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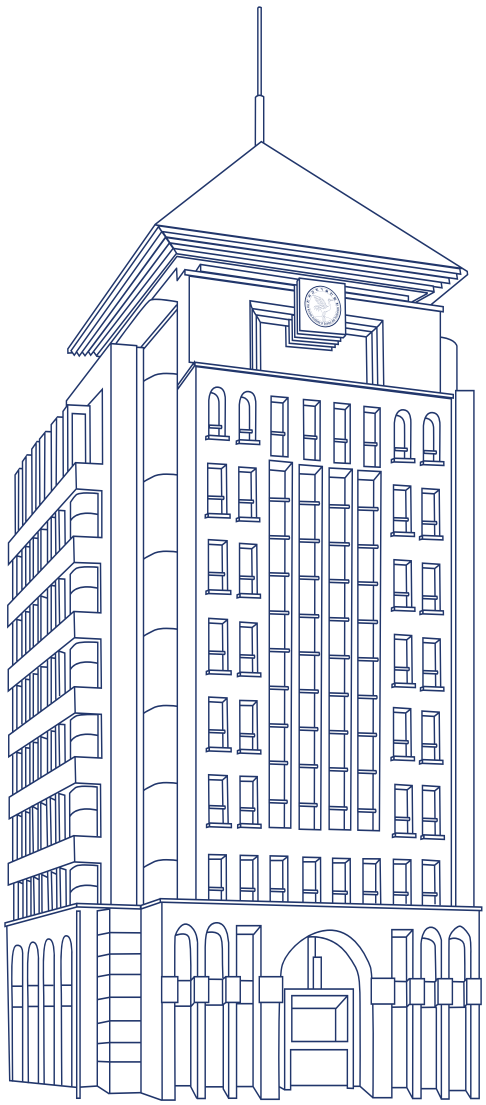
ANNUAL REPORT

The Korean Academy of Science & Technology



KAST 한국과학기술한림원
The Korean Academy of Science and Technology

2022

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.

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

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 the Joseon Dynasty, officials in literature and martial arts wore embroidered badges on the front and back of official costumes to indicate their status and class.
The badges were designed after animals such as dragon, phoenix, giraffe, peacock, crane, wild goose, tiger, turtle, and deer. Since the 18th century, literary officials wore badges embroidered with cranes, which symbolized the intellectual spirit of scholars. KAST's symbol mark adopted the same image of the crane as a symbol of scholars devoted to studies based on the tradition of our ancestors.
This is used to express the traditional and modern significance of the status and role that KAST members hold as scholars.

Meaning of Han-lim-won

"Han-lim-won" is the Korean word for "academy." At the time when KAST was established, the word "academy" meant a "private educational institute" in Korea.
The committee behind the establishment of KAST looked for an institution that played a role similar to academies in Korean history, and came upon "Han-lim-won," which was a royal academic research institute during the Goryeo Dynasty. It was later succeeded by Jiphyeonjeon, or the Hall of Worthies. The word "hanlim" refers to "a place where many scholars get together." Today, "han-lim-won" is generally used in Korea as a word meaning "academy."

한림원

- **Location**
  KAST building, 42(Gumi-dong), Dolma-ro, Bundang-gu, Seongnamsi, Gyeonggi-do 13630, Korea
- **Online channel**
  www.kast.or.kr

CONTENTS

MESSAGE FROM THE PRESIDENT AND THE EXECUTIVE COMMITTEE

Professor Svante Pääbo, a Nobel Prize Laureate in Physiology or Medicine 2022, has published a paper on the Neanderthal genome, which he has been working on for years, in an open source scientific database. This was a move to promote follow-up research as he thought the result itself was meaningless in science and that reaching a certain mastery would present a higher stage. The value of "sharing and taking on challenges" shown by Professor Pääbo is the fundamental principles for scientists' great accomplishments.

Over the past year, the Korean Academy of Science and Technology (KAST) has been practicing the values of sharing and taking on challenges, and making efforts for promoting R&D and a better life in the international community.

KAST expanded face-to-face attendance based on online as analysis that COVID 19 had entered an 'endemic' came out. For joint symposiums with foreign academies, face-to-face exchanges are being resumed, starting from Germany, Sweden, and Israel. Science-gifted students from all over the country and members of KAST participated in the KAST Future Scientist Camp, and conducted various exchange activities, including a special talk with 2022 Fields Medal winner Professor June Huh and field trips to research sites. In commemoration of the "International Year of Basic Sciences for Sustainable Development" proclaimed by the United Nations, the "Scientist's Space" project was also implemented. Six of the best basic scientists in physics, chemistry, and life sciences gave special lectures to the general public to introduce their laboratories and research contents.

KAST has operated diversified forums composed of experts from all walks of life and presented their experiences and vision on topics such as space exploration, quantum computers, metaverse, COVID-19, and artificial intelligence (AI). KAST has also disseminated various scientific contents, such as an open forum on YouTube, the most easily accessible medium for the public.

KAST operates "National Science Challenges Support & Network," a leading convergence R&D project that approaches unresolved scientific challenges with creative and innovative ideas. Domestic researchers help to create an enterprising and challenging researching climate by discovering scientific challenges through convergence research. The "Center for Metallic Heterophase Control Research," "Center for Cold Quantum Reaction," and "Artificial Water-tree Research Team" were newly launched and are working for the common prosperity of humankind.

KAST promoted two new projects for the development of science and technology leading to the future of the country. "Discovering System on Establishing Future Promising Seed Technology" is a research project to break away from the past "catch-up" R&D system and prepare a global leading R&D system. KAST has been conducting data-based planning research to discover leading source technologies with significant pump effects of government R&D. The "Science Networking Center" is a project that supports systematic promotion and international network for promising scientists in the field of basic science. KAST plans to build an omnidirectional channel to promote the international recognition and status of leading researchers based on their capabilities that has been accumulated by exchanges with the academies of each country and international science and technology organizations for the past 30 years.

The COVID-19 pandemic has created an unprecedented social crisis in history as well as a public health crisis for all humankind. KAST has expanded its activities to promote social values and solve universal problems to restore public values in our society. KAST held a policy discussion forum under the theme of "Science and Technology and Social Justice" and an international joint symposium under the theme "Science and Technology for Society" to remind the domestic and international science and technology community of the importance of related topics. The Association of Academies and Societies of Sciences in Asia (AASSA) carried out a policy research project dealing with urgent issues in Asia, such as climate change and neonicotinoids.

Historian Arnold Toynbee said, "All great human achievements are often directly related to the creative responses to challenges." Reflecting on the value of sharing, KAST will continue to take on a higher level of challenges.

Thank you.

February 2023

Ook Joon Yoo,

President of KAST

and Members of the 10th Executive Committee

10 Highlights from 2022

01 Proposal of policy direction for major issues in science and technology

KAST has been striving to shed light on major issues in science and technology and present policy directions for Korea's continuous development.

In 2022, KAST held 13 KAST roundtable discussions and 10 joint forums with relevant agencies, published 10 KAST research reports and presented the professional knowledge and vision of science and technology experts on the most domestically and internationally sought-after topics, including "space exploration," "quantum computer," "metaverse," "COVID-19," and "AI". Among these topics, "quantum computer," "microbiome," "reverse aging technology," and "omicron virus" have gained much attention.

