVERSE : A NASA Braille Book of Astronomy (Author Noreen Grice / 2002)
2. Getting a Feel for Lunar Craters : Apollo 50th Commemorative Edition (Authors Cassandra Runyon, David Hurd, Joseph Minafra / 2019)
3. MARS : EXPLORATION PROGRAM (Authors Cassandra Runyon, David Hurd, Joseph Minafra / 2012)

Publication of “Distinguished Scholars Talk about Science and Technology” Series

In 2006, the KAST began publishing the “Distinguished Scholars Talk about Science and Technology” series in order to distribute quality books on science and technology, and to support the circulation of the Koreans’ scientific and technological mindset. By publishing this series, the KAST is also able to support the research and writing done by the KAST members while contributing to the improvement of the quality of scientific and technological publications in Korea.

In 2021, 38th, 39th, 40th, 41st and 42nd editions of “Distinguished Scholars Talk about Science and Technology” series were published. These books were distributed for free to approximately 600 middle and high schools in rural and remote areas, local libraries, and more for their use in youth science education and to enhance youths’ interest in the fields.

No.	Title / Author	
Volume 38	A Story on Advanced Materials - Author: Prof. Kim Young Keun, Korea University	
Volume 39	Science of Smell and Taste - Author: Prof. Park Tai Hyun, Seoul National University	
Volume 40	I Protect My Immunity - Author: Prof. Bae Sang-Cheol, Hanyang University	
Volume 41	Exploring the Biodiversity of Our Fish - Author: Prof. Kim Ik Soo, Chonbuk National University	
Volume 42	An Easy-to-Understand Earthquake and Building Story - Author: Prof. Lee Li-Hyung, Hanyang University	

International Collaboration

The KAST cooperates with 46 academic institutions in 37 countries around the world, serving as a pillar of civil diplomacy in the fields of science and technology. We raise the status of Korea's science and technology and promote the globalization of Korean science and technology by strengthening cooperation with international scientific and technological organizations and overseas academies, and through the executive committee activities of the IAP for Science and the operation of the secretariat of the Association of Academies and Societies of Sciences in Asia (AASSA).



Cooperation with International Academic Organizations

The KAST cooperates with international organizations and national scientific academies in the world, serving as a pillar of civil diplomacy in the fields of science and technology. As an Executive Committee member of the IAP for Science, the world's largest scientific society, we are participating in major projects aimed proactively addressing current issues of the global science and technology community, thus increasing the global presence of Korea. In 2021, the first "Protection of Marine Environments" statement proposed by the KAST was officially announced at the IAP, the world's largest international organization for science and

technology. We also held an online symposium led by domestic marine science experts, who participated in preparing the statement to inform the urgency of protecting the marine environment and conserving the marine ecosystem. Afterward, 46 institutions, including universities, government agencies, companies, and research institutes, expressed their support in Korea and participated in the Korean statement, leading to effective domestic publicity. The KAST will lead global policy proposal activities that prepare practical social change and scientific and technological countermeasures based on the research results of Korea's top scholars.

Announcement of IAP Statement on Protection of Marine Environments

Date	Jun. 1, 2021 (Tue)
Topic	Protection of Marine Environments
Proposed by	Korean Academy of Science and Technology (KAST)
Content	Five solution tasks to restore the integrity of the sea ① Ocean health ② Habitat destruction ③ Environmental contaminants ④ Climate change ⑤ Overexploitation
Participating Agency	Signed by 75 international academies including the USA, the UK, Germany, France, Sweden, Canada, China, and Japan, etc. 46 domestic organizations and universities including Seoul National University expressed their support for the statement

IAP Statement

It is a document that proposes integrated recommendations of academies around the world on major policies related to global scientific issues, and one or two statements are published annually.

The statement is disseminated to both the academies of IAP member countries and international scientific organizations, and used as a guide for sharing and solving major issues in the international scientific and technological community.

Announcement of G (7+4)-Science Academy Statement

Host	The Royal Society
Announcement	<ul style="list-style-type: none"> Policy recommendations for achieving 2050 carbon neutrality Urge for data cooperation to respond to global health crises Warning of the necessity of emergency measures for various crises such as biodiversity and climate change
Participant	Canada, France, Italy, Germany, Japan, the UK, the USA, Korea, Australia, South Africa



The 20th Science Council of Asia (SCA) Conference

The Age of New Materials: Innovation for Sustainable Society

Host	China Association for Science and Technology (CAST)
Date	May 13 (Thu) – May 15 (Sat), 2021
Attendee	Doo Sung Lee Vice President for External Relations (Professor Emeritus, Sungkyunkwan University)

Science 20

Pandemic preparedness and the role of science

Host	Accademia Nazionale dei Lincei, Italy
Date	Sep. 22 (Wed) – Sep. 23 (Thu), 2021
Attendee	Min-koo Han President (Professor Emeritus, Seoul National University)

The 2nd ISC General Assembly 2021

Host	International Science Council (ISC)
Date	Oct. 11 (Mon), 2021 – Oct. 15 (Fri), 2021
Attendee	Doo Sung Lee Vice President for External Relations (Professor Emeritus, Sungkyunkwan University)

IAP Joint Annual Meeting

Host	IAP general meeting attended by the representative of the Academy of each county
Date	Oct. 27 (Wed), 2021
Attendee	Doo Sung Lee Vice President for External Relations (Professor Emeritus, Sungkyunkwan University) Yoo Hang Kim AASSA President (Professor Emeritus, Inha Universty, Fellow, KAST) Mooha Lee AASSA Secretariat (Professor Emeritus, Seoul National University, Fellow , KAST)
Main Activities	Announcement of the “Climate Change and Biodiversity: Interlinkages and policy” statement, etc.

International Symposium

The KAST International Symposium is an open symposium, in which major international science and technology issues are selected as themes, and domestic and foreign experts participate.

In 2021, in-depth lectures and discussions were held on topics such as solving mathematical problems, COVID-19 prediction research, mRNA vaccine and delivery system (LNP) technology trends, smart

farms and food safety, cardiovascular disease, ethical biomedical research, and OLED. The KAST has broadened the basis of domestic science and technology research and established an opportunity for the next generation research groups to leap forward to a world-class level through research exchanges with world scholars including Prof. Akshay Venkatesh, the 2018 Fields Medal winner.

