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ANNUAL REPORT

The Korean Academy of Science & Technology

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KAST ANNUAL REPORT

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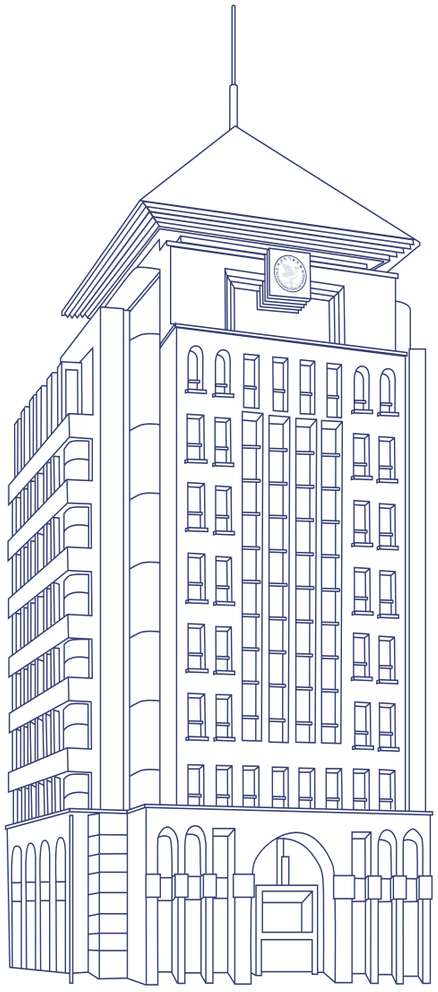


2020

ANNUAL REPORT

The Korean Academy of Science & Technology

THE KOREAN ACADEMY OF SCIENCE AND TECHNOLOGY

is an independent and nongovernmental organization,
consists of distinguished scholars in order to promote excellence in science.

The KAST functions as a pillar of nongovernmental diplomacy in science & technology
through collaboration with Academies around the world.

The KAST offers impartial and reliable advice on pending issues
of the society based on the expertise of its members.

KAST 한국과학기술한림원
The Korean Academy of Science and Technology

Information

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 literature 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 which means private educational institutes in Korea.

Thus, the 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' has 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(Gumi-dong), Dolma-ro, Bundang-gu, Seongnamsi, Gyeonggi-do 13630, Korea

Online channels www.kast.or.kr

Contents

MESSAGE FROM THE PRESIDENT AND THE EXECUTIVE COMMITTEE

In 2020, the world has experienced a rapid paradigm shift due to the COVID-19 global pandemic. The sudden changes and crises in all areas have been a big challenge for everyone, regardless of preparedness. As globalization is slowing down while digital conversion is accelerating, and social vulnerabilities, such as social gaps and conflicts, are expected to increase, the role of science and technology has become more important.

The Korean Academy of Science and Technology (KAST) has stood against the attack of a new infectious disease that threatens human life and safety in the past year as a Fellowship of distinguished scientists drawn from all areas of science and technology. We held an open forum on the topic of COVID-19 for the first time in Korea, and hosted 19 additional forums by gathering the best experts in related fields. The results of the discussion were published reports and statements.

Moreover, we worked with foreign academies all over the world, including the InterAcademy Partnership (IAP), to overcome the pandemic, a global crisis, by sharing information on each country's quarantine policies, current status, and countermeasures. The KAST operates the Association of Academies and Societies of Sciences in Asia (AASSA), which is joined by 30 Asian countries, and plays a central role in Asian science and technology policies. We held a webinar, in which AASSA experts from Japan, Singapore, New Zealand, India, etc., discussed their current status and quarantine policies. The objective and reliable epidemiological information compiled by each country's top experts was used as the fundamental data for domestic quarantine guidelines, as well as joint response policies in Asia.

In general, COVID-19 has had a tremendous impact on society, including health, economy, environment, culture, and education in Korea. Therefore, the KAST took the lead in realizing public values for solving social issues by reflecting the weight of the social roles and the responsibilities of scientists and engineers now more than ever. The KAST held a debate, in which science and technology experts participated to discuss the policies for the development of science and technology, and proposed scientific technological solutions to social problems.

The KAST is also working on projects to share scientific values and knowledge throughout society. These include a program in which the KAST members directly visit schools in areas with low science educational benefit, and give lectures on the latest science and technology topics, called the “Mentor Program for Outstanding Students” that provides 1-on-1 mentoring classes with the KAST members, and a program that cultivates those who will lead the future of Korean science and technology field. Other programs are science and technology cultural projects for the socially disadvantaged, including the production of Braille books and audiobooks for the visually impaired, and the production of sign language interpretation videos for the hearing impaired.
The KAST has promoted a variety of scientific culture contents for a science and technology-friendly society where everyone understands and enjoys scientific knowledge. The KAST held an online public lecture with Stefan Hell, the director of the Max Planck Institute for Biophysical Chemistry in Germany and Nobel Laureate in Chemistry 2014, who looked back on his life as a researcher. In 2020, we held a science symposium jointly with the Embassy of Sweden in Korea to understand the basic principles and values of research achievements in each field of the 2020 Nobel Prize. In addition to the cultural products for universal generations, including lectures at the alma mater of ‘Persons of distinguished service to science and technology’ dedication lectures, and publication of the book of meritorious deeds, we promoted diversified contents based on the video platform preferred by future generations.

The KAST made an effort to provide privileges and support to scientists and engineers as the lead agency in the ‘Project for the Honorable Treatment and Support for Persons of Distinguished Service to Science and Technology’, while also helping young scientists engage in international exchanges and policy activities by operating ‘the Young Korean Academy of Science and Technology’.

We hope that the ‘2020 Annual Report’ can serve as a useful resource to inform many other academies across the globe about our activities for the year, leading to further cooperation with them.

Thank you.

May 2021
Min-Koo Han, President of the KAST
and Members of the 9th Executive Committee

10 Highlights from 2020

1. Beginning discussions among the domestic experts on COVID-19

After the first confirmed case of a novel coronavirus in Korea on January 20, 2020, social confusion and national fear have increased each day as a result of the uncertainty in fighting an unknown virus. Therefore, the KAST held an open forum on COVID-19 for the first time in Korea on February 5 in order to discuss the severity of the situation from the medical and scientific aspects, as well as to seek measures for the science and technology community.

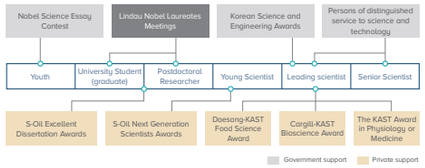
There were 18 more joint open discussions on COVID-19 held in the form of a real-time online forum for safe social communication, and the video of the discussions was posted on the official YouTube channel of the KAST to disseminate scientific information. Moreover, policy reports and statements were announced based on the contents discussed at the forum to urge the establishment of a highly effective quarantine policy.

2. Cooperating with foreign academies on COVID-19 through information exchange, etc.

As the re-proliferation and prolongation of COVID-19 have become more pronounced around the world, international cooperation among academies in each country has been prioritized. Hence, the KAST actively participated in the project to overcome the pandemic, which was promoted by the international science and technology organization and academies of each country. The KAST participated in the declaration of a joint statement emphasizing the urgency of international cooperation by working together with the academies in 15 countries, led by the National Academies of Science, Engineering, and Medicine. In response to the request for information sharing from the Royal Society in the UK, we delivered a report that summarized the domestic COVID-19 crisis response data, treatment and quarantine strategies, and public health measures.

On July 10, the KAST held a webinar on the topic of “National Academy's Response to COVID-19” under the supervision of AASSA, to which the KAST operates its secretariat. Top experts representing their countries, such as Korea, Japan, Singapore, New Zealand, and India, participated and shared the current status of COVID-19, as well as the epidemiological information by country, and sought joint response plans that encompass Asia and Oceania.

3. Establishment of a “Platform for Award Programs by Life Cycle of Scientists”



In 2020, the KAST has built a “Platform for Award Programs by Life Cycle of Scientists”, and began to operate it in order to raise the self-esteem of scientists and engineers, and to support a stable research environment. In cooperation with the government and companies, we have been implementing award programs tailored to the growth stage of scientists and engineers from teenagers to doctoral degree programs, from next generation scientists to mid-level to leading scientists, and senior science and technology scholars. By continuously expanding and supplementing the award programs platform, the KAST aims to lay the foothold for winning the Nobel Prize, the nation’s wish.

4. Discovery of policy topics and strengthening of advisory for the future of national science and technology

Korean universities are currently experiencing internal and external crises. The ultra-low birth rate situation in Korea, where the total birth rate is less than one person, results in a decrease in the school-age population, a decline in the research capacity of universities, and a financial crisis. Local universities are faced with an absolute crisis of extinction beyond imbalance due to the concentration of political function, capital, and population in the metropolitan area. As a result, the KAST held the KAST Roundtable Discussions on the subject of local universities, and proposed effective plans for its solution. We also published the “Next Generation Report” containing young scientists’ opinions on future science and technology. Moreover, we published the “KAST Policy Study Reports” that reviewed and analyzed the R&D history of Korea over the past 50 years, and provided the policy implications for Korean science R&D.

5. Scientific and technological culture dissemination activities for the public

Science and technology have an enormous impact on human life and play a key role in promoting social changes by transcending physical spaces, specific societies, cultures, and regions. The KAST promoted a variety of projects for the dissemination of scientific and technological culture in which various members of society understand and share the value of science and technology.

The KAST held an online lecture for the public with Stefan Hell, the Nobel Laureate in Chemistry 2014 under the theme of “Being a Scientist”. With the Swedish Embassy in Korea, the KAST also held an online symposium where the participants discussed the meaning of the 2020 Nobel Prize Category-specific winning achievements and research. Moreover, the KAST produced and distributed the results of the policy research and advisory projects as infographics, and expanded access to science and technology through the development of public-friendly video content in collaboration with YouTube creators.

6. Reinforcement of specialized projects for the underprivileged

The KAST published 4 volumes of the “Scholars Discuss Science and Technology” series in Braille and audiobooks to realize the public value that enables everyone to live a happy life through science and technology. Braille books and audiobooks were distributed free of charge to more than 300 locations nationwide, including schools for the blind, welfare centers, and Braille libraries. Meanwhile, audiobooks with professional voice actors were provided with a free application for the visually impaired. The KAST also plans on enhancing the special scientific and technological culture projects for the underprivileged by producing the “Meeting with the KAST Scholars” lecture as the “KAST Scholar Lecture Sign Language Video” for the hearing impaired and distributing an integrated sourcebook to help understand the lecture.

7. Launch of the National Science Challenges Support & Network

In 2020, the planning research helped promote the “National Convergence Research of Scientific Challenges (2020 - 2025)” project, which is a new R&D project of the Ministry of Science and ICT. The KAST was selected as the “National Science Challenges Support & Network (NSCN)” for the success of the project. NSCN plans to provide constant support for the opening of performance exchange meetings and a global cooperation network by being in charge of discovering and selecting candidates for scientific challenges, and planning customized scientific challenges, as well as being an advisor so that 5 research teams can successfully carry out the projects.