02 Transition of international cooperation projects and resumption of face-to-face exchanges following the "Post-COVID" era

KAST has diversified its methods in accordance with "With COVID-19" campaign in international cooperation and exchange projects, such as international symposiums, which have been conducted online for two years due to COVID-19 global pandemic. Online-based face-to-face participation is expanding in the international symposium, where leading researchers from various countries participate in a specific field of science and technology, and face-to-face exchanges are being resumed for joint symposiums with foreign academies, starting from Germany, Sweden, and Israel.

The first joint symposium was held with the Israel Academy of Sciences and Humanities in Jerusalem with the theme of "Quantum Physics" and another one with the German National Academy of Sciences Leopoldina with the theme of "AI and Digital" in Seoul. Moreover, about 40 top scientists from major Swedish universities visited Korea and had in-depth exchanges with Korean scientists.

03 Planning research for challenging and creative R&D

The "National Science Challenges Support & Network" operated by KAST under the "Science Challenge Convergence R&D Project" constantly discovers and plans difficult problems, establishing itself as a challenging and creative research program in Korea. Starting this year, KAST chose the "STEAM Research Project – Promising Future Convergence Technology Pioneer: Science Challenge Type" as a new research group in addition to the five existing leading convergence research groups. Accordingly, the newly selected "Center for Metallic Heterophase Control Research," "Center for Cold Quantum Reaction," and "Artificial Water-tree Research Team" began scientific challenges for the shared prosperity of humankind.

Moreover, KAST entrusted the "Research on Establishing Future Promising Seed Technology" in the second half of this year, and is conducting research to establish a system that will discover emerging technologies with high originality, potential, and significant pump effects of government R&D based on data.

04 Launch of "Science Networking Center" to support the international exchange of leading scientists in Korea

SCIENCE NETWORKING CENTER

As KAST was appointed as the host institution for the "Dissemination of Basic Research Results" task among the "Excellent Researcher Exchange Support (BrainLink) Project," a new project promoted by the Ministry of Science and ICT in 2022, the Science Networking Center was launched as an organization to carry out the task. In the first year, a total of 11 people, including 8 leading scientists and 3 rising scientists (under the age of 45), were selected in three basic science fields: physics, chemistry, and life science, and a systematic network was established.

05 Implementation of the “Scientist’s Space” project in commemoration of the UN International Year of Basic Sciences

Last July, the United Nations (UN) declared 2022 as the “International Year of Basic Sciences for Sustainable Development (IYBSSD, Jul. 1, 2022 – Jun. 30, 2023)” and urged various international institutions and academic organizations to participate in activities to promote the importance of basic science. KAST has participated as a member of the IYBSSD International Advisory Committee since February 2021 and implemented two projects as official programs this year. First, the “Scientist’s Space” was held to provide a virtual reality (VR) tour of six basic scientists’ laboratories to the general public including the youth, and the KAST Roundtable Discussions on “The Role of Basic Sciences in Overcoming the Energy and Climate Change Crisis” was held to propose relevant policy directions to scientists, engineers, and stakeholders.

06 Expansion of science popularization activities

KAST and the Embassy of Sweden in Korea held the “Nobel Memorial Symposium,” an explanatory lecture on the achievements of the 2022 Nobel Prize, both online and offline. A total of 6 speakers from Korea and Sweden participated in physics, chemistry, physiology, and medicine and presented easy and interesting lectures.

The production and distribution of scientific contents using YouTube, an influential platform for the public, has also expanded. A commentary lecture on the 2022 Fields Medal and the Nobel Prize in Science was produced and uploaded as a video with the best experts. Moreover, KAST tried “Shorts,” which summarizes interesting parts of various events, including the KAST Roundtable Discussions, in a one-minute video.

07 Expansion of contribution for social value promotion

KAST has been expanding its activities to promote social values and solve universal problems of humankind. KAST’s policy magazine, the “View of KAST,” dealt with “Just Science and Technology” as its annual theme and held a policy discussion on “Science and Technology and Social Justice” to remind the domestic science and technology community of the importance of related topics.

Moreover, the Association of Academies and Societies of Sciences in Asia (AASSA) conducted joint research projects on issues in Asia, such as climate change and neonicotinoids, and at the YKAST-YAS Bilateral Symposium, scientists from both countries discussed the topic of “science and technology for society.”

KAST has continuously contributed in maintaining regional and gender balance and consideration for the underprivileged in its human resource development project.

08 Maintenance of the KAST Hall to support writing and lecture activities of members

Ook Joon Yoo, the President of KAST who was appointed in March, set three goals to be achieved during his tenure: promoting the contributions of scientists to the public, creating a comfortable research environment, and showing respect for members. To achieve these goals, "Career Decisions" lecture series and “Scholarly Writing and Policy Proposals” have been set as the main tasks. As a preliminary preparation, the lobby space on the first floor of the KAST Hall was reorganized for lectures and writing sessions. From 2023, KAST plans to use the space as a place for senior scientists’ writing activities and scholarly career decision lectures.

09 Vitalization of member participation and exchange

The 10th Executive Committee of KAST has been planning various programs with member participation and exchange vitalization as its main tasks. In May, the “KAST Member Venture Exchange” was held, providing a venue for information exchanges among members who started a business to contribute to the society. The meeting is expected to provide opportunities for collaboration by sharing participants’ experiences. From 2023, when many of the restrictions caused by COVID-19 are expected to be lifted, member exchange meetings operated based on regions and institutions will be revitalized, and academic exchanges through colloquiums and cultural events for members will be prepared.

10 Strengthening the status of KAST and its members

As Korea's representative science and technology scholarly institution, KAST is making efforts to spread a culture of respect for scientists and engineers and to strengthen its status and members. As part of the efforts, President Ook Joon Yoo and the 10th Executive Committee members toured domestic universities and held individual meetings with presidents to discuss how to treat the KAST members with respect at their affiliated institutions. The relevant contents will be more actively implemented in 2023.

Summary

Date of Establishment

November 22, 1994

Objectives

- 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, KAST plays an integral role in strengthening the foundation of science and technology and in preparing to meet the challenges of future needs of our nation and the global society. 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.