No.	Date	Theme
44th	Feb. 5	Advanced Therapy in Cardiovascular Regeneration
45th	Feb. 27-28	Periods of Automorphic Forms
46th	Mar. 31	COVID-19 Pandemic Forecasting Accelerator:Trailblazing New Frontier of Prediction Science & AI
47th	Jun. 18	Research in Biomedical Science: How to Conduct in Better Scientific and Ethical Way?
48th	Aug. 4	Recent Advances in the Development of mRNA Therapeutics and Their Delivery Systems
49th	Sep. 24	What is the limit of lifetime and color purity of OLED?
50th	Nov. 11	Smart Farm for the Innovative Food Production and Food Safety



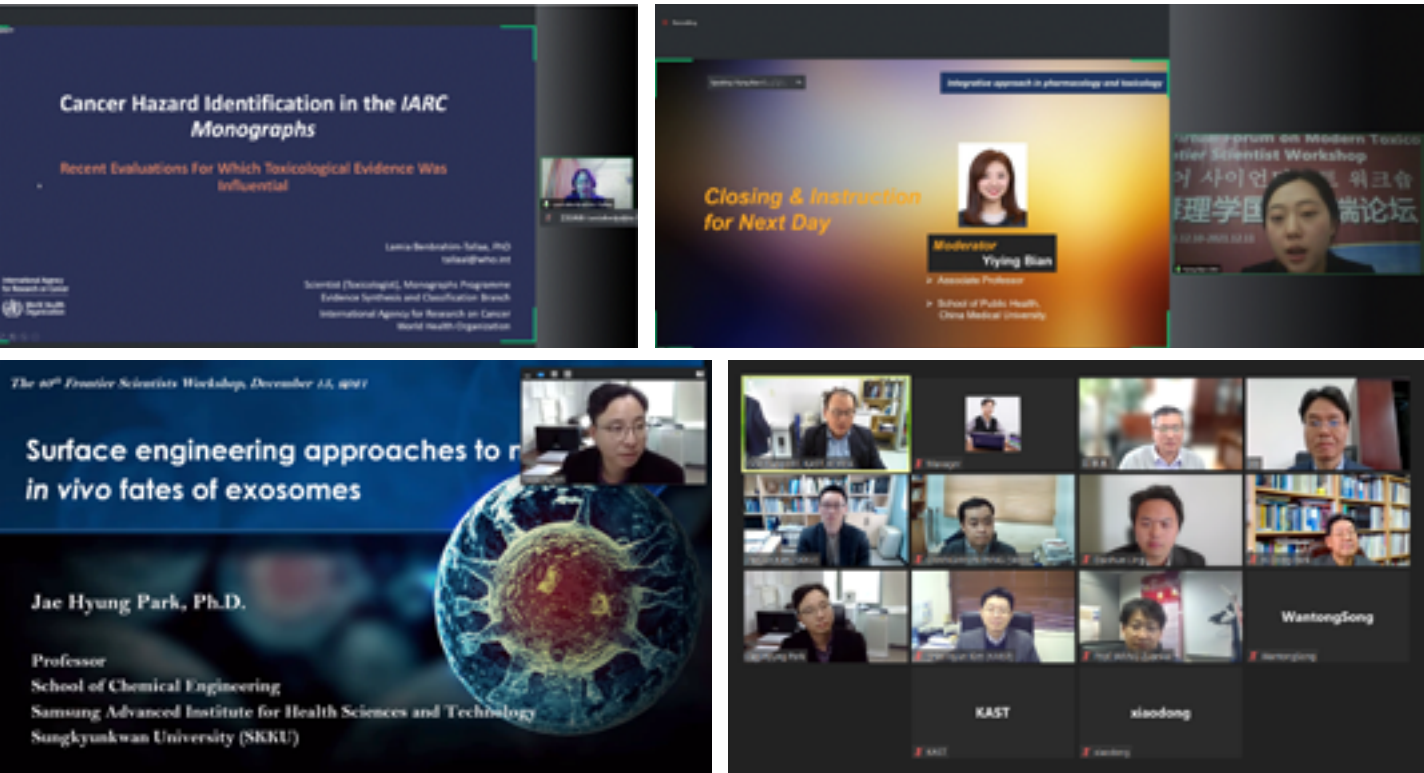
Networking with World-leading Scientists

The KAST helps Korean scholars network with their global peers and thereby expand their international influence in the field of science and technology by

supporting academic exchanges with international organizations and inviting distinguished scholars from overseas.

Frontier Scientists Workshop

No.	Date	Theme
37th	Aug. 18	Advances in Molecular Genetics of Aging
38th	Dec. 14-15	Multi-Omics Technology for Human Health and Food Safety
39th	Dec. 10-11	Integrative Approach in Pharmacology and Toxicology
40th	Dec. 15	Recent Advances in Bioinspired Materials & Interfaces



The Association of Academies and Societies of Sciences in Asia (AASSA)

The Association of Academies and Societies of Science in Asia is a non-profit international organization with science, technology and innovation (STI) interests. It consists scientific and technological academies and science societies in Asia and Oceania. It was launched in 2012 through the merger of two organizations, i.e., AASA (Association of Academies of Sciences in Asia, founded in 2000) and FASAS (Federation of Asian Societies and Academies of Sciences founded in 1984). Its current membership is 33 national academies and societies

of sciences from 30 countries and one regional academy of engineering and technology.

In 2021, AASSA analyzed the actual conditions of science education in 10 Asian countries to find ways to provide welfare and regional development through education. It signed a joint MoU with the UN Technology Bank for Least Developed Countries, and laid the practical foundation for the establishment of the Academy of Sciences in the least-developed countries in Asia.

Current Practice and Issues for Improvement in STEM Education up to K12 in Asia and the Pacific

Host	AASSA Science Education Committee
Translation/Revision	Yoo Hang Kim AASSA President (Professor Emeritus, Inha University) Mooha Lee AASSA Director, the Secretariat (Professor Emeritus, Seoul National University) Jinwoong Song Professor, Seoul National University
Participant	Korea (Operating country of the project) Australia, Bangladesh, China, Indonesia, Japan, Singapore, Sri Lanka, Thailand, Turkey
Content	A national report summarizing the current situation of each country under the common theme of the “Status of STEM (Science, Technology, Engineering, Mathematics) education up to 12th grade (K-12) and improvement plans”

Joint MoU with the UN Technology Bank for Least-Developed Countries

- Signed a joint MoU with the UN Technology Bank for Least Developed Countries
- Promoted the establishment and development support of the Academy of Sciences, which plays an important role in the sustainable development of underdeveloped countries in Asia and national development in economic and social fields.