8. Strengthening of promotion for “Persons of distinguished service to science and technology”

In 2020, the KAST presented the esteemed science and technology people who will become role models for the next generation by widely publicizing the achievements of Persons of distinguished service to science and technology. Various scientific and cultural contents that strengthen the social influence of scientists and engineers were also promoted.

The KAST published the Book of Meritorious Deeds 3, which examines the lives and achievements of 12 Persons of distinguished service to science and technology designated in 2019, and continued the tradition of Korea’s only critical biography series on scientists and engineers. The KAST provided an opportunity to instill research motivation in scientists and engineers, as well as the next generations, by holding a dedication lecture at venues, such as the alma mater, affiliated school and academy, etc., of the Persons of distinguished service to science and technology to honor their achievements and reflect on their philosophy. Based on a popular video platform, the KAST produced promotional content tailored to the tastes of young people, such as interviews, mini documentaries, and YouTube creator collaboration.

9. Fast switch and performance expansion with non-face-to-face projects

After the government recommended “social distancing”, the KAST changed the discussion method to a real-time online open forum and started collecting the opinions of experts in each field and discussing alternatives. The KAST focused on strong and timely response policies by proactively discovering the issues in our society that are triggered by the prolonged COVID-19 pandemic. An average of 1,200 people participated in the online open forum, inquiring and presenting opinions through real-time chat, which received enthusiastic responses from not only the scientists and engineers, but also the general public. The open forum video was posted on the KAST YouTube channel, thus paving the way for continuous communication.

Moreover, the KAST quickly switched the overseas joint research and global cooperation projects that were temporarily postponed or canceled due to restrictions on cross-border movement to a non-face-to-face format manner, and rapidly promoted them to minimize research loss. The KAST solidly established the research network with scholars around the world by supporting online workshops and symposiums after actively collecting the opinions of the KAST members.

10. Expansion of member participation, etc.

The KAST is an independent and nongovernmental organization, consists of distinguished scholars in order to promote excellence in science. In 2020, it elected 30 new fellows of the KAST, and 34 members of Y-KAST through a strict screening process. Since a fellow of the KAST serves as a role model for outstanding scientists and engineers, we mainly evaluated the originality and academic contribution of the candidate’s research achievements published as the corresponding author. For the Y-KAST members, we mainly evaluated the candidate’s achievements as a post-doctorate independent researcher in order to select a researcher who will lead the global science and technology field in the future. The KAST consists of approximately 1,000 members, who together represent the country’s foremost experts in the science.

Summary

Date of Establishment

▸ November 22, 1994

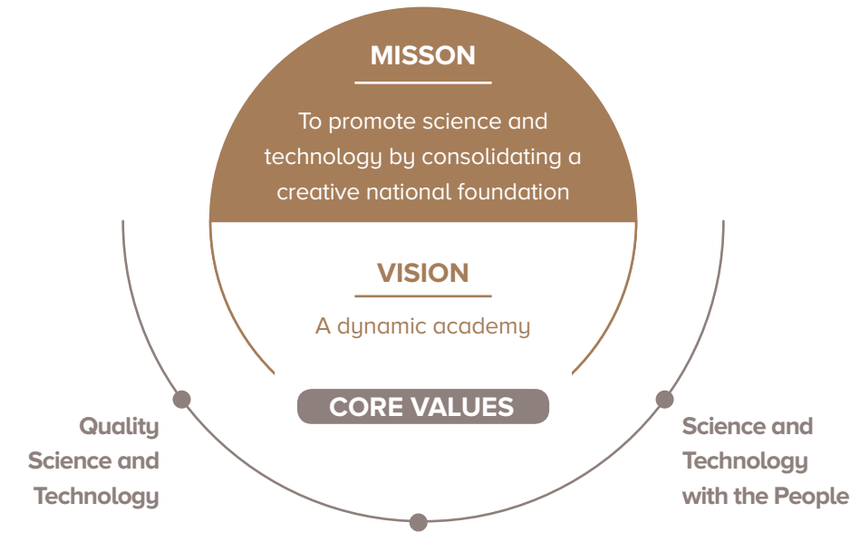
Objectives

▸ 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 the 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



STRATEGIES

To develop a creative environment

- To build a social framework for basic science-oriented knowledge creation
- To foster creative and convergent human resources in science and technology
- To promote science and technology as a driving force of a creative economy
- To engage in national science and technology policy-making
- To secure financing and operational independence

To establish international leadership

- To provide scientific and technological assistance to developing countries
- To produce coordinated international responses to global issues
- To secure global leadership by facilitating international exchange
- To promote strategic international cooperation and joint research activities
- To make preparations for inter-Korean cooperation for the reunification of the Korean Peninsula

To promote a people-friendly science culture

- To build a rational society by advancing scientific trends
- To promote local science by supporting local fraternities
- To reinforce the social responsibility of scientists and engineers
- To expand the KAST member's social activities and participation
- To develop technologies designed for less privileged people

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 »

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 KunMo 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
- KAST History of Development(1994~2005) published

2010 »

2007

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

2008

- Mentor Program for Outstanding Students launched

2010

- The 6th President Kil saeng Chung inaugurated

- Joined the InterAcademy 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
- Korea Science Week 2018 held

2019

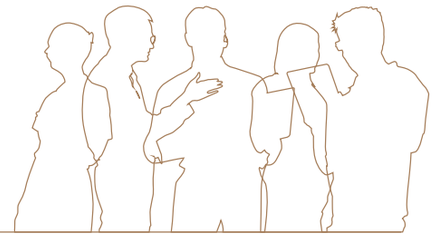
- The 9th President Min-koo Han inaugurated
- 'S-Oil Young Scientist Award' launched
- Operated the 'Final Screening Committee on Government Awards of Outstanding Scientists and Engineers' by the Ministry of Science and ICT (MSIT)

2020

2020

- '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

Membership



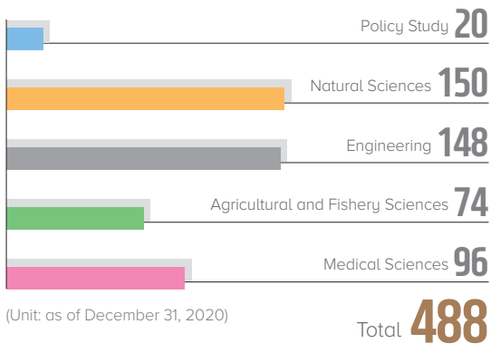
The KAST consists of approximately 1,000 members, who together represent the country's foremost experts in the sciences. The KAST contributes to progressing science in Korea supported by its members' exceptional professional expertise. Its members are elected by peers in recognition of distinguished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

Status of members

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

Fellow (under 70 years of age)

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



(Unit: as of December 31, 2020)

Total 488

Fellow (over 70 years of age)

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

435 (Unit: as of January 2020)

Associate Member

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

36 (Unit: as of January 2020)

Foreign Member

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

62 (Nobel Prize laureates: 31)
(Unit: as of January 2020)

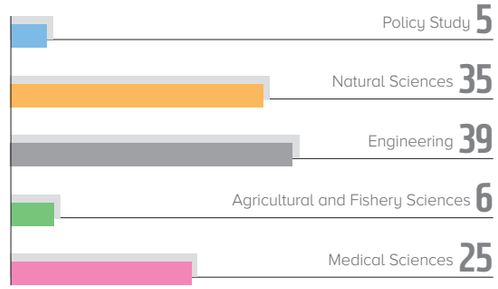
Honorary and Patron Member

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

9 Honorary member (Unit: as of January 2020)
1 Patron member (Unit: as of January 2020)

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

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

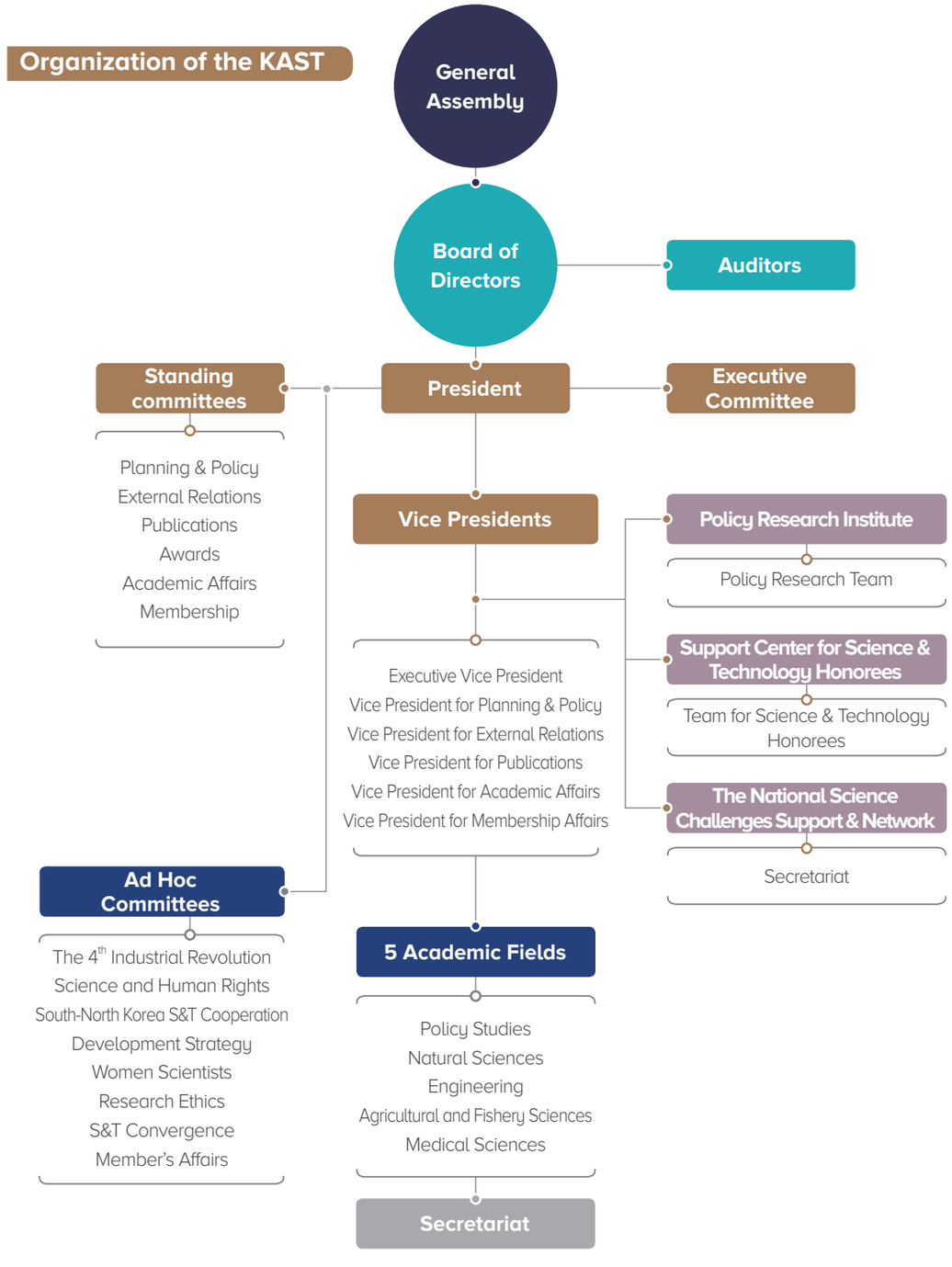


(Unit: as of December 31, 2020)