- KAST actively seeks international academic collaborations 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

MISSION — To promote science and technology by consolidating a creative national foundation

VISION — A dynamic academy

CORE VALUES — Future strategies for national science and technology | International Leadership | Social responsibility through science and technology

STRATEGIES

Develop a creative environment

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

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

Promote a people-friendly science culture

- To build a rational society based on a sophisticated science culture
- To promote local science by supporting local fraternities
- To reinforce the social responsibility of scientists and engineers
- To expand KAST members' social activities and participation
- To develop technologies for less privileged people

Historical Highlights

1994 • Established as the Korean Academy of Science and Technology
• **The 1st President Wan Kyoo Cho inaugurated**


1995 • KAST policy study report published
• International symposium celebrating the establishment of KAST held

1996 • KAST Roundtable Discussions/Distinguished Lecture Series/symposium launched
• The 1st KAST Distinguished Lecture Series 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 • Signed an MOU with the Royal Swedish Academy of Sciences
• Association of Academies of Sciences in Asia(AASA) launched and secretariat established

2001 • **The 3rd President In Kyu Han inaugurated**


2002 • KAST Advisory Committee founded

2003 • New KAST building completed
• The 1st Voice of the KAST announced

2004 • **The 4th President Kun Mo Chung inaugurated**
• The Project of "The Korea Science & Technology Hall of Fame" transferred to KAST


2005 • Promoted to a statutory body following an amendment to the Basic Science Research Promotion Act
• "English/Korean and Korean/English Key Science & Technology Terminology Dictionary" published

2006 • "Distinguished Scholars Talk about Science & Technology" series published

2007 • **The 5th President Hyun-Ku Rhee inaugurated**
• "Ethics Code in Science & Technology" announced

2008 • Mentor Program for Outstanding Students launched

2009 • Launched the memoir project of the deceased members

2010 • **The 6th President Kil-Saeng Chung inaugurated**
• Joined the InterAcademy Partnership for Science(IAP for Science)
• KAST Society for Science, Technology and Innovation established under the National Assembly

2011 • The 1st Prestige Workshop held
• The 1st Frontier Scientists Workshop held

2012 • Inter-Academy Seoul Science Forum(IASSF) launched
• Association of Academies and Societies of Sciences in Asia (AASSA) launched and secretariat established

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) established
• Korea Science Week 2017 held
• Nobel Prize Dialogue Seoul 2017 held


2018 • Sejong Science & Technology Forum held

2019 • **The 9th President Min-koo Han inaugurated**
• General Assembly of the InterAcademy Partnership (IAP) held
• "S-Oil Young Scientist Award" launched


2020 • Joined the International Science Council (ISC)
• "The National Science Challenges Support & Network" launched
• Transferred and reviewed the Korea Science Award and Korea Engineering Award project
• The KAST Award in Physiology or Medicine established and awarded
• Implemented production projects, including science and technology Braille books, audiobooks, and sign language lecture videos for the socially disadvantaged

2021 • "Amgen-KAST Biotechnology Award" launched
• Proposed and prepared the IAP statement

2022 • **The 10th President Ook Joon Yoo inaugurated**
• Science Networking Center established
• "Career Decisions Lecture Series" commenced

Membership

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

Status of members

KAST members are categorized into Fellow, Foreign Member, Associate Member, Honorary and Patron Member, and Young Korean Academy of Science and Technology(Y-KAST) Member and Alumni.

Fellow

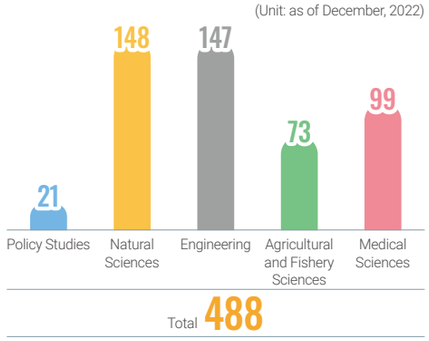
Qualification

Korean scholars who have 25 years or more of experiences in science & technology with an outstanding academic achievements in development of science & technology.

Term

Until 70 years of age

(Unit: as of December, 2022)



Fellow Emeritus

Term Lifetime

Associate Member

Qualification

Selected from excellent scientists up to 100 persons.

Term

5 years, possible to be reelected once

Foreign Member

Qualification

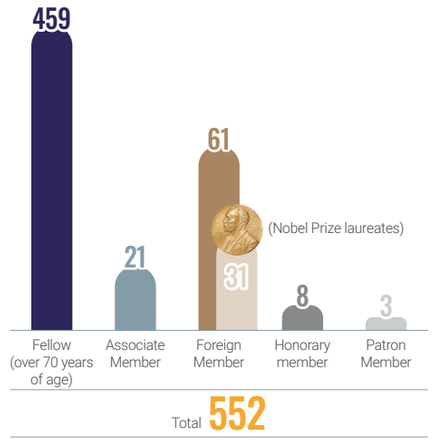
Foreign Scholars who have made outstanding academic achievements.

Honorary and Patron Member

Qualification

Individuals, corporations and organizations supporting KAST programs.

(Unit: as of December, 2022)



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

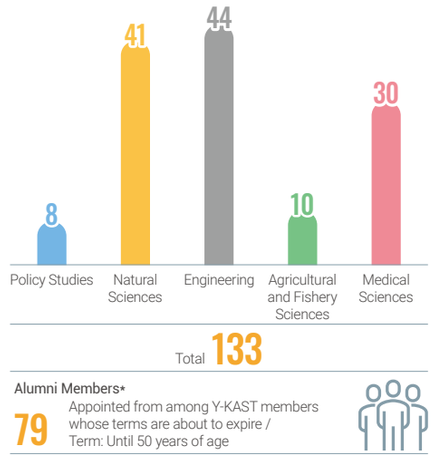
Qualification

Brilliant young Korean scientists who are 45 years old or younger

Term

3 years, re-appointment permitted until 45 years of age

(Unit: as of December, 2022)



Alumni Members*

79 Appointed from among Y-KAST members whose terms are about to expire / Term: Until 50 years of age

Organization

Organization of KAST

Board of Directors

Chairman

Min-Koo Han
Prof. Emeritus of Seoul National University

Director

Dohan Kim
Prof. Emeritus of Seoul National University

Sang-Cheol Bae
Prof. of Hanyang University

Kee-Yoeup Paek
Distinguished Prof. of Chungbuk National University

Kong-Rae Lee
President of Asia Innovation Research Institute

Doo Sung Lee
Prof. Emeritus of Sungkyunkwan University

Jung Han Yoon
Prof. Emeritus of Hallym University

Youngsook Lee
Prof. of POSTECH

Yong-Hee Lee
Prof. of KAIST

Changhee Lee
Distinguished Prof. of Hanyang University

Ki Ryun Choi
Prof. Emeritus of Ajou university

Seung-Bok Choi
Prof. Emeritus of Inha University

Hunjoo Ha
Prof. of Ewha Womans University

Ook Joon Yoo
President of KAST

Pansik Hwang
Director General of Future Talent Policy Bureau of Ministry of Science and ICT

Auditor

Jin-Ho Seo
Prof. Emeritus of Seoul National University

Jong-Yil Chai
Prof. Emeritus of Seoul National University

Executive Committee

Ook Joon Yoo
President
Prof. Emeritus of KAIST

Changhee Lee
Executive Vice President
Distinguished Prof. of Hanyang University

Tai Hyun Park
Vice President for Planning & Policy
Prof. of Seoul National University

Aree Moon
Vice President for External Relations
Chairman of WISET

Youngjo Lee
Vice President for Publications
Chair Prof. of Dankook University

Hoon Teak Lee
Vice President for Academic Affairs
Prof. of Konkuk University

Pill Hoon Choung
Vice President for Membership
Prof. of Seoul National University

Sunyang Chung
Policy Research Institute Director
Prof. of Konkuk University

Youngbae Kim
Division Chair for Policy Studies
Prof. of KAIST

Byeang Hyean Kim
Division Chair for Engineering
Prof. of POSTECH

Hyung Hee Cho
Division Chair for Engineering
Prof. of Yonsei University

Young Joon Surh
Division Chair for Medical Sciences
Prof. of Seoul National University

Hyun Jin Park
Division Chair for Agricultural and Fishery Sciences
Prof. of Korea University

Dae Young Kwon
Director for Domestic Cooperation
Prof. of Hoseo University

Jun Soo Kwon
Director for International Cooperation
Prof. of Seoul National University

Joong Hee Lee
Director for Domestic Academic Affairs
Prof. of Jeonbuk National University

Wonwoo Nam
Director for International Academic Affairs
Prof. of Ewha Womans University

Young Keun Kim
Chair of Y-KAST
Prof. of Korea University

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

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

Doo Sung Lee
Science Networking Center / Director
Prof. Emeritus of Sungkyunkwan University

Advice for Policy Makers and Society

The research and advice of KAST serve as a compass which guides policymaking on science and technology in the country.