The 5th AASSA General Assembly

Date	Oct. 15 (Fri), 2021
Venue	Online (Korea)
Attendee	Yoo Hang Kim AASSA President Mooha Lee AASSA Secretariat Hogeun Kim Vice President for Publications (Professor Emeritus, Yonsei University)
Content	Report on AASSA activities and board election

BAS-AASSA Webinar

Plastic Pollution : Causes, Effects and Solutions

Date	May 29 (Sat) – May 30 (Sun), 2021
Venue	Online (Dhaka, Bangladesh)
Host	Bangladesh Academy of Sciences (BAS) & AASSA
Domestic Attendee	Yoo Hang Kim AASSA President (Professor Emeritus, Inha University)
Major Achievement	<ul style="list-style-type: none"> • Urging for the solutions to plastic waste pollution • Proposing a ban on the use of polyethylene, common use of hemp-based products, active support for the production of hemp-based items at the government level, reinforcement of education on environmental pollution, restraint on the use of plastics on social media, and active use of science academies as an environmental pollution think tank

AASSA – AIPI International Webinar

DIGITAL SCHOLARLY COMMUNICATION

Date	Mar. 31 (Wed), Apr. 28 (Wed) and May 19 (Wed), 2021
Venue	Online (Jakarta, Indonesia)
Host	Indonesian Academy of Sciences (AIPI) & AASSA
Domestic Attendee	Yoo Hang Kim AASSA President (Professor Emeritus, Inha University)
Major Achievement	<ul style="list-style-type: none"> • Held three international webinars on the theme related to Digital Scholarly Communication • Promoted “Open Access” that allows universal access to scientific research and its results in accordance with UNESCO Recommendation on Open Science • Ruminated that the development of a vaccine and treatment for COVID-19 is the value of sharing and cooperation • Urged for a knowledge ecosystem where anyone can freely access scientific knowledge

Conversation with Scholars

KAST has been holding the lecture series with Nobel Laureates, to form a public understanding and consensus on science and technology, and to inspire future scientific talents.

The online conversation can be viewed via the KAST YouTube channel and the viewers can freely state

their opinions while talking with the scholars through the chat window. The Nobel Laureate public lectures on the topics of their academic achievements, their life as a researcher, scientific development, and social impact have been well received by many people, including middle school, high school, and university (graduate) students.

Conversation with Nobel Laureate

Live Talk with the Nobel Laureate

Dream Big: Being a Scientist beyond Nobel Prize

Date	Oct. 20 (Wed), 2021
Speaker (Chair)	<p>Donna Strickland Professor, University of Waterloo, Canada, 2018 Nobel Laureate</p> <p>Junsuk Roh Professor, POSTECH (Member, Y-KAST)</p> <p>Jihyun Lee In the master's course, Dept. of Electric Information Engineering, Seoul National University</p> <p>Chanhee Lee Sophomore, Hanmin High School</p>



Cover of Asia Science Education Report



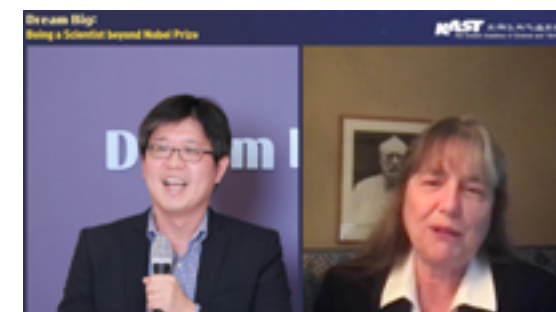
Joint MoU with UNTB



AASSA-AIPI Webinar



E.B and General Assembly



Special Talk with the Nobel Laureate

James Webb Space Telescope That Will Solve the Mysteries of the Universe

Date	Dec. 2 (Thu) , 2021
Speaker	John Mather Senior astrophysicist, NASA Goddard Space Flight Center, 2006 Nobel Laureate in physics
MC	Seongjoo Lee Professor, Seoul National University (Member, Y-KAST)
Pre-commentary	Yujin Yang Senior Researcher, Korea Astronomy and Space Science Institute
Host	Jonghak Woo Professor, Seoul National University



Conversation between Prof. Jonghak Woo and Dr. John Mather



James Webb Space Telescope

Conversation with Scholars

The 2nd Online Conversation with Scholars

Innovative Drug Delivery System

Date	Nov. 3 (Wed), 2021
Speaker (Chair)	Robert Langer Chair professor, MIT, co-founder of Moderna "Advances in Drug Delivery" Hyukjin Lee Professor, Ewha Womans University (Member, Y-KAST) Yu-Kyoung Oh Professor, Seoul National University (Fellow, KAST)



Conversation with Profs. Hyukjin Lee and Yu-Kyoung Oh

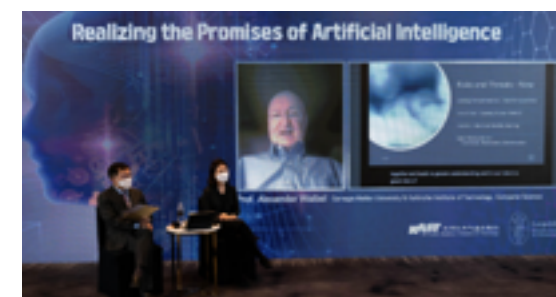


Presentation by Prof. Robert Langer

The 3rd Online Conversation with Scholar

Realizing the Promises of Artificial Intelligence

Date	Nov. 25 (Thu), 2021
Speaker	Alexander Waibel Professor, Carnegie Mellon University, USA "Artificial Intelligence at the Service of Humanity" Hyeyeon Oh Director, KAIST Institute for Artificial Intelligence "Ethnic bias in neural language models and approaches for mitigation"
(MC)	Seryun Song Professor, Kyung Hee University Law School