Total 110

Organization

Organization of the KAST



Board of Directors

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Director

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Prof. Emeritus of Seoul National University

Jin-hyung Kim
President of Artificial Intelligence Research Institute

Hak-Soo Kim
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Do-Seon Na
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Choon sik Park
Prof. of Soonchunhyang University

Kee-Yoeup Paek
Distinguished Prof. of Chungbuk National University

Mu-ha Lee
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

Moo Young Choi
Prof. of Seoul National University

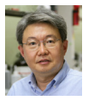
Seon keun Hwang
Prof. Emeritus of Inha University

Min-Koo Han
Prof. Emeritus of Seoul National University

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

Auditor

Kwang Soon Moon
Executive Director of True Happiness Inperience and Sharing



Byeang Hyean Kim
Prof. of POSTECH

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Prof. Emeritus of Seoul National University

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Prof. of Seoul National University

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

Youngsook Lee
Directors for Domestic Cooperation
Prof. of POSTECH

Haecheon Choi
Directors for International Cooperation
Prof. of Seoul National University

Junghan Yoon
Directors for Chair of Y-KAST
Prof. of Hallym University

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

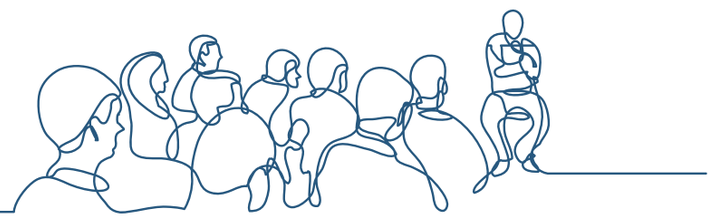
Mi-Ock Lee
Directors for International Academic Affairs
Prof. of Seoul National University

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 people's lives as well as policies in science & technology.

In 2020, a total of 37 discussion meetings were held for science and technology experts to present their opinions on social issues. For the first time in Korea, the KAST held an open forum with experts on COVID-19, prepared 20 joint open forums in close cooperation with relevant agencies, and focused on the discovery of social issues prompted by the prolonged COVID-19 pandemic and highly effective response measures. The KAST proposed strong and timely policies on the subject of innovation and the future of university education, research ethics, convergence education, women scientists and engineers, etc.

Meanwhile, the KAST changed its discussion method to a non-face-to-face online forum. The KAST strives to provide accurate information by continuously holding open forums in which top experts in the relevant fields participate in order to resolve the social anxiety and health crisis in the pandemic era. With an average of 1,200 participants, the online open forum was an event where a wide range of communication took place with questions being asked and opinions being given through real-time chat, among others.

Exclusive KAST open forum

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

Date	Theme
Feb. 5	Response measures against the novel coronavirus (COVID-19) infection
May 21	Directions for the improvement and the selection and evaluation system for R&D projects from a young scientist's perspective
May 28	Measures to overcome the crisis and strengthen the capabilities of local universities
Jun. 23	Scientific and technological innovation measures that are geared toward social values in the post-COVID-19 era
Jun. 30	The future of Korean universities in 10 years from the perspective of a young scientist
Jul. 15.	Changes and response to the agrifood industry in the post-COVID-19 era
Jul. 30.	The future of Korean universities in 10 years from the perspective of a young scientist
Aug. 24.	Acceleration of the 4th Industrial Revolution in the post-COVID-19 era
Sep. 8.	Are there any female scientific and technological leaders you want to become when the career ladder is broken?
Sep. 17.	What are the results of the national R&D investment in the past 50 years?
Nov. 5.	Step 4 BK21 project and universities innovation
Nov. 27.	Current status and future of Korea's precision medicine - Clinical application and future of next generation genome sequencing
Dec. 4.	Improvement measures for university professor evaluation system

Joint discussion with relevant organizations

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. The Ministry of Science and ICT, the Korean Federation of Science & Technology Societies (KOFST), the National Academy of Medicine of Korea (NAMOK), the National Academy of Engineering of Korea (NAEK), the National Research Council of Science & Technology (NST), the Korea Institute of S&T Evaluation and Planning (KISTEP), and the Presidential Council on Intellectual Property participated in the event.

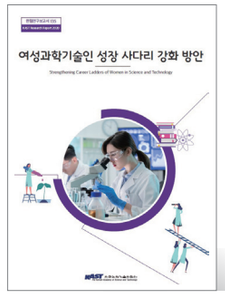
Type	Date	Theme
COVID-19	Mar. 12	Interim inspection of COVID-19 from a scientific and technological perspective
	Apr. 3	COVID-19 pandemic intensive care practices and solutions
	Apr. 10	Key issues and future plans related to mental health in preparation for the COVID-19 crisis
	Apr. 17	How far did the development of the COVID-19 treatment and vaccines come?
	Apr. 28	Post-COVID-19 – The new normal and the chance for a leap
	May 8	Reorganization of the medical system in preparation for the second COVID-19 pandemic
	May 12	How will we survive in the post-COVID-19 era?: Information field
	May 18	How will we survive in the post-COVID-19 era?: Economy and industry fields
	May 25	How will we survive in the post-COVID-19 era?: Education field
	Jun. 17	Turning crisis into opportunity – Response to environmental changes post-COVID-19
	Jun. 19	Experiences of COVID-19 in Daegu and Gyeongbuk, and measures based on the experience
	Jul. 9	Living with COVID-19
	Jul. 24	Appropriate medical workforce and medical system for a healthy medical welfare
	Aug. 7	Can herd immunity prevent the spread of COVID-19?
	Sep. 25	Development status of COVID-19 treatment
	Oct. 22	COVID-19 test for a successful K-quarantine
	Nov. 9	COVID-19 resurgence prediction and effective response
	Dec. 8	Simultaneous influenza infection during the COVID-19 pandemic
	Dec. 9	Measures for critical care in response to the rapid increase of COVID-19 patients
Science and Technology Talent Fostering and Utilization Policy	Sep. 10	Role of universities in fostering science and technology talent
	Sep. 23	Strategies to strengthen the capabilities of science and technology employees
	Oct. 7	Plans to improve basic and core competencies for future generations
	Oct. 13	Measures for the technology commercialization and faculty start-up revitalization of universities
Advancement of Science and Technology	Oct. 14	What are the conditions for success in the Korean version of the new deal?

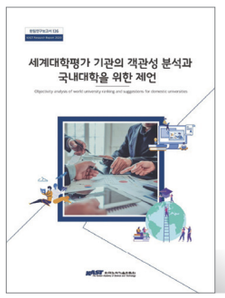
Policy Study Reports

The KAST members conduct research and write reports on Korea's mid to long-term policies in science & technology, and suggest to the government to reflect the research results into national science & technology policies. These suggestions primarily cover the following issues; ▲Creating the foundation for promoting research in basic science ▲Assessing and advising policies in science & technology ▲Encouraging young talents to study science, and etc.

In 2020, 6 reports were published.

No.	Title
133rd	Development of Genetic Information-Based Precision Medical Care
134th	Performance Analysis of National R&D Investment
135th	Strengthening Career Ladders of Women in Science and Technology
136th	Objectivity analysis of world university ranking and suggestions for domestic universities
137th	An update on the current status of patients with schizophrenia and policies for optimization of treatment in South Korea
138th	Co-correspondence and honorary authorship : a possible trend of unethical authorship among Korean scientists?





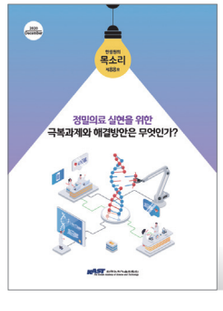
Voice of the KAST

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 the status of the Korean science and technology," publications had been made about 5 to 10 times a year. In 2020, six editions were distributed, totaling 88 editions thus far.

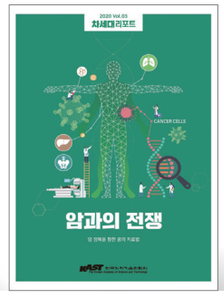
No.	Title
83rd	Suggestions for measures against new infectious diseases, such as the novel COVID-19
84th	Suggestions for the response stage and measures by the stage of COVID-19
85th	Science and technology education innovation measures to realize social values
86th	Measures to help Korean universities in coping with the future society
87th	Innovative measures of universities to overcome the era of local extinction crisis
88th	What are the challenges to overcome and the solutions for the realization of precision medical care?



Next-generation Reports

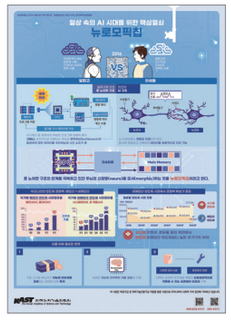
'Next-generation Reports' is a policy recommendation based on the thoughts and ideas of young scientists, mainly the members of the 'Young Korean Academy of Science and Technology (Y-KAST)'. Each report contains policy approaches to support promising science and technology research areas and core technologies to strengthen national competitiveness on the global stage.

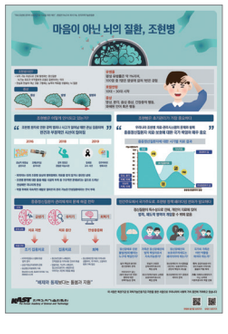
No.	Title
Vol. 01	Neuromorphic Chip – A Small Semiconductor Containing the Human Brain
Vol. 02	Future of Universities – Looking Through the Eyes of a Young Scientist
Vol. 03	Fight Against Cancer – Dream Cure to Conquer Cancer
Vol. 04	Digital Healthcare – A New Paradigm in Healthcare



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 homepage and other channels.





Other Entrusted Projects

The KAST conducts policy researches commissioned by organizations such as government organizations, National Assembly and corporations that need policy advice from distinguished scholars in science & technology. Since 2018, the KAST has collaborated with the Department of Convergence Technology of the Ministry of Science and ICT on “Research and Planning for Promoting Challenging Convergence Research to Solve Complex Scientific Problems”. Our aim is to promote new Korean-style science challenges projects that pursue a new problem-solving method through convergence research after establishing a collective network across all fields of science and technology. It will open the project planning process to the community and form a leading research team comprised of basic scientists and engineers.
In 2020, the planning research helped promote the “National Convergence Research of Scientific Challenges (2020 - 2025)” project, which is a new R&D project of the Ministry of Science and ICT. KAST was selected as the “National Science Challenges Support & Network (NSCN)” for the success of the project. NSCN plans to provide constant support for the opening of performance exchange meetings and a global cooperation network by being in charge of discovering and selecting candidates for scientific challenges, and planning customized scientific challenges, as well as being an advisor so that 5 research teams can successfully carry out the projects.

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
- (Period and scale) 2020 - 2025 (6 years)/Around 48 billion won

National Science Challenges Support & Network

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

NSCN
The National Science Challenges Support & Network

- 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

In 2020, 2 research groups were launched as ‘National Science Challenge Initiatives’.
NSCN plans to provide constant support for the opening of performance exchange meeting and global cooperation network by being in charge of discovering and selecting candidates for scientific challenges, and planning customized scientific challenges, as well as being an advisor so that research teams can successfully carry out the projects.