Armed with experts of every distinctive field, 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 KAST and other experts in diverse areas discuss in depth about extensive issues, which directly affect the people's lives as well as policies in science & technology.

In 2022, a total of 23 discussion meetings were held for science and technology experts to present their opinions on social issues. KAST discussed leading scientific issues, from quantum computers, space development, and AI, which are considered game changers in the industrial ecosystem, to natural disasters, climate change, and K-food that can solve social issues and increase public value for humanity. Moreover, in collaboration with the Korean Federation of Science & Technology Societies and the National Academy of Medicine of Korea, KAST reviewed the current status of COVID-19, focusing on variants and response strategies.

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
Jan. 25	Giant Ecosystems, the Future of Microbiome Research
Feb. 14	Prospects and Challenges of Quantum Computers: What Should We Prepare for?
Mar. 10	Omicron: How is It Different from Existing Viruses and How Will We Respond?
Apr. 29	Science and Technology Driven Growth: What Should Be Done?
Jun. 2	No More Natural Disasters: Understanding and Preparing for Natural-Technology Complex Disasters
Jun. 17	Value and Vision of K-Food
Jun. 29	Benjamin Button's Time: Going beyond the Secret of Aging and Aiming for Reverse Aging
Sept. 26	New Paradigm of Drug Discovery
Sept. 29	Why and How Do We Go to Space?
Oct. 12	Engineering Meets Healthcare: 100-year-old Health Opened by AI
Oct. 21	Science and Technology and Social Justice
Nov. 18	The Role of Mathematics for Sustainable Growth and Value Innovation
Dec. 1	The Role of Basic Sciences in Overcoming the Energy and Climate Change Crisis

Joint Discussion with relevant organizations

The Academy held six joint forums on COVID-19 and four science and technology policy debates inviting presidential candidates.
The Korean Federation of Science & Technology Societies (KOFST) and the National Academy of Medicine of Korea (NAMOK) participated in the COVID-19 joint forums, and 30 science and technology organizations participated in the presidential debates.

theme	Date	Theme
COVID-19, etc.	Feb. 10	Status and Prospects of COVID-19 Treatment
	Mar. 18	COVID-19 Infection Status and Countermeasures in Children and Adolescents
	Jun. 17	Current Status and Future Countermeasures of COVID-19
	Jul. 5	Monkeypox, Is It Another Emerging Infectious Disease Crisis?
	Sept. 5	Continued Occurrence of COVID-19 Patients and Countermeasures for Fall
	Dec. 13	Forum for Forming a Sustainable Health Care System
Presidential Debate	Jan. 19	Science and Technology Policy Debate inviting Presidential Candidates I – Lee Jae-Myung, Presidential Candidate of The Minjoo Party of Korea
	Jan. 27	Science and Technology Policy Debate inviting Presidential Candidates II – Ahn Cheol-Soo, Presidential Candidate of People's Party
	Feb. 8	Science and Technology Policy Debate inviting Presidential Candidates III – Yoon Seok-Yeol, Presidential Candidate of People Power Party
	Feb. 10	Science and Technology Policy Debate inviting Presidential Candidates IV – Sim Sang-Jeong, Presidential Candidate of Justice Party

KAST Communique

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

Based on the expert analysis and opinions of scholars in related fields, improvement schemes for policies, related laws and regulations are proposed and also distributed to the Korean government, the National Assembly, and related organizations.

Started off with the first edition titled "Korean students avoiding science and engineering | How to elevate status of the Korean science and technology," publications had been made about 5 to 10 times a year. In 2022, six editions were distributed, totaling 102 editions thus far.

No.	Theme
97th	Giant Ecosystem Microbiome: Global competitiveness should be secured based on convergence and challenging national strategies.
98th	An advanced and scientific disaster response system must be prepared based on understanding natural-technological complex disasters.
99th	Direction of science and technology policy to secure growth engines amid a global paradigm shift
100th	New Space Era: Direction for improving national space power
101st	A new technological paradigm for innovative drug development
102nd	Securing future growth engines through mathematics, the language of science

S&T Policy Reports

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 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 2022, 6 research reports were published.

No.	Theme
144th	Policy Recommendations for the Post-Plastics Age
145th	An exploration of current status and core agenda on the Metaverse
146th	Basic science research in Korea based on large-scale research facilities and equipment
147th	Desirable Governance System for Space Exploration in Korea
148th	S&T Policies to Solve the Social Grand Challenges to Nations: Focusing on Health·Medicine, Sustainable Development·Climate Protection·Energy, and Future Mobility
149th	A Study on How to Strengthen KAST's S&T Policy Studies and Consulting Activities






Young Academy Reports

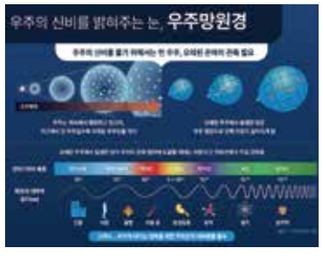
"Young Academy Reports" is policy recommendation based on the thoughts and ideas of young scientists, mainly the members of the "Young Korean Academy of Science and Technology (Y-KAST)". Each report contains policy approaches to support promising science and technology research areas and core technologies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

No.	Theme
Vol.09	How Could We Explore Space?
Vol.10	Could Genome-Edited Crops Be an Alternative to Food Security?
Vol.11	How Should We Respond to COVID-19 Endemic Transition and Long COVID-19 Issues?
Vol.12	What Are the Conditions for Responsible AI?




Infographic Book

KAST publishes "Infographic Book" containing highlights of Policy Study Reports and Next-generation Reports, and distributes them to middle and high school students 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

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

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

KAST is also responsible for conducting the “Discovering System on Establishing Future Promising Seed Technology,” a research project to break away from the past “catch-up” R&D system and prepare a global leading R&D system. This project aims to secure original technology to lead the era of technological hegemony.