Conversation with Profs. Song, Oh and Waibel



Presentation by Prof. Hyeyeon Oh

Awards

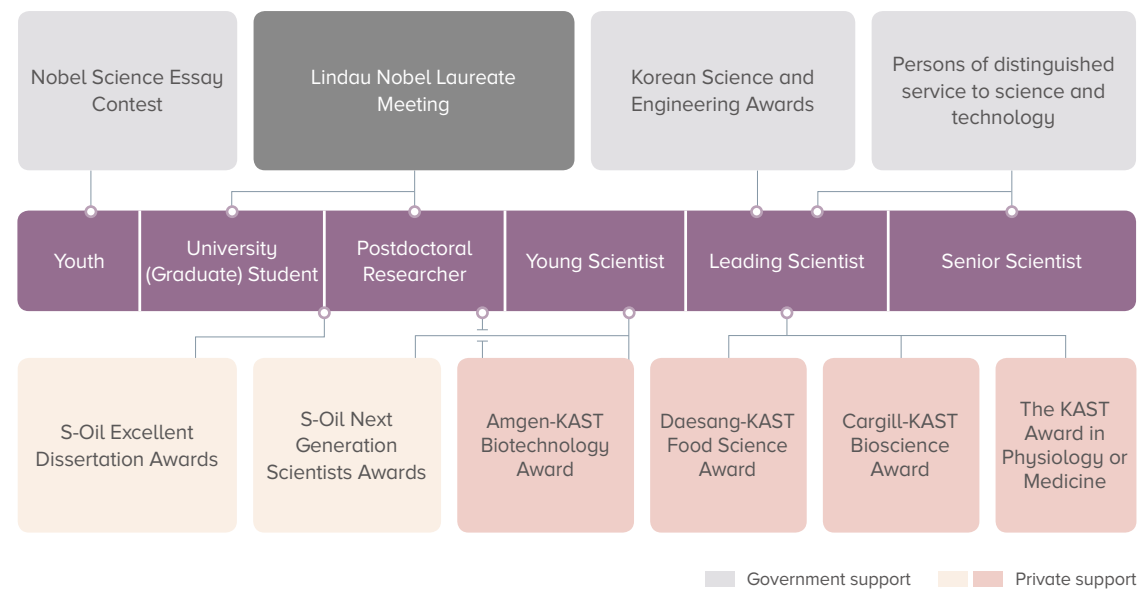
The KAST administers various award programs to recognize and encourage scientists and engineers who have made outstanding achievements in their academic fields.

With the goal of creating systematic research results over the entire life cycle of scientists and engineers, we have built our own specialized “Platform for Award Program by Life Cycle of Scientists” and continued to expand and promote it. We have been promoting support projects specialized in the growth stages of scientists and engineers, from teenagers to doctoral students, from next-generation scientists to senior scientists and highly experienced science and technology scholars.

In the future, we will do our best to lay a stepping stone for the Nobel Prize, the public’s wish, by expanding the awarding business through close cooperation with the government and the private sector.



Platform for Award Programs by Life Cycle of Scientists



In 2021, the following awards were presented: ▲Korea Science Award is an award given to scientists and engineers who have achieved outstanding world-class research accomplishments by identifying the main principles of the natural science field. ▲Korea Engineering Award is an award given to scientists and engineers who have greatly contributed to the national economy and industrial development by producing world-class research results in the engineering field. ▲S-Oil Excellent Dissertation Awards, to select talented researchers with academic passion and who have made outstanding research outcomes, in order to foster them to become the leaders of our society in the next generation; ▲S-Oil Next Generation Scientists Awards, for top-notch scientists who are 45 years of age or under. Thanks to our efforts, the S-Oil Next Generation Scientists Award was launched this year to select promising scientists with outstanding research outcomes in the fields of physics, chemistry, physiology and medicine, and materials engineering, and to provide research funds in order to further solidify the foundations of basic science research ▲Daesang-KAST Food Science Award, to support outstanding



scientists and engineers in food science; ▲Cargill-KAST Bioscience Award, to recognize internationally renowned scholars in the field of agriculture, fishery; ▲The Nobel Science Essay Contest aims to help high school students develop scientific writing skills and establish the importance of scientific and technological research by describing the effects of Nobel Prize winners’ achievements on civilization and natural ecosystems in an essay format.



The 21st Korea Science Award (Presidential Award)

Purpose	It was established in 1987 to promote Korea's independent and self-sustaining scientific development by recognizing and awarding the scientists and engineers who have achieved outstanding world-class research accomplishments through the identification of the main principles of the natural science field. It was conducted as part of the award program for outstanding scientists by the Ministry of Science and ICT.
Number of people awarded	2 persons



2021 Awardees

	Group 1 : Mathematics
	Awardee: Inkang Kim , Professor of KIAS Single research achievement: • Convergence of freely decomposable Kleinian groups (Inventiones Math, 2016)
	Group 2 : Physics
	Awardee: Yunho Kim , Professor of POSTECH Single research achievement: • Protecting entanglement from decoherence using weak measurement and quantum measurement reversal (Nature Physics, 2012)

The 17th Korea Engineering Award (Presidential Award)

Purpose	It was established in 1994 to increase the research motivation of scientists and engineers, and establish a creative research environment by recognizing and awarding the scientists and engineers who have greatly contributed to the national economy and industrial development through the production of world-class research achievements in the engineering fields. It was conducted as part of the award program for outstanding scientists by the Ministry of Science and ICT.
Number of people awarded	2 persons



2021 Awardees

	Group 1 : Electrical Electronics, Computer, Information Communication, etc.
	Awardee: Tae-Eog Lee , Professor of KAIST Single research achievement: • Scheduling Cluster Tools With Ready Time Constraints for Consecutive Small Lots (IEEE TRANSACTIONS ON AUTOMATION SCIENCE AND ENGINEERING, 2013)
	Group 2 : Machinery, Metals, Ceramics, Aviation, Shipbuilding, Resources, Industrial Engineering, etc.
	Awardee: Tae-Woo Lee , Professor of Seoul National University Single research achievement: • Overcoming the electroluminescence efficiency limitations of perovskite light-emitting diodes (Science, 2015)

The 3rd S-Oil Next Generation Scientists Awards

Purpose	To encourage scientists who are 45 years of age or under working at domestic universities or research institutes with outstanding research outcomes in 6 areas including physics, chemistry, physiology or medicine, chemical/materials engineering, energy, and IT
Number of people awarded	6 persons (one for each six fields)
Sponsorship	S-OIL Science Culture Foundation is a public foundation established by S-OIL in 2011 to train talented people through international exchange activity, scholarship business, and research support for social return of the company's profit.











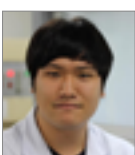

2021 Awardees


Physics		Awardee Major Achievements	Gil-Ho Lee , Professor of POSTECH Graphene-based Josephson junction microwave bolometer (Nature, 2020)
Chemistry		Awardee Major Achievements	Sanghoon Joo , Professor of UNIST A General Approach to Preferential Formation of Active Fe-N x Sites in Fe-N/C Electrocatalysts for Efficient Oxygen Reduction Reaction (J. Am. Chem. Soc., 2016)
Physiology · Medicine		Awardee Major Achievements	Choongwon Jeong , Professor of Seoul National University A dynamic 6,000-year genetic history of Eurasia's Eastern Steppe (Cell, 2020)
Chemical engineering/ Material engineering		Awardee Major Achievements	Bumjoon Kim , Professor of KAIST Flexible, Highly Efficient All-Polymer Solar Cells (Nature Communications, 2015)
Energy		Awardee Major Achievements	Jin Young Kim , Professor of Seoul National University Efficient, stable silicon tandem cells enabled by anion-engineered wide-bandgap perovskites (Science, 2020)