Novel AST Paradigm to Prevent, Detect, and Treat Cancer Metastasis

- Principal Investigator : Hyun Woo Park (Henry Park) / Yonsei University, Seoul, Korea
- Keyword : AST(Adherent-to-Suspension Transition), Metastasis, Biomarker, Drug Discovery, EMT(Epithelial-to-Mesenchymal Transition), CTC, Precision Medicine, TME
- Research overview
  - Examine the relationship between AST & EMT paradigms
  - Validate newly developed AST assay
  - Data analysis on genomic & epigenomic landscape of AST paradigm
  - Allograft mouse models for metastasis experiments
  - Analysis of cancer genome database
  - Identify novel AST biomarkers and signal transduction
  - GSEA analysis identifies key mechanisms of AST
  - Establish patient-derived biobank for AST paradigm validation in human

Development of nano-to-macro trans-scale artificial morphogenesis based on emergent evolution

- Principal Investigator : Do-Nyun Kim / Seoul National University, Seoul, Korea
- Keyword : Trans-scale, Self-assembly, Emergent property, Biomimetics, Artificial Intelligence, Mechano-unit, Organic structure, Multi-object
- Research overview
  - Chemomechanical responsive mechanism: We developed a chemomechanical approach for controlling the shape and stiffness of DNA nanostructures by DNA binding molecules. Based on this mechanism, we realized ultra-sensitive threshold shape morphing.
  - Multiscale analysis model: We developed a multiscale analysis framework called SNUPI (Structured NUcleic acid Programming Interface) that predicts the shape and mechanical properties of DNA nanostructures. (Published in ACS Nano, 15:1002-1015, 2021)
  - Photothermal effect of DNA hydrogel
  - Modeling DNA hydrogel
  - Synthetic DNA condensate platforms
  - Screening of stimuli-responsive hydrogels
  - Analysis of interacting multibodies
  - Constructing models of self-organizing systems

People-friendly Science Promotion

The KAST takes the initiative in nurturing talents in science and technology to strengthen 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 the 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'.

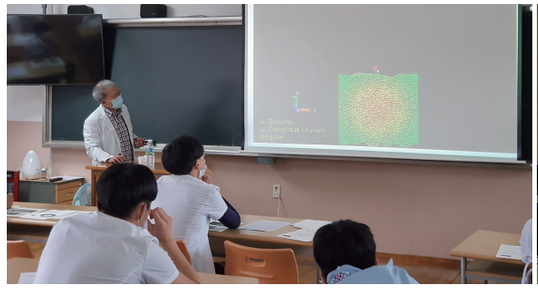
If schools apply for the program, distinguished scholars of the KAST will visit schools, deliver lectures on the latest science & technology, and provide students with counseling on their career paths.

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 2020, the scholarly lectures were held in 86 schools under the strong timely topics that will satisfy the curiosity of the students, such as the "4th Industrial Revolution", "future society", "AI", "virus and vaccine," etc., and 91.8% of these were held at schools in the non-metropolitan area. Moreover, 10 excellent lectures were selected and produced as a "sign language-interpreted video", which was distributed to 250 schools and welfare centers nationwide for the hearing impaired.

2020 statistics

No. of lectures	Attendees	Proportion of lectures targeted at schools located in rural areas
86 times	**8,441** students	**91.8**%



Mentor 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 & technology. This program motivates creative students to grow into excellent scientists through 5-month long systematic mentoring.

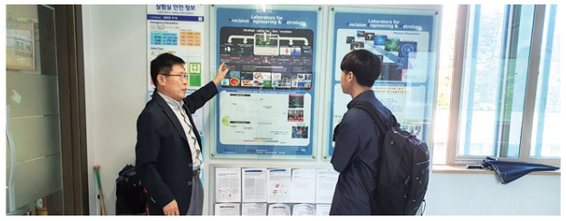
In order to help students to carry out their own projects, their mentors are those from among the top scholars in the fields of mathematics, physics, chemistry, life sciences and bioengineering. The program application rate is increasing every year because of its reputation for effective learning methods focused on experimentation and practice, as well as the enthusiastic mentees.

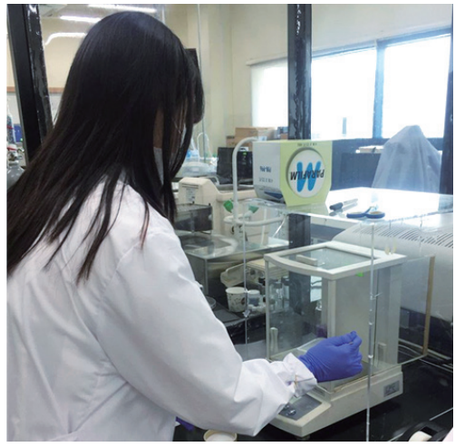
In 2020, the KAST expanded the opportunities for students to participate by selecting 5 additional mentees to the existing 30 mentees. The KAST also recognized the students' scholastic achievements by selecting 1 outstanding mentee in the fields of physics, chemistry, life science, and engineering. Instead of reducing face-to-face events following the proliferation of COVID-19, the KAST sought supplementary measures, such as online programs and individual field trips, in order to support the successful mentoring relationship between scholars and students.

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.

2020 statistics

No. of mentees	No. of mentors	Proportion of students from rural areas	Proportion of female students
35 mentees	**30** mentors	**54.3**% (17persons)	**45.7**% (16persons)





Publication of "Distinguished Scholars Tell about Science and Technology" Series

In 2006, the KAST began publishing the "Distinguished Scholars Tell 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 2020, 35th, 36th and 37th editions of "Distinguished Scholars Tell about Science and Technology" series were published. These books were distributed for free to 859 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 35	**A Story of Pharmaceuticals Found Pharmacy** - Author: Professor Yeong Shik Kim, Seoul National University - Content: The stories of major drugs' development process, as well as the scientists who devoted their lives to the discovery and development of pharmaceuticals	
Volume 36	**Love and War of Microorganism** - Author: Professor Jin-Ho Seo, Seoul National University - Content: The impact of microbial survival methods and principles on human life	
Volume 37	**Scientific and Technological Revolution: Scientific Revolution and the 4th Industrial Revolution** - Author: Professor Yoo-Shin Kim, Pusan National University - Content: The meaning of the 4th Industrial Revolution, with focus on the history of modern science and AI	

In 2020, KAST produced the "Distinguished Scholars Tell about Science and Technology" series as Braille books and audiobooks for the visually impaired in order to improve the reading environment of the underprivileged. The KAST selected 4 books that received excellent reviews in terms of science education to help improve the science culture of the visually impaired. The published Braille books and audiobooks were distributed to over 300 places, including schools and welfare centers for the blind, and Braille libraries nationwide free of charge. Audiobooks narrated by professional voice actors were streamed to an application designed specifically for the visually impaired in order to increase the convenience of information access.

1. Understanding the Global Environment with the Nobel Prize
2. Are the Parasites in Our Body Friends or Foes?
3. History of Korean Food
4. Big Data and Data Science

International Collaboration

The KAST is the driving force in advancing and globalizing national science and technology.
The KAST maintains a long-term friendship with science academies overseas and builds a global network so that it can play a central role in non-governmental diplomacy in science and technology.

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, the KAST is participating in major projects aimed at proactively addressing current issues of the global science and technology community, thus increasing the global presence of Korea.

In 2020, the KAST joined the International Science Council (ISC), a non-governmental organization that integrates natural and social sciences among international scientific organizations, to further expand its activities.

In order to respond to the COVID-19 pandemic crisis in 2020, the KAST strengthened the international cooperative system by supporting domestic advisory activities, sharing information, and gathering opinions with the international science and technology organizations and academies of each country.

The KAST seeks to raise the international status of Korean science by establishing a cooperative system with science academies worldwide, and leading joint research projects to realize a sustainable future and universal values for humankind.

COVID-19-Related International Cooperation

To effectively respond to the COVID-19 pandemic, it is important to secure virus epidemiologic knowledge and quarantine information through the exchanges with advanced science and technology countries. As a scholarly group of experts in the field of science and technology, the KAST launched direct communication with the academies in each country by using a variety of platforms. The KAST researched and shared the treatment, quarantine materials, and public health measures on the COVID-19 crisis response in Korea. In addition, the KAST closely collaborated with individual academies in the US, the UK, Germany, and Russia to actively cooperate with the global quarantine measures.

Exchange of the current status of each country's response with the InterAcademy Partnership (IAP)

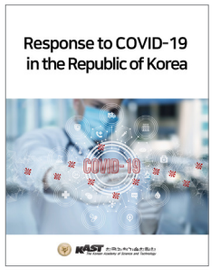
- Submitted "Response Data by Academy in Each Country"
- Held the "COVID-19 Response Status and Future Plan" webinar in Asia according to IAP's suggestion

Participation in the joint announcement of the statement led by the National Academies of Science, Engineering, and Medicine, USA

- The National Academies of Science, Engineering, and Medicine (NASEM) announced a joint statement, “The Critical Need for International Cooperation During COVID-19 Pandemic: JOINT STATEMENT OF ACADEMIES OF SCIENCES AND MEDICINE”, which highlights the urgency of international cooperation.
- Academies from 15 countries, including Germany, the UK, France, China, Japan, and Italy, participated, and KAST signed on behalf of Korea.

Response to the Royal Society’s request

- The Royal Society established the Data Evaluation and Learning for Viral Epidemics (DELVE), a multidisciplinary research group that supports data-driven approaches related to various ways of managing epidemics in each country. It also requested the KAST’s cooperation for clinical data provided by the Korean government or research institutes, indicators of disease prevalence, risk factors related to infection and mortality, economic impact, and other public health measures.
- The KAST prepared and delivered 2 reports: “Response to COVID-19 in the Republic of Korea” (written by Publication Planning Director Hogeun Kim) containing the current status, response measures, and relevant data on COVID-19 in Korea, and “The Scientific Community’s Response to COVID-19 (KAST)” that organized the COVID-19 response measures of the domestic science field, including the KAST.



Cooperation with the German National Academy of Sciences Leopoldina

- Shared Korea’s COVID-19 quarantine system and examination methods at the request of the German National Academy of Sciences Leopoldina.
- Announced the Science 20 Statement to G20 Leaders on the COVID-19 Pandemic with the academics of G20 countries, including KAST, by leading the international discussions on major issues.
- The KAST cooperated via video conferencing and information sharing.

Cooperation with the Russian Academy of Sciences

- Responded to the requests for expert recommendation related to the GScience COVID-19 joint statement
- Exchanged relevant information via video conference, interview, etc.

International Organizations/International Conferences and Project Activities

Proposal and preparation of the IAP statement (to be announced in the first half of 2021)

Proposed a statement on the protection of the marine environment to the IAP, which was selected
To be announced as the first IAP joint statement in the first half of 2021 after 10 months of preparation period

- Topic: Protection of Marine Environment
- Activities: The KAST formed a preparation committee and wrote the first draft after 8 meetings.