National Science Challenges Support & Network (NSCN)

Selection of 4 major tasks and 10 scientific challenges for 2022

NSCN 국가과학난제도전협력지원단 The National Science Challenges Support & Network

task Ⅰ	Breakthrough Challenge	① Wouldn't it be possible to open new possibilities of science by controlling atoms and molecules or synthesizing materials?
		② Could new science and technology change the theory and paradigm of existing science?
task Ⅱ	Sustainability Challenge	③ Would it be possible to produce true green hydrogen?
		④ Is the water we drink safe?
		⑤ What is groundbreaking carbon-neutral technology?
		⑥ What new approaches are needed for climate environment monitoring and forecasting?
task Ⅲ	Health Challenge	⑦ What is a new concept of convergence research to overcome incurable diseases?
task Ⅳ	Challenge Beyond Imagination	⑧ What is the mathematical challenge to be solved in the 21st century?
		⑨ Wouldn't various convergence problems including life, medicine, and manufacturing be solved through computational and mathematical modeling?
		⑩ Could we identify the theoretical principles of data science and machine learning?

National Science Challenge Initiatives of 2022

국가과학난제도전융합연구개발사업 National Science Challenge Initiatives 금속이질상제어연구단

- **Center for Metallic Heterophase Control Research**

  Improve the mechanical strength of the second phase, calculate atomic level stability and interphase energy, and create alloy design techniques to implement new components and processes through using the quantum mechanics-based first principles and AI techniques.

  P.I Senior Researcher **Seung Zeon Han**, Korea Institute of Materials Science

국가과학난제도전융합연구개발사업 National Science Challenge Initiatives 저온양자반응연구단

- **Center for Cold Quantum Reaction**

  Understand the microscopic principles of chemical reactions governed by quantum mechanics through cooling the reactants, and control reactions and design new reactions based on this.

  P.I Professor **Bum Suk Zhao**, UNIST

국가과학난제도전융합연구개발사업 National Science Challenge Initiatives 인공 물나무 연구단

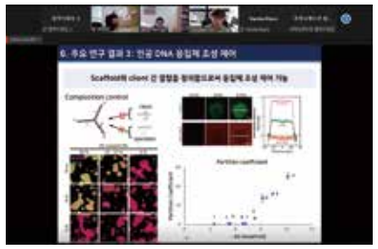
- **Artificial Water-tree Research Team**

  Develop artificial water trees capable of producing drinking-quality water in extreme and disaster environments.

  P.I Professor **Seoktae Kang**, KAIST

Support scientific challenge research

Conducting advice and consulting by Steering Committee and Technology Committee, which are composed of a variety of experts in science and technology to support a successful performance of challenging scientific challenge research.



Establishment and support of international cooperation

Attending DARPA Forward seminar, visiting UCLA Grand Challenge program support secretariat, visiting RAND Corporation, and holding Israeli R&D innovation discussion

Expansion of a challenging R&D culture

Diversified contents such as card news, recommended books, and academy videos, promoted 221 contents on multiple social network channels for the past year to raise awareness of the project, and secured 1,705 followers on social network channels. Held a joint forum with POSTECH Tae-Joon Park Institute on the theme of “Overcoming failures and taking up challenges in preparing for the future.”

Establishment of an innovative performance evaluation and management system

Development of performance evaluation guidelines tailored to challenges. Conducting research security education and security consulting. The publication of research series and the production of educational video contents with the operation of the National Science Challenges Academy, and the efficient management of risk factors for each research group through the research innovation working-level council.

Discovering System on Establishing Future Promising Seed Technology

Period

Sept. 15, 2022 – Apr. 14, 2023 (7 months)

Objectives

Establish a research support system that discovers leading source technologies with significant ripple effects.

Content and Scope

- Investigation of the current status of domestic source technology development projects
- Analysis of advanced technology designation and development strategies of major countries
- Deriving key promising source technologies that require government R&D investment
- Establishment of legal and institutional improvement measures to establish mid- to long-term main promising source technology R&D promotion strategy

Promotion Strategy

- Deriving implications through literature collection, expert consultation, and case collection
- Reviewing the possibility of analyzing the R&D investment status through NTIS data, etc.
- Presenting expert reviews in each field, predicting detailed technology development trends and proposing macro investment directions
- Investigation of recent domestic policy and institutional changes and proposal of improvement plans

Expected Outcome

- Reinforcing the consistency and continuity sustainability of mid- to long-term roadmap planning for government R&D investment and policy implementation
- Presenting a direction in which main promising source technologies are linked to the nation's flagship industry
- Using the results as the reference and basic data for policy establishment

People-friendly Science Promotion

KAST takes the initiative in nurturing talents in science and technology to strengthen the national competitiveness in the future. All members of KAST are committed to sharing their expertise and knowledge with the public to fulfill their noblesse oblige.

KAST tries to create a society where everyone can enjoy science. To this end, the academy carries out a variety of activities, factoring in the specific needs of target recipient.

KAST aims to build a science and technology society without discrimination by reinforcing scientific and cultural activities for the socially underprivileged.

Meeting with KAST Scholars

This is a nationwide science lecture program in which 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 KAST will visit schools, deliver lectures on 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 2022, the lectures were held at 85 schools with timely topics that satisfied the intellectual curiosity of students, such as "new drug development," "precision medicine and AI," "nanomaterials," "brain science," "genetic correction," "future cars," etc., and 64 of the schools were in rural areas.

2022 statistics

No. of lectures	Attendees	Number of lectures targeted at schools located in rural areas
85 times	Approximately 8,450 students	64

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 particular, 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.

In 2022, KAST held a special talk time with June Huh, a professor of Princeton University and the first Korean who won the Fields Medal, and selected the best mentee to hold a research presentation.

2022 statistics

No. of mentees	No. of mentors	Proportion of students from rural areas	Proportion of female students
25 mentees	25 mentors	64% (16persons)	56% (14persons)

Career Decisions Lecture Series

Great Scholar Career Decisions was launched to derive development strategies for the Korean science and technology by utilizing the accumulated knowledge and experience of the best scientists.
In 2022, seven lectures of the Great Scholar Career Decisions were held as a pilot project to share outstanding research achievements and decision-making process of individual scholars with colleagues and future scientific talents.

Sang Jun Sim
(Korea University, Fellow)
Sept. 28
Self-renovation, Prepared Coincidence, and Father's Legacy

Young Pak Lee
(Fudan University, Fellow)
Oct. 5
From Engineering to Physics and Back to Commercial Research with Literature

Il-Doo Kim
(KAIST, Fellow)
Oct. 18
Technological Innovation Changes the World: The Decisive Criterion at the Crossroads

Wonjun Lee
(Korea University, Fellow)
Oct. 24
Accidental Encounter with Computer Science/Network Communication: 30 Years of Proving Timely Relationship

Taiha Joo
(POSTECH, Fellow)
Dec. 7
Simple is Beautiful

Q-Han Park
(Korea University, Fellow)
Dec. 14
Changes Brought about by Formulas Accidentally

Yoon-Seok Chang
(UNIST, Fellow)
Dec. 21
Small Habits for a Big Life

International Year of Basic Sciences for Sustainable Development Project

To celebrate the "International Year of Basic Sciences for Sustainable Development (IYBSSD, Jul. 1, 2022 – Jun. 30, 2023)," KAST planned and conducted the **"Scientist's Space"** project, which can raise interest in basic science for the public. This project was designed to encourage the younger generation, especially teenagers, to enter the scientific field, and provide a detailed look at the laboratories of six basic scientists in physics, chemistry, and bioscience through online exhibitions and on-site lectures.