The 11th S-Oil Excellent Dissertation Awards

Purpose	To encourage young scientists who are striving for research in the field of the basic science of Korea, contributing to the promotion of the basic science research of Korea, and foster excellent talents that will become the leaders of our society in the next generation.
Number of people awarded	Grand prize and Excellence award in 6 fields: Mathematics, Physics, Chemistry, Biology, Chemical engineering/Material engineering and Information Technology. 24 persons in total including 1 advisor each
Sponsorship	S-OIL Science Culture Foundation,

2021 Awardees

Mathematics	 	Grand Award
		Awardee(school) Jeongin Lee , POSTECH Advisor(school) Sungmoon Cho , POSTECH Title of Thesis On the number of abelian varieties over finite fields Additive Regression with Hilbertian Responses
		Excellence Award
Physics	 	Excellence Award
		Awardee(school) Jaehoon Lee , Seoul National University Advisor(school) Panki Kim , Seoul National University Title of Thesis Heat kernel estimates for jump processes with application
		Grand Award
Chemistry	 	Grand Award
		Awardee(school) Hyungyu Song , KAIST Advisor(school) Yonghoon Cho , KAIST Title of Thesis Exciton-photon interaction in semiconductor hexagonal wire structures: from Hermitian to non-Hermitian photonics
		Excellence Award
Chemistry	 	Excellence Award
		Awardee(school) Joonyoung Ahn , Seoul National University Advisor(school) Beomjung Yang , Seoul National University Title of Thesis Band Topology of Spacetime-Inversion-Symmetric Systems
		Grand Award
Chemistry	 	Grand Award
		Awardee(school) Sanghee Yang , Seoul National University Advisor(school) Taerim Choi , Seoul National University Title of Thesis Formation of Morphologically Tunable 1D and 2D Nanostructures from Fluorescent Conjugated Polymers by Crystallization-Driven Self-Assembly
		Excellence Award
Chemistry	 	Excellence Award
		Awardee(school) Jonghoon Choi , KAIST Advisor(school) Yoonho Lee , Seoul National University Title of Thesis H ₂ and CO ₂ conversion at a cobalt center supported by an acridane based pincer-type ligand
		Grand Award

Chemical engineering/ Material engineering	 	Grand Award
		Awardee(school) Youngdong Song , KAIST Advisor(school) Cafer T. Yavuz , KAUST Title of Thesis Nickel Nanocrystals on Well-defined Supports for the Exploration of New Heterogeneous Catalysis
		Excellence Award
IT	 	Excellence Award
		Awardee(school) Jaewon Pyun , Jeonbuk National University Advisor(school) Jinhoon Han , Jeonbuk National University Title of Thesis Sustainable process design for producing biofuels and biopentenediols from lignocellulosic biomass
		Grand Award
IT	 	Grand Award
		Awardee(school) Jooheo Lee , KAIST Advisor(school) Yonghoon Kim , KAIST Title of Thesis First-principles Calculation of Electric Enthalpy at Voltage-Applied Electrochemical Interfaces
		Excellence Award
IT	 	Excellence Award
		Awardee(school) Myungchan Oh , Seoul National University Advisor(school) Hyungdong Park , Seoul National University Title of Thesis Development of GIS based PV Power Calculation Algorithm Considering Building Roofs and Facades using High-resolution Urban Spatial Data
		Grand Award



The 7th Daesang-KAST Food Science Award

Purpose	To promote the morale of scientists and engineers and find a candidate who has excellent research and development achievements in the field of food science
Number of people awarded	1 person
Sponsorship	Daesang Corporation is one of the three major fermentation companies in the world, and is a general food company which has 25 domestic and overseas subsidiaries.

2021 Awardee



Ki Hun Park, Professor of Gyeongsang National University

Major achievements:

- Comparative investigation on metabolites changes in soybean leaves by ethylene and activation of collagen synthesis (Industrial crops & products, 2020)

The 6th Cargill-KAST Bioscience Award

2021 Awardee



June Myoung Kwak, Professor of DGIST

Major achievements:

- A lignin molecular brace controls precision processing of cell wall critical for surface integrity in Arabidopsis (Cover article)(Cell, 2018)



Cheorun Jo, Professor of Seoul National University

Major achievements:

- Potential of 2D qNMR spectroscopy for distinguishing chicken breeds based on the metabolic differences (Food Chemistry, 2021)



The 1st Amgen-KAST Biotechnology Award

Purpose	To contribute to the development of Korean biotechnology and to inspire young researchers' research motivation by discovering and rewarding young researchers in Korea who have demonstrated outstanding achievements in the fields of life science and bioengineering
Number of people awarded	1 postdoctoral researcher, 1 next-generation scientist

Research achievements of the winners

Post-
doctorate
study
category



Nathaniel Suk-Yeon Hwang, Professor of Seoul National University

Major achievements:

- Novel enzymatic cross-linking-based hydrogel nanofilm caging system on pancreatic b cell spheroid for long-term glucose regulation (Science Advances, 2021)

Next
generation
scientist
category



Sejin Jeon, Ewha Womans University Research Center for Cellular Homeostasis

Major achievements:

- Anti-Inflammatory Actions of Soluble Ninjurin-1 Ameliorate Atherosclerosis (Circulation, 2020)



The 15th Science Essay Contest

Purpose	It was established to help high school students develop scientific writing skills and establish the importance of science and technology research by describing the effects of Nobel Prize winners' achievements on civilization and natural ecosystems in an essay format.
Number of people awarded	A total of 60 students in three fields, including physics, physiology, and chemistry (students: 51; teachers: 9)

Support Programs

The KAST plays a major role in creating a social climate where scientists and engineers are respected. The KAST will do its best to ensure that people in science & technology, the foundation of Korea's national competitiveness, are well-respected in our society so that they can devote themselves to R&D with high pride and confidence.

The KAST is responsible for the implementation of the "Persons of distinguished service to science and technology" and carries out activities to select and support persons who greatly contributed to scientific advances in Korea. In this way, the KAST is taking the lead in raising the honor and pride of scientists and engineers and building a social and cultural environment where they are respected. In addition, the KAST selects promising young scientists under 45 years of age as members of the Young Korean Academy of Science and Technology (Y-KAST). The KAST supports their efforts to establish exchanges with overseas Young Academies and to make science policy recommendations, in order to strengthen their leadership competencies both at home and abroad.