Joining the International Science Council (ISC)

A total of 142 member organizations from 116 countries of the council participated in the UN conferences and committees by representing the international scientific community, as well as established science and technology policies and operated international research programs in order to solve the issues in the international public sector.
The KAST became a member in January 2020.

Participation in the COP 26 joint statement preparation meeting

Host	The Royal Society
Date	Sep. 21, 2020 (Mon)
Attendee	(Korea) Doo Sung Lee, Vice Director of External Cooperation (Emeritus professor, Sungkyunkwan University) (UK) Peter Bruce, Vice Director
Activities	Discussion on the preparation of joint statement regarding carbon reduction emission

Participation in the Science 20 Saudi Arabia : Foresight: Science for Navigating Critical Transitions

Host	King Abdullah University of Science and Technology (KAUST)
Date	Sep. 26, 2020 (Sat)
Attendee	Doo Sung Lee Vice Director of External Cooperation (Emeritus professor, Sungkyunkwan University)
Activities	Submission of policy recommendations containing 10 science and technology proposals recommended by the science academies in G20 countries to major economically developed countries in the world under the theme of “Realizing Opportunities of the 21st Century for All”

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 2020, 6 international symposiums were held with themes of “Future Blue OLED Technology”, “AI in the Biomedical Science”, and “Nanobio”. At the 42nd KAST International Symposium, the participants shared COVID-19 cases from around the world, and discussed the impact and threats of infectious diseases on food and poverty under the theme of “Food Safety and Risk in the Age of Disease X”. The symposium contributed to the delivery of scientific and technological knowledge and cultural expansion by posting it on the official KAST YouTube channel.

No.	Date	Theme
38th	10. 22.	AI in Biomedical Science: Current Status and Perspectives
39th	10. 6.	1. Aging Researches from the Basic to the Application 2. Epigenetic Regulation of Gene Expression
40th	9. 23.	Emerging Materials
41st	10. 15.	Technology for the Future Blue OLED
42nd	11. 6.	COVID-19 and Disease-X in Food Safety
43rd	11. 19.	New horizons of Nanobiological Therapeutics

Networking with World-leading Scientists

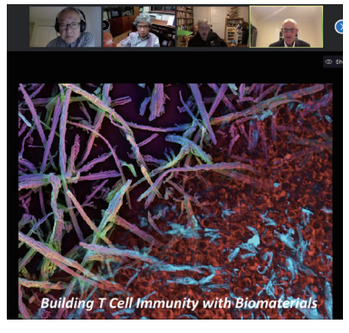
The KAST helps Korean scholars network with their global peers and thereby expand their international influence in the field of science and technology by supporting academic exchanges with international organizations and inviting distinguished scholars from overseas.

The KAST offers individual scholars a rare opportunity to participate inaccessible programs such as Frontier Scientists Workshop, the Lindau Nobel Laureate Meetings, Prestige Workshop, and international scholar exchange programs.

In 2020, 15 programs were held in the form of online webinars. Cancer, cardiovascular disease, turbulence, number theory, strongly correlated properties, nano-bio sensors, lupus precision medicine, and complex soft materials in various fields were among the topics discussed by world-class scholars.

Frontier Scientists Workshop

No.	Date	Theme
22nd	9. 18.	Recent Advances in Drug Delivery System for Cancer Therapy
23rd	9. 19.	Epigenetic Signature on Gastric Carcinogenesis
24th	11. 6.	Turbulence Prediction and Control
25th	11. 11.~12.	International On-line Bioinorganic Symposium
26th	12. 18.	International Virtual Summit Forum on Alternative to Animal Experiments
27th	11. 13.	Van der Waals Magnets
28th	11. 23.	Korea-France Environmental Biotechnology Workshop: Linking Theory and Practice
29th	11. 23.	Molecular and Colloidal Self-Assembly
30th	11. 27.	Recent Advances in Medical Polymers for Therapeutic Applications
31st	12. 4.	Recent Advances in Nano/Biosensors and Biosensing Technologies
32nd	12. 4.	Perspectives of GPCR research with 2012 Nobel Laureate in Chemistry
33rd	12. 4.~5.	See the Future of Toxicology and Pharmacology
34th	12. 17.	Complex Soft Matter: Fluidics and Mechanics
35th	12. 9.	Immune System and Diseases
36th	12. 18.	Precision Medicine in SLE



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 of 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.

The principal objective of AASSA is to act as an organization in Asia and Oceania which plays a major role in the development of the region through science and technology. AASSA serves as a forum to discuss and provide advice on issues related to science and technology, research and development, and the application of technology for socio-economic development.

The AASSA is also the only IAP Affiliated Regional Network for Asia of the IAP for Science to conduct a long-term project for sustainable development in Asia and seek cooperation with other continental partners such as EASAC (Europe) / IANAS (America) and NASAC(Africa). The KAST has been operating the AASSA Secretariat since its launch in 2012. While actively engaging in AASSA activities as a member, the KAST is sharing with the world the experiences of Korea, a country that successfully rose from being one of the world's poorest nations to joining the ranks of the developed countries.

In 2020, the AASSA held a webinar on the theme of "The Current Status of the Academy's Response to COVID-19 and Future Plans by Country" to strengthen the international cooperation in the Asian continent amid the serious COVID-19 global pandemic. As a responsible organization in Asia for global projects conducted by the IAP, the AASSA published two reports seeking joint problem-solving and development plans.

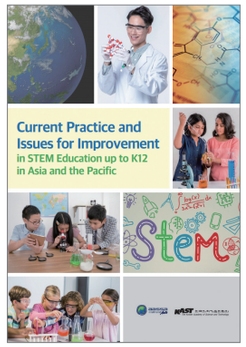
Publication of the Report

Climate Change & Health

- Host: AASSA Sustainability Committee. (Chairperson Khairul Anuar B Abdullah, Academy of Sciences Malaysia [ASM])
- Conducted a project to prepare a report on the climate and health in the Asia and Oceania regions with the support of the IAP. (to be published in the first half of 2021)

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

- Host: AASSA Science Education Committee. (Chairperson Mooha Lee [KAST])
- Published a report on the current status of science education (K-12) and improvement measures in 10 countries in the Asia and Oceania regions, including Korea, China, Japan, Australia, Singapore, and Thailand.



COVID-19 Webinar

AASSA Webinar : National Academy's Response to COVID-19

Date	Jul. 10, 2020
Venue	Live broadcast on the official KAST YouTube channel
Moderater	**Mooha Lee**, AASSA Director, the Secretariat, Emeritus professor, Seoul National University (Fellow, KAST)
Speaker	**Myongsei Sohn**, Prof., Yonsei University Chair **Hogeun Kim**, Prof., Yonsei University (Vice President for Publications, KAST) **Arsen Arakelyan** National Academy of Sciences of Armenia **Abul Kalam Azad Chowdhury** Bangladesh Academy of Sciences **J.P. Khurana** Indian National Science Academy **Satryo Soemantri Brodjonegoro** Indonesian Academy of Sciences **Hashem Rafii-Tabar** Academy of Sciences of IR of Iran **Akiba Suminori** Science Council of Japan **Sunil Babu Shrestha** Nepal Academy of Science and Technology **Shaun Hendy FRSNZ** Royal Society of New Zealand **Zabta K Shinwari** Pakistan Academy of Sciences **Jaime C. Montoya** National Academy of Science and Technology **Tit Meng Lim** Singapore National Academy of Science **Gulnar Sultanovna Dzhunusova** National Academy of Sciences of the Kyrgyz Republic **Supawan Tantayanon** The Science Society of Thailand Under the Patronage of His Majesty the King
Major Achievements	• A webinar was held under the support of KAST to strengthen the network of the Asian and Oceania continents in a situation where the importance of international response and cooperation to resolve the COVID-19 pandemic was becoming increasingly important. • Experts from 14 AASSA-affiliated countries gathered together to share the current status and experience, and quarantine policies of COVID-19 by country. • Joint quarantine policies are sought to encompass all of Asia and Oceania in consideration of each country's characteristics.

Public Lecture on Nobel Prize

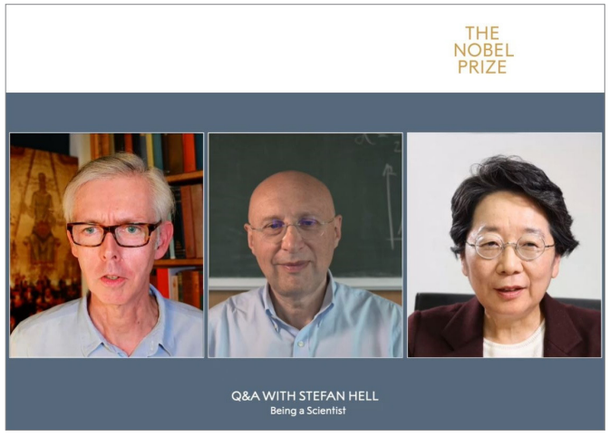
KAST has been holding Nobel Laureate invitation lectures, etc., to form a public understanding and consensus on science and technology, and to inspire future scientific talents. The Nobel Laureate public lectures on the topics of their academic achievements, their life as a researcher, scientific development, and social impact have been well received by many people, including middle school, high school, and university (graduate) students.

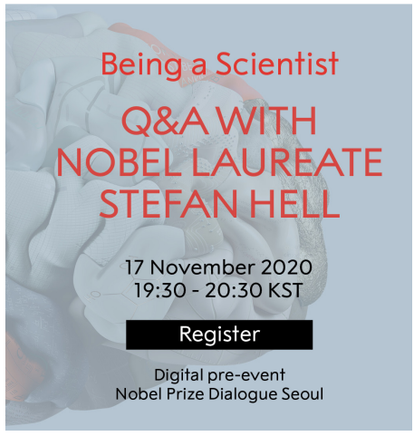
In 2020, the KAST held two online science lectures, including the Nobel Prize Dialogue Seoul Pre-Event and the Sweden-Korea Nobel Memorial Program 2020, and communicated the value of science and technology with 800 people around the world.

Nobel Prize Dialogue Seoul Pre-Event

The KAST has successfully hosted the “Nobel Prize Dialogue Seoul 2017”, an academic event in which 5 Nobel Laureates participated for the first time in Korea. It was a meaningful event that connected the world and Korea with science, with the participation of over 1,000 general public and over 2 million viewers around the world through online channels.

In 2020, the KAST planned to hold the “Nobel Prize Dialogue Seoul 2020” once again to provide an occasion for communication. However, it was postponed to 2021 under the decision that the safety of the audience and speakers is the top priority amid the proliferation of COVID-19. As a result, the KAST held an online public lecture with Stefan Hell, the director of Max Planck Institute for Biophysical Chemistry on the topic of “Being a Scientist”. He was awarded the Nobel Prize in Chemistry in 2014 “for the development of super-resolved fluorescence microscopy”, which increased the resolution of the microscope by 10 times that of the existing one. Professor Jung-Hye Roe, who won the Korean Science Award for research that identifies the antioxidant stress response of bacteria, participated in the lecture and had interesting discussions on the importance of diversity in science and technology.