The online exhibition hall and on-site lecture videos are organically connected, and English subtitles are inserted to make the research contents of domestic basic scientists accessible abroad. Moreover, a record book with the contents of the laboratory tour and on-site lectures was produced and distributed online and offline to spread the results of the project.

Area	LectureDate	Scientist/Laboratory
Physics	Nov. 2	**Young Hee Lee** Sungkyunkwan University IBS Center for Integrated Nanostructure Physics
		YongKeun Park KAIST Biomedical Optical Lab
Chemistry	Nov. 7	**Phil Ho Lee** Kangwon National University Center for Catalytic Organic Reactions
		So Jung Park Ewha Womans University Nano-Bio Materials Laboratory
Bioscience	Nov. 9	**Tae-Young Yoon** Seoul National University Applying single-molecule tools to membrane proteins
		Jeong Ho Lee KAIST Translational Neurogenetics Lab

Physicist's Space

Chemist's Space

Bioscientist's Space

Online lab tour

Scientist's Space Brochure

Nobel Memorial Symposium/Commentary Lecture Video

The Sweden Korea Nobel Memorial Program is a symposium where experts from Sweden and Korea meet to present the research achievements of Nobel Prize laureates in each field and discuss the meaning of Nobel Prize research for the future and its impact on our daily lives.
As the host of the science session, KAST recommended Korean experts in each field. The speakers gave lectures on "quantum entanglement, click chemistry, bio-orthogonal chemistry, and ancient genetics," which won the 2022 Nobel Prize in Physics, Chemistry, and Physiology or Medicine, and shed light on the progress that scientific development would bring.

Host	Swedish Embassy in Korea	Sponsor	KAST
Date	Nov. 10	Venue	Online (Seoul National University)
Participants	[Sweden] **Daniel Wolvén** Ambassador of Sweden [Korea] **Ook Joon Yoo** President of KAST		
Swedish Lecturer	[Physics] **Anna Delin** KTH [Chemistry] **Sven Lidin** Lund University [Physiology] **Katrine Riklund** Umeå University	Korean Lecturer	[Physics] **Eunmi Chae** Korea University [Chemistry] **Dongwhan Lee** Seoul National University [Physiology] **Choongwon Jeong** Seoul National University

KAST has been producing high-quality scientific contents and disseminating it broadly through YouTube to contribute to the cultivation of future science and engineering talents and the popularization of science and technology. Reflecting the people's interest in the Nobel Prize and the desire to help excelling scientists become a Nobel Prize Laureate, KAST produced a series of commentary on the Nobel Prize in Science in 2022 as well as in 2021. In addition, a lecture video was produced that easily and accurately explains the achievements of Professor June Huh, the first Korean to win the Fields Medal and provided timely content to the public. The commentary lecture video on the Fields Medal received a great response, recording 77,000 views.

2022 Fields Medal Commentary Lecture

Resolving Challenges in Combinatorics through Algebraic Geometry

Young-Hoon Kiem
Seoul National University

2nd Series of the Great Discovery of Nobel Prize Laureates

Laying the Foundations of Quantum Mechanics

Eunmi Chae
Korea University

Opening the Era of Functionalism in Chemistry

Junwon Choi
Ajou University

The Past and Future of Sapiens Told by the DNA of Extinct Humans

Jung Kyoon Choi
KAIST

International Collaboration

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

Cooperation with International Academic Organizations

KAST cooperates with international organizations and national scientific academies in the world, serving as a pillar of civil diplomacy in the fields of science and technology. As an Executive Committee member of the IAP for Science, the world's largest scientific society, we are participating in major projects aimed proactively to address current issues of the global science and technology community, thus to increase the global presence of Korea.

In 2022, KAST diversified its participation methods in accordance with COVID-19 and carried out international exchange activities that took advantage of both online and offline. Face-to-face exchanges with the German, Swedish, and Israeli academies were resumed, and international organization activities were carried out as hybrids, resulting in cooperation with many countries.

Bilateral Symposia

UK-Korea Research Conference

Host	The Royal Society, KAST, Institute for Basic Science(IBS)		
Date	Feb. 14 ~ 16	Venue	Online
Subject	Material Sciences and Biomedical Science		
Participant	34 scholars from two academies and experts in material science and biomedical science		

UK-Korea Conference

KAST and the Royal Society signed an MoU in 1998 and have held a series of joint symposiums since then. The UK-Korea Research Conference was held as a joint academic event along with KAST, IBS, and the Royal Society since 2019.

The 1st KAST-IASH Bilateral Symposium

Date	Sept. 14 ~ 15	Venue	Jerusalem, Israel
Subject	Quantum Physics: From Fundamentals to Applications		
Participant	16 scholars from two academies and experts in quantum physics		

Bilateral Relationship with Israel Academy of Sciences and Humanities

KAST and the Israel Academy of Sciences and Humanities (IASH) have collaborated since signing the MOU in 2000 by operating the "Korea-Israel Academy Scientists Exchange" program. In 2017, Y-KAST members visited Israel at the invitation of the Israeli government and interacted with local researchers. A joint symposium has been prepared from 2022 for the participation and continuous exchange of more scientists from both countries on various topics.

The 6th KAST-Leopoldina Bilateral Symposium

Date	Sept. 29 ~ 30	Venue	Seoul, Korea
Subject	Artificial Intelligence and the Digital Age - Implications for the Future of Society		
Participant	14 scholars from two academies, and experts in AI		

Bilateral Relationship with German National Academy of Sciences Leopoldina

KAST signed an MOU with the German National Academy of Sciences Leopoldina in 2012, and renewed it in 2018. The two academies have been holding a joint symposium since 2013. The academic exchange that had been postponed for two years due to COVID-19 resumed in 2022, and an event was held to celebrate the 10th anniversary of MoU assignment.

High Level Roundtable on Quality in Research

Date	Nov. 9	Venue	Seoul, Korea
Subject	Quality in Research		
Participant	70 high level scholars from two countries		

Cooperation Meeting and Signing MoU with Academies

10th Anniversary MoU Assignment between KAST and German National Academy of Sciences Leopoldina

Date	Sept. 29	Venue	Seoul, Korea
Attendees	(Korea)	**Ook Joon Yoo** President of KAST **Seongwhan Lee** Korea University (Fellow, KAST)	
	(German)	**Michael Reiffenstuel** Ambassador of the German Embassy in Korea **Ulla Bonas** Vice President of Leopoldina **Alexander Waibel** Karlsruhe Institute of Technology / Carnegie Mellon University	
Description	Commemorating the 10th anniversary of the MOU signing between KAST and Leopoldina and promoting bilateral exchange		

Cooperation Symposium with International S&T Organization

Korea-Sweden Interdisciplinary Joint Lectures

Host	KAST	Sponsor	Seoul, Korea
Date	Oct. 29	Venue	Solna, Sweden
Attendees	(Sweden)	**Anders Nilsson** Stockholm University **Christer Betsholtz** Uppsala University (Member, KVA)	
	(Korea)	**Kinam Kim** Samsung Advanced Insititute of Technology (Fellow, KAST) **Taeg Hwan Hyeon** Seoul National University (Fellow, KAST)	

Participating International Conferences

S20 Summit

Host	Indonesian Academy of Sciences(AIPI)		
Date	Sept. 20 ~ 21	Venue	Jakarta, Indonesia
Subject	Recover Together, Recover Stronger		
Participant	Representatives of G20 science academies and science and technology experts		
Attendees	**Changhee Lee** Executive Vice President, KAST **Junsoo Kwon** Seoul National University (Director for International Cooperation, KAST)		
Main Activities	Discussed post-pandemic scientific and technological countermeasures and policy directions, conducted the final review of the joint statement and introduced the future action plans of each country		

Science 20 Summit

As a preliminary event of the G20 Summit, the Science 20 Summit (S20) is an event where the representatives of the science academies from the G20 participating states join to deliver a final joint declaration to the representatives of the host country.