Persons of distinguished service to science and technology

The Korean government designates persons with distinguished merits in the contribution to national scientific and technological development, among those people in the science and technology area, engaged in R&D and technological innovation activities according to the enforcement decree of the "ACT ON THE HONORABLE TREATMENT OF, AND SUPPORT FOR, PERSONS OF DISTINGUISHED SERVICE TO SCIENCE AND TECHNOLOGY (Act No. 13579)" enacted on December 22, 2015.

The KAST was selected as the competent authority for the "Project on the honorable treatment and support for persons of distinguished service to science and technology" in 2016. The KAST selected 32 persons of distinguished service who led the development of the Republic of Korea in 2017, followed by selecting 16 persons in 2018, followed by selecting 12 persons in 2019, followed by selecting 12 persons in 2020 and have been protecting the honor of scientists and engineers.

In 2021, the KAST designated 8 scientists and engineers, who had received the accolades of their fellow scientists and engineers and the respect of the Korean citizens, as the "persons of distinguished service to science and technology in 2021."

The KAST has conducted various projects to ensure that the experiences and knowledge of the persons of distinguished service to science and technology can be passed on as a proud scientific heritage of the social community, thereby making their academic footsteps can serve as academic guides for the next generation of scientists and engineers. We have produced various scientific and cultural contents, such as interviews with people of distinguished service to S&T, publicity and tribute videos, and the "Great People of Science and Technology" video series by actively utilizing the video platform. We published the works that shed light on the knowledge and philosophy of them in various ways, such as policy recommendation, publication of a book about the meritorious records of Persons of Distinguished Service to Science and Technology, and collections of literature. Moreover, we carried out innovative cultural products, such as "The Beautiful Days of Dr. Seok Joo-myung," which exhibited 254 artifacts under the theme of the life and achievements of Dr. Seok, and the "Innovative Electronic Products that Changed Our Lives" exhibition, which looked back on the achievements of Jong Yong Yun, Wook Hyun Kwon, the living proofs of the history of the Korean electronics industry, etc.



2021 Persons of Distinguished Service to Science and Technology (8 persons in total)

Natural Science

Decd. Myung Hyo Chul (1937-2010), Former President, the Korea Institute for Advanced Study



- An outstanding mathematician who contributed to the establishment of a mathematical theory of generalization of quantum mechanics
- Solved the unsolved “Albert problem” with Prof. Okubo, an American physicist
- Contributed to strengthening the capabilities of the domestic mathematics community and enhancing its international status by working as a professor at the University of Northern Iowa, KAIST, and the Korea Institute for Advanced Study

Decd. Lee Ikchoon (1929-2016), Honorary Prof., Inha Univ.



- A chemist who laid the foundations of Korean physical chemistry
- Established the theory of structural analysis of transition state of organic reactions by proposing the concept of a cross-interaction constant
- Led the internationalization of domestic chemical research by publishing an international academic journal

Life Science

Decd. Kim Chung Yong (1935-2016), Honorary Prof., Seoul National University



- A pioneer in liver disease research that developed hepatitis B vaccine
- Greatly contributed to public health by reducing the prevalence of hepatitis B with the development of Hepa Box, a domestic hepatitis b vaccine, through isolating the hepatitis B virus from human serum and conducting preventive vaccine research
- Isolated hepatitis C virus from human serum for the first time in the world

Park Sang-Dai (1937), Honorary Prof., Seoul National University



- A life scientist who has led research in biotechnology in Korea and established a foundation for basic research
- Contributed to the establishment of the molecular and cell biology research foundation and globalization by establishing the Korean Society for Molecular and Cellular Biology, attracting the International Vaccine Institute in Korea, and launching Molecules and Cells, the first SCI in Korea
- Contributed in laying the foundation of domestic science and technology base by serving as the chairman of the Korea Research Council of Fundamental Science and Technology, the president of KOFST, etc.

Engineering

Decd. Bien Zeung Nam (1943-2017), Honorary Prof., KAIST/UNIST



- A leader in the field of control engineering such as optimal control theory, intelligent robot control, and fuzzy theory
- Developed the first industrial robot in Korea and pioneered domestic intelligent robot research
- Was appointed as an IEEE Fellow for his contribution to the global technological development of robot systems, and served as the first president of Korean Institute of Intelligent Systems, the president of the Institute of Electronics and Information Engineers, the president of the International Fuzzy Systems Association (IFSA), and the first president of the Korea Robotics Society (KROS)

Lee Hyun Soon (1950), Adviser, Former Vice Chairman, Doosan/Hyundai Motors



- Korea's leading automotive engineer who developed automotive engine and transmission
- Laid the foundation for an automobile manufacturing powerhouse by raising the engine technology to the level of advanced countries
- Contributed to the global development of the Korean automobile industry by developing 1.5L Alpha, 2L Theta, 3L Lambda, and 5L Tau engines

Convergence

Decd. Kim Sam Soon (1909-2002), Honorary Prof., Seoul Women's University



- The first female doctor of agriculture in Korea, who published international research papers and contributed to the development of mycology
- Published papers in Nature (2 theses), published <The Mushroom of Korea>, and presented outstanding research results, such as the artificial cultivation of oyster mushroom
- Committed to the institutionalization of science, such as women's higher education, establishment of a society, and opening of an institute in difficult circumstances

Chung Kun Mo (1939), Former Minister of Science and Technology / Chair-Prof., KAIST



- A science and technology administrator who contributed to the R&D growth by developing and executing national science and technology development strategies, and promoting policies to foster excellent research centers
- Contributed to the development of nuclear fusion reactors, standard design for Korean nuclear power plants, and nuclear risk control
- Contributed in laying the foundation of R&D infrastructure in Korea by supporting excellent research centers such as SRC and ERC and promoting mid- to long-term large-scale R&D projects such as G7
- Served a major role in the establishment of KAIST, Korea Science and Engineering Foundation, Korea Institute for Advanced Study, Korea Institute for Advance Study, etc.

Support for the activities of the Persons of Distinguished Service to Science and Technology

Lecture at the alma mater of the Persons of distinguished service to science and technology

The persons of Distinguished Service to Science and technology visited their alma mater (high school) with their students, provided them with lectures on the joy and career of research, and had liberal Q&A session.

Dedication lecture

Commemorative symposium and memorial lecture were held at the academic societies and affiliated institutions centering on the successors of the people of merit in science and technology, in which the participants discussed the achievements and impacts of the Persons of distinguished service to science and technology. Additional events, such as the designation of a commemorative lecture room and installation of a dedication space, were conducted.

Publication of policy proposals

The policy proposal in related fields with the successors focused on the surviving people of merit.