Event Overview

Event Title	Nobel Prize Dialogue Seoul Pre-Event
Subject	Being a Scientist
Host	Korean Academy of Science and Technology, Nobel Prize Outreach
Date	Nov. 17, 2020 (Tue)
Venue	Online (Twebcast broadcast), Nobel Prize Official YouTube Channel
Moderator	Adam Smith Chief Scientific Officer, Nobel Prize Outreach
Speaker	Stefan Hell, Max Planck Institute, 2014 Nobel Laureate in Chemistry Jung-Hye Roe, President, National Research Foundation of Korea

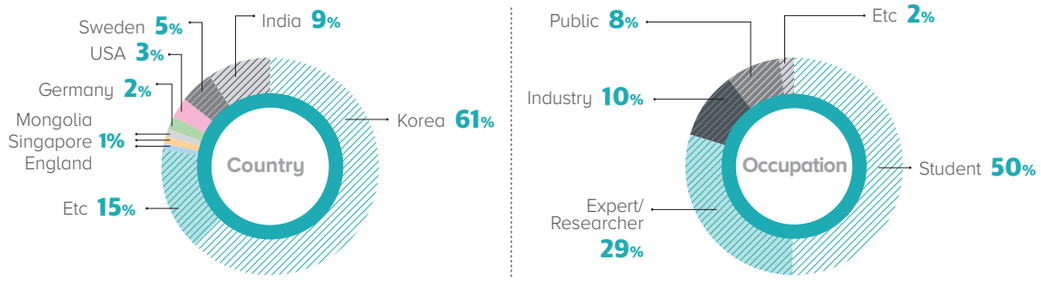
Contents of Lectures and Conversations

- 2014 Nobel Laureate Stefan Hell’s experience as a scientist and his research journey that led to the Nobel Prize.
- Experience in creativity, the value of collaboration, and acceptance through failure that are required as a researcher.
- Professor Jung-Hye Roe, the second female scientist who won the Korean Science Award, participated and shared her opinions on the occupations that female scientists and engineers need on the subject of diversity.
- Increase in communication with online audiences by having a separate conversation time composed of questions received in advance.

Event Results

- Pre-registration: 1,438 people from 68 countries
- Simultaneous access: 500 people

Access statistics



Sweden-Korea Nobel Memorial Program 2020

An online symposium called the “Sweden-Korean Nobel Memorial Program 2020” was jointly held with the Swedish Embassy in Korea on the subject of 2020 Nobel Prize-winning achievements to raise public interest in winning the Nobel Prize and to inspire interest in scientific research. In the program, distinguished scholars from Sweden and Korea held a lecture on the achievements and values of the 2020 Nobel Prize winners from the perspective of the general public.

Event Overview

Event name	A Symposium on the awards in the Sciences present the 2020 Nobel Prizes in Physics, Chemistry, and Physiology or Medicine
Host	Swedish Embassy in Korea
Sponsor	Korean Academy of Science and Technology
Date	Dec. 1, 2020 (Tue)
Venue	Online broadcasting from Lee Sambong Hall, Ewha Womans University
Moderator	Science and Technology Councilor **Anders Hektor**, Swedish Embassy in Korea
Speaker	(Physics) Professor **Anna Delin**, KTH Royal Institute of Technology (Chemistry) Professor **Sven Lidin**, Lund University (Member of the Swedish Academy of Science, former Chair of the Nobel Committee for Chemistry) (Physiology or Medicine) Professor **Mathias Uhlén**, KTH Royal Institute of Technology (Physics) Vice President **Soonkeon Nam**, Kyung Hee University (Chemistry) Professor **Hyongbum Kim**, Yonsei University (member of Y-KAST) (Physiology or Medicine) Professor **Yu-Kyoung Oh**, Seoul National University (fellow of the KAST)

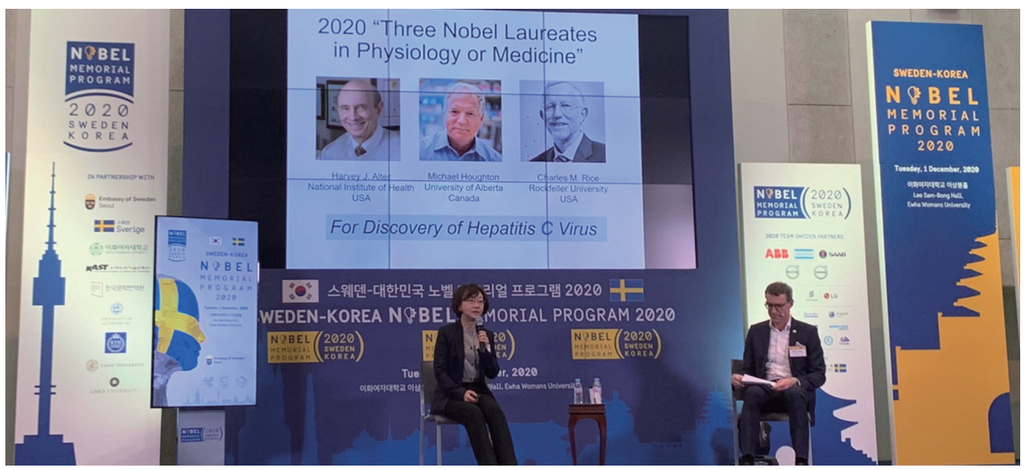
Lecture Content and Achievements

- Experts from prominent universities and institutions in Sweden and Korea came together to celebrate the achievements of science, discovery, and research of the 2020 Nobel Prize in each field, and discussed the meaning of the Nobel Prize.
- The presentation of the researches that won the 2020 Nobel Prize in Physics, Chemistry, and Physiology or Medicine provided an opportunity to understand the basic principles of science and technology.
- Lectures were given on the topics of virus conquest that saved the lives of hepatitis-C patients by discovering the secrets of the silent killer (Nobel Prize in Physiology or Medicine), black hole theory and astronomical observation (Nobel Prize in Physics), and genetic scissors technology that confirmed the importance of gene correction (Nobel Prize in Chemistry).
- Programs to revitalize scientific and technological R&D and educational cooperation between the two countries were sought.
- It was meaningful event that promoted social awareness for the importance of fundamental science and satisfied the intellectual curiosity of the people who are highly interested in the field of science and technology and Nobel Prizes.

Event Results

Pre-registration: **500** people

Simultaneous access: **250** people

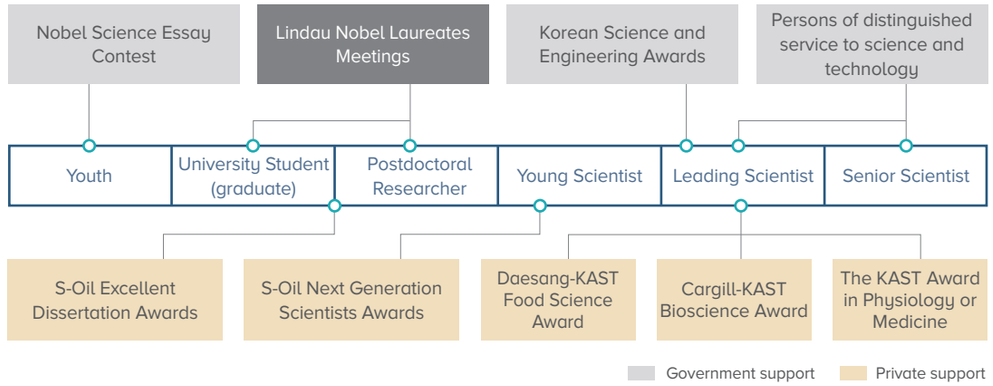


Awards

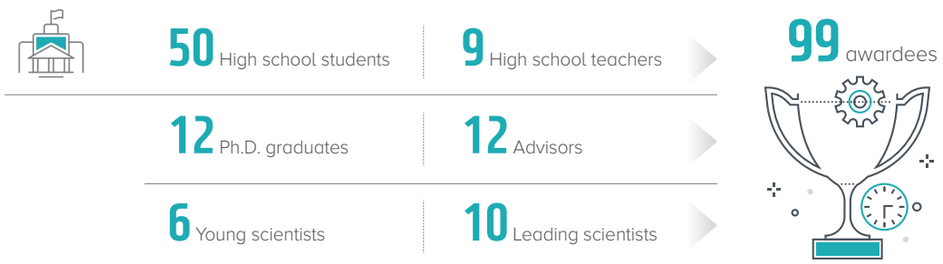
The KAST contributes to enhancing the morale of people engaged in science and technology by selecting and awarding the best researchers in respective fields of basic and applied sciences. The KAST administers various award programs to recognize and encourage scientists and engineers who have made outstanding achievements in their academic fields.

In 2020, we built a “Platform for Award Programs by Life Cycle of Scientists” based on our accumulated know-how and vision in the award program, and launched the operation by selecting 9 winners. We aim to expand and promote support projects specializing in the stages of growth of scientists and engineers, from teenagers to doctoral degree programs, from next generation scientists to mid-level to leading scientists, and senior science and technology scholars.

Platform for Award Programs by Life Cycle of Scientists



No. of 2020 Awardees



In 2020, 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 △KAST Physiological Medicine Award is an award given to physiological medical scientists who contributed to human health and welfare with outstanding R&D achievements in the field of physiological medicine. △Science Essay Contest is an award given to high school students with excellent scientific writing skills.

The 30th 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

2020 Awardees

Group 1 : **Mathematics**

Awardee:

Bumsig Kim, Professor, Korea Institute of Advanced Study

Single research achievement:

- Stable quasimaps to GIT quotients

Group 2 : **Physics**

Awardee:

Q-Han Park, Professor, Korea University

Single research achievement:

- Universal impedance matching and the perfect transmission of white light

The 16th 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

2020 Awardees

Group 1 : **Electrical Electronics, Computer, Information Communication, etc.**

Awardee:

PooGyeon Park, Professor, POSTECH

Single research achievement:

- Reciprocally convex approach to stability of systems with time-varying delays

Group 2 : **Machinery, Metals, Ceramics, Aviation, Shipbuilding, Resources, Industrial Engineering, etc.**

Awardee:

Young-Kook Lee, Professor, Yonsei University

Single research achievement:

- Superplasticity in a lean Fe-Mn-Al steel

The 2nd 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 every 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 the social return of the company's profit.