IAP General Assembly

Host	InterAcademy Partnership		
Date	Nov. 3	Venue	Arizona, USA
Attendee	**Woo-Sung Jung** POTECH (Fellow, Y-KAST)		
Main Activities	Held exchanges at a meeting attended by about 200 participants, including representatives of each country's academy and next generation academies, and discussed cooperation plans with Young Academy		

InterAcademy Partnership

Founded in 1993, it now has 150 member institutions. In conducts important international scientific and technological policy research through collaboration among member organizations and provide scientific views on issues that are important to the future of humankind. KAST has been a selected member of the Advanced Countries of the Scientific Division since 2016 and participated until 2022.

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

The Association of Academies and Societies of Sciences in Asia is a non-profit international organization with science, technology and innovation (STI) interests. It consists scientific and technological academies and science societies in Asia and Oceania. It was launched in 2012 through the merger of two organizations, i.e., AASA (Association of Academies of Sciences in Asia, founded in 2000) and FASAS (Federation of Asian Societies and Academies of Sciences founded in 1984). Its current membership is 33 national academies and societies of sciences from 30 countries and one regional academy of engineering and technology.

In 2022, KAST conducted the policy research on the "Risk Assessment of Neonicotinoids in the Asia-Pacific Region" as part of the IAP global project, and supported the AASSA Regional Workshops in Korea, Sri Lanka, and Türkiye.

2022 Temporary AASSA Executive Board Meeting

Date	Feb. 11	Venue	Online(Korea)
Attendees	**Yoo Hang Kim** AASSA Former President (Fellow Emeritus, KAST) **Mooha Lee** AASSA Executive Board Member (Fellow Emeritus, KAST) **Seung-Bok Choi** AASSA Former Director of Secretariat (Fellow, KAST)		
Agenda	AASSA activity details and plans, etc.		

2022 AASSA Executive Board Meeting

Date	Dec. 13
Venue	Online(Korea)
Attendees	**Yoo Hang Kim** AASSA Former President (Fellow Emeritus, KAST) **Mooha Lee** AASSA Executive Board Member (Fellow Emeritus, KAST) **Jang Ryol Liu** AASSA Director of Secretariat (Fellow Emeritus, KAST)
Agenda	AASSA activity details and plans, etc.

Publication of IAP-AASSA Joint Research Neonicotinoids Project Report

Risk Assessment of Neonicotinoids in the Asia-Pacific Region

Host	KAST, AASSA, IAP
Period	July, 2021 ~ June, 2022
Content & Major Achievement	Promoted the 'Risk Assessment of Neonicotinoids in the Asia-Pacific Region' report production project following Europe and Africa as part of the global project of the InterAcademy Partnership (IAP).

AASSA-IAP-ASM International Webinar

Climate Change & Health in Asia

Date	Feb. 28	Venue	Online(Malaysia)
Host	IAP, AASSA, The Academy of Sciences Malaysia (ASM)		
Attendee	**Yoo Hang Kim** AASSA Former President (Fellow Emeritus, KAST)		

AASSA-IAP-NASSL International Webinar

Long-Term Social Impacts of the COVID-19 Pandemic

Date	Feb. 22 ~ 24	Venue	Online(Sri Lanka)
Host	AASSA, National Academy of Sciences of Sri Lanka (NASSL)		
Attendee	**Yoo Hang Kim** AASSA Former President (Fellow Emeritus, KAST)		

KAST-AASSA International Webinar

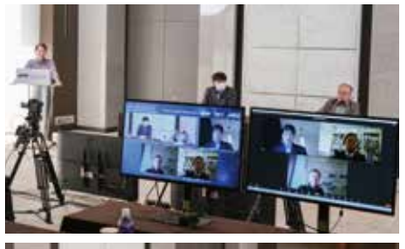
Global Climate Change and Zoonotic Infectious Diseases

Date	Apr. 25 ~ 26	Venue	Online(Korea)
Host	KAST, AASSA		
Participants	**Ook Joon Yoo** President, KAST **Yoo Hang Kim** Former President, AASSA (Fellow Emeritus, KAST) **KwangSoo Lyoo** Korea Zoonosis Research Institute **Yong Ho Park** Seoul National University (Fellow, KAST) **Byung-Ju Sohn** Seoul National University		**Daesub Song** Seoul National University **ManKi Song** Seoul National University **Joonseok Chae** Seoul National University **Christian Fanzke** Pusan National University

KAST-AASSA Working Group Workshop

Neonicotinoid Insecticides: Use and Effects in Asian Agriculture-A Review and Recommendations to Policymakers

Date	May. 19
Venue	Korea(Online)
Host	KAST, AASSA
Attendee	**Yoo Hang Kim** AASSA Former President (Fellow Emeritus, KAST) **Chuleui Jung** Andong National University



AASSA-TÜBA Joint Symposium

Understanding Sustainability in the Context of Business Organizations and Philanthropic Institutions

Date	May. 21 ~ 22
Venue	Online(Türkiye)
Host	AASSA, The Turkish Academy of Sciences(TÜBA)

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 2022, in-depth lectures and discussions were held on the topics of bio-inorganic chemistry, climate change and health, and redox signaling pathways. Through research exchanges with world-class scholars, the base of domestic science and technology research has been broadened, and an opportunity has been provided for the next-generation research group to leap to the world level.

No.	Date	Theme
51st	Jun. 14 ~ 16	Recent Advances of Bioinorganic Chemistry in the field of Energy and Medicine
52nd	Oct. 18	Climate Change, Environment, and Health
53rd	Nov. 3	New Insights on the Landscape of Redox Signaling in Human Diseases

Networking with World-leading Scientists

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

Frontier Scientists Workshop

No.	Date	Venue	Theme
41st	May. 19	Online	Applications of Magnetic Materials and Spintronics
42nd	Nov. 23 ~ 25	Narbonne, France	Environmental Bio-Technology Workshop for reducing GHGs emissions
43rd	Nov. 28 ~ 29	San Diego, USA	Future Trends in Genomic Mutation and Disease Research

Frontier Scientists Workshop

Held two to four times annually overseas, this is an intensive workshop intended to reinforce academic exchanges and networking between Korean scientists residing in and outside of Korea and international scholars while promoting international joint studies.

Prestige Workshop

No.	Date	Venue	Theme
34th	Jul. 21	Quasi-Periodic Materials, a Paradigm Shift in Crystallography	**Dan Shechtman** (2011 Nobel Prize Laureate (Chemistry)) Technion-Israeli Institute of Technology
35th	Nov. 18	Frontiers in Bioscience of Gene Transcription	**Nobuo Shimamoto** National Institute of Genetics and 7 scholars of Korea

Prestige Workshop

A small workshop held in Korea that provides a forum for in-depth and active academic discussions with excellent domestic scientists by utilizing foreign scholars who are staying in Korea or planning to visit Korea.