Public Promotion

Publication of a book about the meritorious records of Persons of Distinguished Service to Science and Technology

The book is compiled as a critical biography of the Koreans distinguished in the field of science and technology, including a biography, their research achievements, media contributions and interviews, and the writings of each individual. It also provides a wealth of additional reading materials, including tributes written by the next generations of scholars and special contributions by science historians. An image book, consisting of easy-to-read information cards describing episodes in the early lives and the careers of these distinguished individuals was also released.

Production of the “Great People in the Field of Science and Technology” series video

A video containing the interview with the Persons distinguished service to science and technology and the achievements introduced by young scientists is produced and promoted widely through YouTube, etc.



Young Korean Academy of Science and Technology (Y-KAST)

Since 2017, the KAST have been selecting outstanding young scientists under the age of 45 as members of the Y-KAST and supporting their exchanges with Young Academies of other countries.

In 2021, the KAST has elected 33 young scientists, who have produced outstanding results as independent researchers, as Y-KAST members. The Y-KAST has been actively involved in policy

recommendations so that the innovative and creative thinking of young scientists can be realized through the universal value promotion of the social community. Moreover, the Y-KAST has produced diverse scientific culture contents with the active participation of young scientists in order to increase the attention and interest of the next generation in the field of science and technology.

Y-KAST Executive Committee for 2021-2023

General



Byoungho Lee
Chair of Y-KAST
Professor, Seoul National University
(Fellow, KAST)

Division of Policy



Woo-Sung Jung
Vice Chair of Y-KAST
Professor, POSTECH



Joonmo Ahn
Committee member
Professor, Korea University



Sungjoo Lee
Committee member
Professor, Seoul National University

Division of Natural Sciences



Myoungjean Bae
Vice Chair of Y-KAST
Professor, KAIST



Jaewon Ko
Committee member
Professor, DGIST



Young-Wook Cho
Committee member
Professor, Yonsei University

Division of Engineering



Jeong-Yun Sun
Vice Chair of Y-KAST
Professor, Seoul National University

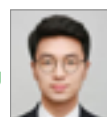


Junsuk Rho
Committee member
Professor, POSTECH



Changho Suh
Committee member
Professor, KAIST

Division of Agriculture and Fishery Sciences



Dae-Hee Lee
Vice Chair of Y-KAST
Principal Researcher, Korea Research Institute of Biosciences & Biotechnology



Soon-Kyeong Kwon
Committee member
Professor, Gyeongsang National University



Tae-Gyu Lim
Committee member
Professor, Sejong University

Division of Medical Sciences



Young Seok Ju
Vice Chair of Y-KAST
Professor, KAIST



Mi-hyun Kim
Committee member
Professor, Gachon University



Beom Kyung Kim
Committee member
Professor, Yonsei University

Major activities in 2021

Jan. – Dec. 2021

YouTube video production and distribution.

Produced 4 videos with YouTube creators specializing in science, and introduced Y-KAST members to the public on the subjects of “biology,” “quantum mechanics,” “energy harvesting,” “polymer engineering,” “3D metal printing oral treatment”

May 2021

Hosting the 2nd Korean Science Journalists Association/Y-KAST Forum 2021.

Directly delivered the voices of the science and technology field to science journalists, and provided the opportunities to enhance the public's understanding of the media and expand discussions

Sep. 2021

Participation in the 2nd GYA Online Young Academies Meeting.

Established the international networks with the delegations of young academies and GYA members from various countries

Dec. 2021

Hosting the Y-KAST Members' Day 2021.

▲ Presented the 2021 Y-KAST achievements and 2022 business plan ▲ Introduced the research fields of the new members elected in 2021



New Members of Y-KAST Elected in 2021

DIVISION OF POLICY

**Younghwan Kim**

STEPI (Science and Technology Policy Institute)
- Entrepreneurship Theory
- Public Policy for Tech Startup Ecosystem
- Technology Transfer and Commercialization

**Joo Young Park** Korea University

- Circular Economy
- Material Flow Analysis
- Sustainability Assessment

**Moon-Jin Kang** KAIST

- Mathematical fluid dynamics
- Well-posedness theory
- Shock waves

**Jinhyung Park** Sogang University

- Positivity of line bundles
- Singularities of pairs
- Syzygies of algebraic varieties

**Dohun Kim** Seoul National University

- Solid state quantum computing devices
- Open quantum system dynamics
- Low temperature physics

**Gil-Ho Lee** POSTECH

- Quantum material and device
- Topological superconductivity
- Low-dimensional condensed matter

**Hyo Jae Yoon** Korea University

- Molecular Electronics
- Energy conversion
- Nanomaterials

**Hyun-Woo Rhee** Seoul National University

- Chemical Biology
- Enzymatic Chemistry
- Systems Biology

**Yun Jeong Hwang** Seoul National University

- Power-to-X Electrocatalyst
- Nanomaterials
- CO₂ conversion, Water Splitting, Artificial photosynthesis

**Sangsu Bae** Hanyang University

- Genome editing using CRISPR-Cas system
- *Ex vivo* and *In vivo* therapeutic editing
- Computational biology and Bioinformatics

**Jong-Yeon Park** Jeonbuk National University

- Climate modeling
- Biogeochemical prediction
- Earth system modeling

DIVISION OF ENGINEERING

**Doo-Yeol Yoo** Hanyang University

- Ultra-high-performance concrete
- High-performance strain-hardening cementitious composites
- Cement-based retrofit materials

**Sukhwan Yoon** KAIST

- Environmental Microbiology and Biotechnology
- Biogeochemistry
- Greenhouse gas mitigation

**Seunghwa Ryu** KAIST

- Multiscale Mechanics & Modeling
- Machine Learning Driven Design of Materials & Structures
- Analyses and Design of Composites

**Jeong Ik Lee** KAIST

- Small Modular Reactor
- Supercritical CO₂ Power Cycle
- Mechanical Energy Storage

**Jae Sung Son** UNIST

- 3D Printing
- Thermoelectric Energy Conversion
- Nanoparticles

**Chul-Ho Lee** Korea University

- 2D Materials
- Nano Semiconductors & Devices
- Energy-efficient Electronics & Optoelectronics

**Young Min Song** GIST

- Flexible Optoelectronic Devices
- Passive Radiative Cooling
- Nanophotonics

**Wonbin Hong** POSTECH

- Electromagnetics
- Antenna and RF Circuits
- Millimeter-wave and Terahertz 5G and 6G communications