2020 Awardees

Physics

Awardee: Sung Wng Kim, Professor, Sungkyunkwan University

Major Achievements: Dense dislocation arrays embedded in grain boundaries for high-performance bulk thermoelectrics (Science, 2015)

Chemistry

Awardee: Mi Hee Lim, Professor, KAIST

Major Achievements: Rational Design of a Structural Framework with Potential Use to Develop Chemical Reagents That Target and Modulate Multiple Facets of Alzheimer's Disease (JACS, 2014)

Physiology · Medicine

Awardee: Ka Young Chung, Professor, Sungkyunkwan University

Major Achievements: Discovered the binding principle between GPCR and G-protein (Assembly of a GPCR-G protein complexes, Cell, 2019)

Chemical engineering/ Material engineering

Awardee: Chong Min Koo, Professor, KIST

Major Achievements: Electromagnetic interference shielding with 2D transition metal carbides(MXenes) (Science, 2016)

Energy

Awardee: Jong Hyeok Park, Professor, Yonsei University

Major Achievements: Unassisted photoelectrochemical water splitting exceeding 7% solar-tohydrogen conversion efficiency using photon recycling (Nature Comm., 2016)

IT

Awardee: Sung Jae Kim, Professor, Seoul National University

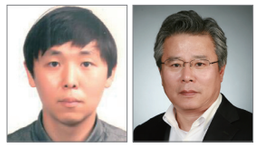
Major Achievements: Capillarity Ion Concentration Polarization as Spontaneous Desalting Mechanism (Nature Comm., 2016)

The 10th 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,

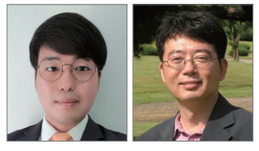
2020 Awardees

Mathematics



Grand Award

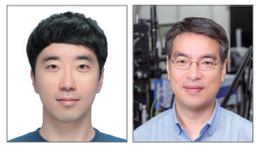
Awardee(school)	Jeong Min Jeon, Seoul National University
Advisor(school)	Byeong Uk Park, Seoul National University
Title of Thesis	Additive Regression with Hilbertian Responses



Excellence Award

Awardee(school)	Jongho Park, KAIST
Advisor(school)	Chang-Ock Lee, KAIST
Title of Thesis	Domain Decomposition Methods for Convex Optimization in Image Processing: Focusing on Total Variation Minimization

Physics



Grand Award

Awardee(school)	Kangwon Kim, Sogang University
Advisor(school)	Hyeonsik Cheong, Sogang University
Title of Thesis	Raman Spectroscopy of Two-dimensional Antiferromagnetic Materials

Excellence Award

Awardee(school)	Sungmin Park, Seoul National University
Advisor(school)	Tae Won Noh, Seoul National University
Title of Thesis	Manipulation of physical properties in oxide thin films by a local inversion symmetry breaking induced by flexoelectricity

Chemistry

Grand Award

Awardee(school)	Seung Youn Hong, KAIST
Advisor(school)	Sukbok Chang, KAIST
Title of Thesis	Mechanism-Guided Development of Nitrenoid Transfer Catalysts for Selective Formation of N-Heterocycles

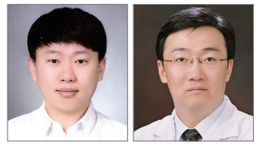
Excellence Award

Awardee(school)	Seong Hee Bae, Ewha Womans University
Advisor(school)	Wonwoo Nam, Ewha Womans University
Title of Thesis	Comparative Reactivity and Mechanistic Insight into the Oxidation Reaction by Mononuclear Nonheme Iron-Oxygen Complexes

Biology

Grand Award

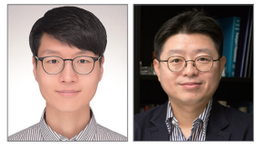
Awardee(school)	Daseuli Yu, KAIST
Advisor(school)	Won Do Heo, KAIST
Title of Thesis	Optogenetic activation of intracellular antibodies for direct modulation of endogenous proteins



Excellence Award

Awardee(school)	Yohan Kim, Hanyang University
Advisor(school)	Dongho Choi, Hanyang University
Title of Thesis	Reprogramming of human hepatocyte into bi-potent chemically derived hepatic progenitors

Chemical engineering/ Material engineering



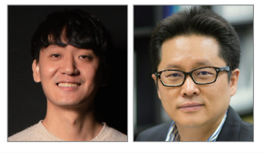
Grand Award

Awardee(school)	Sang Seok Lee, KAIST
Advisor(school)	Shin-Hyun Kim, KAIST
Title of Thesis	Microfluidic Encapsulation of Cholesteric Liquid Crystals for Photonic Applications

Excellence Award

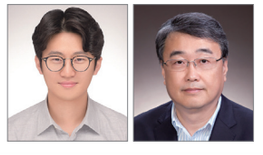
Awardee(school)	Sang Myeon Lee, UNIST
Advisor(school)	Changduk Yang, UNIST
Title of Thesis	Comprehensive Investigation of Efficient Organic Conjugated Materials for Optoelectronics via Material-Synthesis Engineering

IT



Grand Award

Awardee(school)	Seung-Hwan Baek, KAIST
Advisor(school)	Min Hyuk Kim, KAIST
Title of Thesis	Computational Imaging with Light Waves



Excellence Award

Awardee(school)	Girim Kwon, KAIST
Advisor(school)	Hyuncheol Park, KAIST
Title of Thesis	User Scheduling and Beamforming Design for Millimeter Wave MIMO Communications

The 6th 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.

2020 Awardee

Hyun Jin Park, Professor, Korea University

Major achievements:

- Soluble starch formulated nanocomposite increases water solubility and stability of curcumin(Food Hydrocolloid, 2016)

The 1st KAST Award in Physiology or Medicine

Purpose	It was newly established in 2020 to promote research motivation and contribute to the development of the national pharmaceutical industry by selecting and awarding outstanding physiologists who have contributed to human health and welfare with their excellent R&D achievements in the field of physiological medicine.
Number of people awarded	1 person

2020 Awardee

Inhee Mook-Jung, Professor, Seoul National University

Major achievements:

- A Breakdown in Metabolic Reprogramming Causes Microglia Dysfunction in Alzheimer's Disease(Cell Metabolism, 2019)

The 5th Cargill-KAST Bioscience Award

2020 Awardees

Sungchul C. Bai, International Professor, Pukyong National University

Major achievements:

- Heat-killed Bacillus sp. SJ-10 probiotic acts as a growth and humoral innate immunity response enhancer in olive flounder(FSI, 2017)

Ildoo Hwang, Professor, POSTECH

Major achievements:

- BIL1-mediated MP phosphorylation integrates PXY and cytokinin signalling in secondary growth(Nature Plants, 2018)

The 14th 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 59 students in three fields, including physics, physiology, and chemistry (students: 50; 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, and have been protecting the honor of scientists and engineers.
In 2020, the KAST designated 12 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 2020.' In addition, the KAST organized 'lectures from persons of distinguished service to S&T' to pass down their rich research experience and accumulated knowledge to young scholars. And the KAST published 'policy recommendations by persons of distinguished service to S&T' to consult for the establishment of national policies on science and technology. And the KAST provides honorable treatment and convenience with dignity and formality for persons of distinguished service to science and technology.

2020 Persons of Distinguished Service to Science and Technology (9 People)

Natural Science

Decd. Chaepyo Kook, (1906~1967), The Central Meteorological Service

- A meteorologist who established the academic foundation of Korean meteorology and pioneered the weather forecasting technology
- Acquired international reputation and recognition with "Kook's Method", a typhoon path prediction method that is widely used in weather forecasting

Decd. Nung Min Yoon, (1927~2009), Sogang University

- A chemist who led the field of organic synthesis using metal hydride
- Built the basis for joint research in organic chemistry through the establishment of the Organic Chemistry Research Center

Decd. Dock Sang Rim, (1928~1982), Univ. of Pennsylvania

- Solved the problem of "homology algebra" in 1959 and drew the world's attention after creating the module classification theory that was defined for the finite group
- Generalized the deformation theory, which is the field of algebraic geometry, by using an original axiomatic approach

Life Science

Decd. Chonghwee Chun, (1913~2007), The Catholic University

- Laid the foundation for infectious disease treatment and research as the first infectious disease clinician in Korea
- Dedicated his life to the enlightenment of the people for preventive medicine by striving for the treatment and eradication of acute infectious diseases in Korea

Moon Hi Han, (1934), Korea Research Institute of Bioscience and Biotechnology

- A representative life scientist who contributed to the academic research, industrialization, and institutionalization of biotechnology in Korea
- Contributed to the development of starch sugar industry with the development of isomerized glucose syrup production process, and contributed to public health through the successful localization of anti-tuberculosis antibiotic raw materials

Engineering

Sung Tack Ro, (1943), Seoul National University

- An engineer who led the development of the energy field through technology development and human resources training in the thermal engineering field
- Provided data on thermal properties, presented optimal conditions for efficient power plant operation, and contributed to the development of the energy industry, such as refrigeration and refrigerant fields

Decd. Byungseong Ahn, (1935~2010), Electronics and Telecommunications Research Institute

- An information and communication engineer who helped Korea become an IT powerhouse
- Developed Korea's first mini-computer, Sejong No. 1, and the first electric private branch exchange (PBX)
- Opened the era of one phone per household and contributed to the global IT companies, such as Samsung and LG, in their goal of becoming world-class IT companies

Convergence

Myung Ja Kim, (1944), The Korean Federation of Science and Technology Societies

- Established the policy keynote for pre-environment pollution prevention (comprehensive Nakdong River water management measures, natural gas bus supply policy, etc.)
- Contributed to the establishment of major policies in the fields of science and technology innovation, environment, women, and defense

Decd. Yong kwan Kim, (1897~1967), Scientific Knowledge Promotion Society

- Established the Society of Invention with focus on the technical improvement and economic development of Joseon during the Japanese occupation period
- Established the Scientific Knowledge Promotion Society and promoted popular science campaign by designating a science week in April

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 surviving people of merit in 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 Persons of distinguished service to 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 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 people of merit in 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 has been selecting outstanding young scientists under the age of 45 as the members of the Y-KAST, and supporting their exchanges with Young Academies of other countries.

In 2020, the KAST has elected 34 next generation science and technology leaders, 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 2019-2021

General

Junghan Yoon
Chair of Y-KAST
Professor emeritus, Hallym University
(Fellow, Agricultural/Fishery Sciences)

Division of Policy

Sungjoo Lee
Vice Chair of Y-KAST
Professor, Ajou University

Chaewoon Oh
Committee member
Senior Researcher, Green Technology Center

Woo Sung Jung
Committee member
Professor, POSTECH

Division of Natural Sciences

Tae-Young Yoon
Vice Chair of Y-KAST
Professor, Seoul National University

Tae-Lim Choi
Committee member
Professor, Seoul National University

Myoungjean Bae
Committee member
Professor, KAIST

Division of Engineering

Ki Tae Nam
Vice Chair of Y-KAST
Professor, Seoul National University

Sooyoung Kim
Committee member
Professor, Korea University

Hyunjoo Lee
Committee member
Professor, KAIST

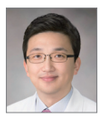
Division of Agriculture and Fishery Sciences

Kee Hoon Sohn
Vice Chair of Y-KAST
Professor, POSTECH

Jung Eun Lee
Committee member
Professor, Seoul National University

Dae-Hee Lee
Committee member
Principal Researcher, Korea Research Institute of Biosciences & Biotechnology

Division of Medical Sciences



Jinsung Kim
Vice Chair of Y-KAST
Professor, Yonsei University

Mi Hyun Kim
Committee member
Professor, Gachon University

Young Seok Ju
Committee member
Professor, KAIST

Major activities in 2020

Jan. – Dec. 2020
YouTube video production and distribution.
Produced 4 videos with a YouTube creator specializing in science, and introduced them to the public on the subjects of "Lithium-ion Battery", "Synthetic Biology", "Next Generation Sequencing of DNA", and "Mathematical Biology".

Jan. 2020
Hosting the 1st Y-KAST Members' Day 2020.
△ Announced the Y-KAST status and 2020 business plan △ Presented a membership plaque to the new 2020 members △ Held a farewell ceremony for the alumni members

May 2020
Hosting the 1st Korean Science Journalists Association/Y-KAST Breakfast Forum 2020.
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. 2020
Participation in the GYA Online Young Academies Meeting.
Established the international networks with the delegations of young academies and GYA members from various countries

Sep. 2020
Participation in the S20 Summit Task Force.
Participated in the administrative work of the Science 20 2020 Saudi Arabia policy recommendations as a member of GYA scientific advisory group

Oct. 2020
Participation in the Heritable Human Genome Editing Virtual Meeting.
Dispatched Korean experts for the "Heritable Human Genome Editing Report" conducted by the National Academy of Sciences (NAS) and the Royal Society, and expressed our opinions

Dec. 2020
Hosting the 2nd Y-KAST Members' Day 2020.
△ Presented the 2020 Y-KAST achievements and 2021 business plan △ Introduced the research fields of the new 2021 members

New Members of Y-KAST Elected in 2020

Division of Policy

Joonmo Ahn Sogang University
- Science, Technology and Innovation Policy
- Open Innovation
- Industry 4.0

Division of Natural Sciences

Hyungryul Baik KAIST
- Low-dimensional topology
- Geometric topology
- Geometrci group theory

Insuk Seo Seoul National University
- Probability theory
- Non-equilibrium behavior of interacting particle systems
- Metastability of stochastic processes

Donghyun Lee POSTECH
- Kinetic theory
- Fluid mechanics

Ki Kang Kim Sungkyunkwan University
- Growth of large area single crystal 2D materials to realize their intrinsic properties.
- Growth of 2D superlattice for unprecedented devices.
- Explore atomic thick catalysts for hydrogen evolution reaction

Eun-Gook Moon KAIST
- Condensed Matter Physics
- Quantum Many-Body States
- Strongly Correlated Systems

Young-Wook Cho Korea Institute of Science and Technology (KIST)
- Quantum Optics
- Quantum Information

Ho Seong Hwang Korea Astronomy and Space Science Institute
- Observational Cosmology
- Galaxy Formation and Evolution
- Multiwavelength Study of Galaxies

Hyungjun Kim KAIST
- Theoretical and Computational Chemistry
- Multiscale Modeling of Materials
- Simulation Method Development

Hye Ryung Byon KAIST
- Electrochemistry
- Nanoscience
- Energy storage and conversion system

Sunkyu Han KAIST
- Synthesis of structurally complex and biologically active natural products.
- Natural products-inspired development of synthetic methods.
- Natural products-inspired drug developments.

Sung-Yon Kim Seoul National University
- Neurobiology of homeostasis, emotion, and stress
- Body-brain communication
- Integrative Physiology

Pil Joon Seo Seoul National University
- Plant epigenetics
- Plant pluripotency and regeneration
- Plant-environment interactions

Tae-Wook Kim Korea University
- Ocean biogeochemical cycles of carbon and nitrogen
- Atmospheric deposition of pollutants to the ocean
- Air-sea exchanges of greenhouse gases

Division of Engineering

Changha Lee Seoul National University
- Water treatment using physical/chemical methods
- Advanced Oxidation Process (AOP)
- Redox technologies for contaminant removal and microbial inactivation

Junsuk Rho POSTECH
- Metamaterials and Plasmonics
- Nanofabrication and Nanomanufacturing
- Artificial Intelligence and System optimization

Jeong-Yun Sun Seoul National University

Multi-Functional Soft Materials
- Stretchable Ionics.
- Bio-inspired ionic brain and nerve system.
- Soft machines (actuators and sensors).
- Solid state ionic devices for bio-medical uses.
- Materials for tissue replacements and medical aids.

Hyunjung Yi
Korea Institute Science and Technology (KIST)
- Human-interfacing sensors and devices
- Bioinspired functional materials and devices
- Low-dimensional electronic materials and devices

WooChul Jung KAIST
- Hydrogen Production
- Fuel Cells
- Heterogeneous Catalysts

Joonwoo Bae KAIST
- Quantum Information Theory
- Entanglement Theory
- Quantum Protocols & Quantum Algorithms

Minsu Cho POSTECH
- Computer Vision
- Machine Learning
- Artificial Intelligence

Jaeyun Kim Sungkyunkwan University
- Materials-based immunotherapy and vaccine
- Nanomedicine and drug delivery
- Hydrogel engineering for biomimetics

Jungwon Park Seoul National University
- Nanomaterials
- In situ miscroscopy
- Energy applications

Changhyun Pang Sungkyunkwan University
- Electric Materials
- Interfaces & Surfaces
- Biomaterials

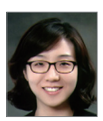
Doh Chang Lee KAIST
- Quantum Dots for Display Applications
- Quantum Dot-Bio Hybrid Materials for Energy Applications
- Photocatalysis

Division of Agriculture and Fishery Sciences

Soon-Kyeong Kwon
Gyeongsang National University
- Microbial genomics
- Metagenomics/Microbiome
- Microbe-host interactions

Sunghoon Jung Chungnam National University
- Insect diagnoses, phylogenetics, DNA barcoding for agricultural resources
- Insect conservation, distribution modeling responding to climate change
- Insect diversification and biodiversity to understand their evolution

Tae-Gyu Lim Sejong University
- Functional Foods
- Nutricosmetics
- Target/Mechanism validation



Yoon Sin Oh Eulji University
- Treatment and prevention of diabetes
- Bioactive substances
- Mechanisms of beta cell proliferation and apoptosis

Division of Medical Sciences

Su-Hyung Park KAIST
- Protective immunity against new emerging virus infection
- T cell exhaustion in cancers
- Vaccine for new emerging virus

Buhm Han Seoul National University
- Bioinformatics
- Genomics
- Computational Biology

YoungSoo Kim Yonsei University
- Drug discovery for Alzheimer's disease based on chemical biology
- Blood test and brain imaging for Alzheimer's disease diagnosis
- Pathological investigation on protein misfolding in Alzheimer's disease

Jaecheol Lee Sungkyunkwan University
- Induced Pluripotent Stem Cell
- Disease Modeling
- Epigenetics

Jin-Woo Kim Ewha Womans University
- Osteonecrosis of the jaw; Next generation sequencing, National cohort registry, Bone biology
- XR-based surgical reconstruction, 3D bio-printing & titanium-printing
- Deep learning-based diagnosis

New Fellows of the KAST Elected in 2020

In 2020, the KAST elected 30 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 129 fellows participated in 24 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

Sang Baek Koh Yonsei University
- Science and technology in the framework of the sustainable development goals
- Digital Health and Big Data
- Preventive Medicine and Community Health

Wonjoon Kim KAIST
- Innovation Strategy and Policy
- Science and Technology Policy
- Technology Management and Economics

Buhm Soon Park KAIST
- History of Science
- Science and Technology Policy
- Science, Technology, and Society (STS)

Jinwoong SONG Seoul National University
- Science Curriculum & Teaching
- Interplay between School Science & Citizen Science
- Science Education Policy & International Collaboration

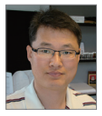
Division of Natural Sciences

Inkang Kim Korea Institute for Advanced Study
- Hyperbolic geometry and geometric topology
- Symmetric space and rigidity of group action
- Surface group representation and invariant theory

Jaeyoung Byeon KAIST
- Partial Differential Equations/ Analysis/ Mathematics

Kyungwon An Seoul National University
- Nonclassical field generation and thresholdless lasing in microlasers
- Quantum chaos and non-Hermitian physics in microcavities
- Phase-controlled atom-field interaction such as superradiance and superabsorption

Ho Nyung Lee Oak Ridge National Laboratory
- Discovery of correlated and topological quantum materials
- Quantum information science
- Physics of complex oxide thin films and heterostructures



Jong-Beom Baek UNIST
- Polymer Chemistry
- Material Chemistry
- Mechanochemistry

Dong Hoon Choi Korea University
- Organic semiconducting Materials : OLED, OPV, OTFT
- Nanostructured materials and their devices; nanomaterials; nano-sized objects of organic semiconductor
- Photonic organic materials : Linear and nonlinear optical materials

Jie-Oh Lee POSTECH
- Protein Structure
- Antibody Engineering
- Toll-like Receptors

Jhoon Kim Yonsei University
- Satellite Remote Sensing
- Atmospheric Composition Measurements
- Air Quality

Division of Engineering

Wan-Kuen Jo Kyungpook National University
- Development of Air Cleaning Device
- Environmental Exposure Assessment
- Photocatalytic Environmental Treatment

Kap Hwan Kim Pusan National University
- Port Logistics
- Maritime Logistics
- Industrial Engineering

Sang-Jae Kim Jeju National University
- MEMS
- Nanogenerator
- Supercapacitor

Jeom Kee Paik University College London, UK
- Marine Technology
- Safety Design and Engineering of Structures and Infrastructure
- Risk Assessment and Management of Engineering Structures

Sang Il Seok
Ulsan National Institute of Science and Engineering
- Functional inorganic-organic hybrid materials
- Multifunctional crystalline hybrid semiconductors
- Hybrid perovskite solar cells

Young-Kook Lee Yonsei University
- Advanced ferrous materials
- Advanced thermo-mechanical treatment

PooGyeon Park POSTECH
- Robust Control
- Adaptive Filtering
- Convex Optimization

Kyoung Mu Lee Seoul National University
- Computer Vision
- Artificial Intelligence
- Machine Learning

Byung-Gee Kim Seoul National University
- Biocatalysis and Enzyme Reaction Engineering
- Proteomics and Application of Mass spectrometry

Chang Ha Lee Yonsei University
- Porous materials: Adsorption, Reaction, Mechanism
- Adsorptive cyclic processes: PSA, PVSA, TSA, SMB
- Simulation and Machine Learning: Reactors, Cyclic Processes, Integrated Processes

Division of Agriculture and Fishery Sciences

Seunghwan Lee Seoul National University
- Systematics, phylogenetics, and evolution of insects
- Quarantine and exotic pests
- Conservation of honeybees, wild bees, and plant pollination

Cheorun Jo Seoul National University
- Meat Quality and Processing
- Non-thermal Processing
- Muscle Biology and Cultured Meat

Ki Won Lee Seoul National University
- Discovery of candidates of phytoceuticals for disease prevention and treatment
- Standardization and materialization of phytoceuticals by each level of pipeline
- Elucidation of the efficacy and mechanism of action of phytoceuticals using various disease models

Division of Medical Sciences

Wan-Uk Kim Catholic University
- Systems Approach to Rheumatoid Arthritis
- Synoviocyte Biology
- Autoimmune Diseases

Minho Shong Chungnam National University
- Endocrinology & Metabolism
- Diabetes & Thyroid Cancer
- Molecules & Cells

Jae-Joon Yim Seoul National University
- Diagnosis and treatment of tuberculosis and non-tuberculous mycobacterial infection

Jung Weon Lee Seoul National University
- Liver disease
- Drug development
- Signal tranduction

Eun-Jung Cho Sungkyunkwan University
- Chromatin dynamics and epigenetic regulation of gene expression
- Cancer epigenetics, Epigenetic mechanism of tumorigenesis
- Non-coding RNAs, Transcriptome analysis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