**Dae Sung Chung** POSTECH

- Organic photodiode
- Molecular switch
- Solution-processed semiconductors

**Kyung-Rok Yu** Seoul National University

- Animal Cell Biotechnology
- Animal Disease Model
- Cell Therapy

**Sanguine Byun** Yonsei University

- Functional Foods
- Bioactive compounds

**Hong-Hee Won** Sungkyunkwan University

- Genomics
- Bioinformatics
- Machine learning

**Young Joon Seo** Yonsei University

- Hearing recovery
- Homing of stem cells
- Exosome

**Heejung Kim** Yonsei University

- Geriatric depression
- Ecological Momentary Assessment and Intervention
- Internet on Medical Things

**Kyunghan Lee** Seoul National University

- Cellular Network Systems (5G/6G)
- Machine Learning over Networks
- Networked Computing

**Eunji Lee** GIST

- Supramolecular Nanochemistry and Materials
- Self-assembled Functional Polymer Materials
- Soft Matter Transmission Electron Microscopy

**Nathaniel S. Hwang** Seoul National University

- Regenerative engineering
- Cellular engineering
- Biomaterials

**Samooel Jung** Chungnam National University

- Protein digestibility
- Clean label processed meat
- Nondestructive inspection of meat quality

**Yun-Sang Choi** Korea Food Research Institute

- Meat Science
- Edible insect protein
- Clean label

DIVISION OF MEDICAL SCIENCES

**Seung-Won Lee** Sejong University

- Medical Big Data
- Epidemiology
- Artificial intelligence

**Hyung-Jun Im** Seoul National University

- Theranostics
- Nuclear Medicine
- Nanomedicine

**Gunhyuk Park**

Korea Institute of Oriental Medicine
- Brain-skin connectome
- Oriental medical sciences
- Neurodegenerative diseases

New Fellows of the KAST Elected in 2021

In 2021, the KAST elected 26 new fellows. The KAST selects scientists and engineers, who have been active in the field of science and technology, for more than 20 years, produced leading research results, and contributed significantly to the development of the field through a strict screening. A total of 124 fellows participated in 23 Membership Committees and evaluated the candidates' 10 representative papers published with the candidate as the corresponding author on the excellence and originality of the research achievements, academic influence, and contribution.

DIVISION OF POLICY



Ho Kim *Seoul National University*

- Health effects of climate change and air pollution
- Biostatistics
- Environmental Health

DIVISION OF NATURAL SCIENCES



Ki-Ahm Lee *Seoul National University*

- Nonlinear Partial Differential Equations
- Geometric Analysis
- Free Boundary Problems, Homogenization



Dongsu Ryu *UNIST*

- Astronomy and Astrophysics
- Cosmology
- Plasma Physics



Sung Hwa Jung *Kyungpook National University*

- Removal of hazardous materials from the environment
- Adsorption and heterogeneous catalysis
- Synthesis and functionalization of porous materials



Jae-Seong Lee *Sungkyunkwan University*

- Epigenetics
- Host-microbiome interaction
- Ocean acidification & Hypoxia
- Microplastics



Jung Hee Cheon *Seoul National University*

- Number theory
- Cryptography



Takhee Lee *Seoul National University*

- Molecular electronics, functional molecular devices
- Organic electronic devices, flexible organic electronics
- 2D atomic film nanoelectronics



Taiha Joo *POSTECH*

- Femtosecond Spectroscopy
- Molecular Reaction Dynamics
- Quantum Dynamics of Molecules and Materials



Chang-Hoi Ho *Seoul National University*

- Climate change science
- Tropical cyclone (typhoon) analysis and forecast
- Air quality forecast

DIVISION OF ENGINEERING



Gye-Chun Cho *KAIST*

- Sustainable Development for Geotechnical Engineering
- Underground Space Development
- Energy Geotechnology



Jeong Whan Yoon *KAIST*

- Computational Mechanics of Plasticity
- Materials Modeling for Metals
- Design & Manufacturing



Il-Doo Kim *KAIST*

- Development of chemiresistive/colorimetric gas sensing devices
- Design of nanomaterials for next-generation energy storage and harvesting devices
- Biodegradable polymer membrane and filtering applications



Tae-Woo Lee *Seoul National University*

- Organic/Perovskite Light-Emitting Diode (LED)
- Neuromorphic Bio Electronics
- Flexible/Strechable LEDs and Electronics



Wonjun Lee *Korea University*

- RF-Powered Computing and Networking for the Internet of Things
- Security and Privacy in Wireless Communications, Mobile Computing and Networked Systems
- Design, Implementation, Analysis, and Optimization of Next-Generation Wired/Wireless Communication Network Protocols



Dong June Ahn *Korea University*

- Sensors and π -Materials Engineering
- Cryo-Bio Nanotechnology
- Molecular Dynamic Simulations on Polymer & Nano-Bio Interfaces



Dae-Eun Kim *Yonsei University*

- Tribology of mechanical components
- Surface engineering for friction and wear reduction



Seong Chan Jun *Yonsei University*

- Nano electronics
- Nano Photonics & Optics
- Nano Energy electrodes



Jong-Hyun Ahn *Yonsei University*

- Graphene and 2D materials
- Flexible and wearable electronics
- Bio-healthcare device



Seon Jeong Kim *Hanyang University*

- Artificial Muscle
- Energy Harvesting
- Biomimics



Sang Jun Sim *Korea University*

- Carbon capture and conversion using photosynthetic microorganisms
- Microfluidic system for efficient screening of microorganisms
- Nanomaterials and nanoplasmonic biosensors for disease diagnosis

DIVISION OF AGRICULTURE AND FISHERY SCIENCES



Woe-Yeon Kim *Gyeongsang National University*

- Circadian clock regulation in plant
- Abiotic stress responses in plant
- Regulations for flowering time in plant



Yongsoon Park *Hanyang University*

- Omega-3 Fatty Acid
- Frailty
- Sarcopenia



Seung-Hwan Lee *Kangwon National University*

- Wood chemistry
- Nanocellulose
- Biorefinery

DIVISION OF MEDICAL SCIENCES



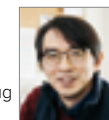
Hyongbum Henry Kim *Yonsei University*

- Genome editing: prediction of editing outcomes of CRISPR-based genome editors using machine learning and deep learning
- Application of CRISPR-based genome editing for gene therapy



Dae-Duk Kim *Seoul National University*

- Nano/micro particles for controlled & targeted drug delivery
- Oral dosage forms for solubilization and controlled drug delivery
- Transdermal/topical drug delivery and cosmeceuticals



Seog Bae Oh *Seoul National University*

- Molecular and cellular mechanism of nociception (pain)
- Neuro-immune interaction in peripheral neuropathy and chronic pain
- Trigeminal system and brain cognition