71st Lindau Nobel Laureate Meetings

Date	Jun. 26 ~ Jul. 1	Venue	Lindau, Germany
Field	Chemistry		
Participants	**Kim Tae-hee** Student, Master's and Doctorate Integrated Program, Chemistry, Yonsei University **Park Seung-hak** Postdoctoral fellow, Materials Engineering, Seoul National University **Jung Hoe-min** Student, Master's and Doctorate Integrated Program, Chemistry, KAIST		

The Lindau Nobel Laureate Meetings

One field of physics, chemistry, or physiology/medicine is selected each year to invite Nobel laureates of the corresponding field and young scientists from around the world to give lectures and engage in discussions. As an Academic Partner of the Lindau Foudation, KAST selects four young scientists every year to participate in the event.

Facilitating the Networking of Scientists

SCIENCE NETWORKING CENTER

KAST operates the Science Networking Center (SNC) to internationally promote the excellence of Korea's distinguished scholars in basic sciences. Both leading scientists and rising scientists are offered strategic support to share their outstanding research achievements with the world.

In 2022, KAST selected 11 leading and rising scientists in three fields and supported activities such as researcher exchange programs and InterAcademy Workshops with various partner institutions abroad. Moreover, KAST created the Science Networking Center website and the English Wikipedia page of leading and rising scientists to lay the foundation for project promotion. KAST also provided support for the local adaptation of leading and rising scientists and lab researchers who were planning to study abroad by producing a translated version of A Beginner's Guide to Swedish Academia.

Overview

Objectives	Providing all-round opportunities and channels to internationally promote the research achievements and capabilities of top Korean scientists in basic science
Director	**Doo Sung Lee** Professor emeritus, Sungkyunkwan University
Period	Apr. 01, 2022 – Dec. 31, 2024
Expected Outcome	① Serve as a center for strategic and professional global publicity ② Enhance Korea's soft power and strengthen national competitiveness

Major tasks

Selection of a leading and rising scientist

- Selection of 11 scientists in three fields, including physics, chemistry, and life science, by forming a specialized field (by stage) committee that guarantees objectivity and expertise

Establishment of overseas base partner institutions

- The InterAcademy Workshop collaboration with the Korea-Nordics Science and Technology Cooperation Center (KNTEC)
- A researcher exchange program with Swedish Research Council (VR)
- A researcher exchange program with the Young Academy of Sweden (YAS)

Researcher exchange program

- Promoting the exchange of doctoral students between leading·rising scientists' labs and renowned scientist labs in related fields
- Promoting the "SNC Fellowship Program in Korea" through overseas partner institutions

Academic exchange support

- Holding InterAcademy Workshop (closed academic exchange) throughout the year
- Holding InterAcademy Symposium (open academic event) throughout the year

Leading and Rising Scientists

Physics

Tae Won Noh
Seoul National University

Atomic Scale Epitaxy Group

Je-Geun Park
Seoul National University

Center for Quantum Materials

Bumjoon Kim
POSTECH

Solid State Spectroscopy Group

Chemistry

Nam-Gyu Park
Sungkyunkwan University

Next Generation Photo-electronics Lab

Sukbok Chang
KAIST

Center for Catalytic Hydrocarbon Functionalizations

Taeghwan Hyeon
Seoul National University

Nanomaterials Laboratory

Mi Hee Lim
KAIST

Center for MetalloNeuroProteinoChemistry

Life Science

Gou Young Koh
KAIST

Center for Vascular Research

V. Narry Kim
Seoul National University

Narry Kim Lab: RNA biology

Tae-Young Yoon
Seoul National University

Yoon Lab: applying single-molecule tools to membrane proteins

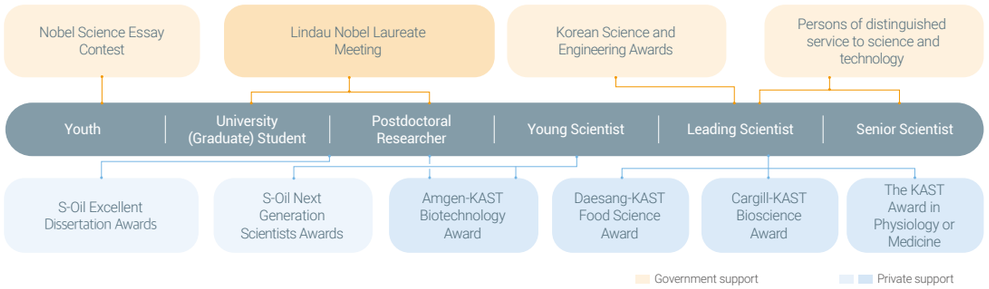
Jeong-Ho Lee
KAIST

Translational Neurogenetics Lab

Awards

KAST administers various award programs to recognize and encourage scientists and engineers who have made outstanding achievements in their academic fields.
With the goal of creating systematic research results over the entire life cycle of scientists and engineers, we have built our own specialized "Platform for Award Program by Life Cycle of Scientists" and continued to expand and promote it. We have been promoting support projects specialized in the growth stages of scientists and engineers, from teenagers to doctoral students, from next-generation scientists to senior scientists and highly experienced science and technology scholars.

Platform for Award Programs by Life Cycle of Scientists



In 2022, the following awards were presented: ▲Korea Science Award is an award given to scientists and engineers who have achieved outstanding worldclass 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 to select promising scientists with outstanding research outcomes in the fields of physics, chemistry, physiology and medicine, and materials engineering, and to provide research funds in order to further solidify the foundations of basic science research; ▲Daesang-KAST Food Science Award, to support outstanding scientists and engineers in food science; ▲Cargill- KAST Bioscience Award, to recognize internationally renowned scholars in the field of agriculture, fishery; ▲The Amgen-KAST Biotechnology Award, to recognize young researchers who have shown outstanding achievements in the fields of life science and biotechnology; ▲ the KAST Award in Physiology or Medicine, to physiological medicine scientists who have contributed to the development of physiological medicine and human health and welfare.

The 22st 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

2022 Awardees

- Group 2 Physics
- Awardee **Jong Seung Kim** Korea University
- Single research achievement
  A Small Molecule Strategy for Targeting Cancer Stem Cells in Hypoxic Microenvironments and Preventing Tumorigenesis (JACS, 2021)

- Group 3 Chemistry
- Awardee **Hyeonsik Cheong** Sogang University
- Single research achievement
  Coherent many-body exciton in van der Waals antiferromagnet NiPS 3 (Nature, 2020)

The 18th 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

2022 Awardees

- Group 2 Machinery, Metals, Ceramics, Aviation, Shipbuilding, Resources, Industrial Engineering, etc.
- Awardee **Jun Ho Oh** KAIST
- Single research achievement
  Development of the humanoid disaster response platform DRC-HUBO+ (IEEE Transactions on Robotics, 2018)

- Group 3 Chemical engineering, Food, Polymer, Fiber, Biotechnology, Industrial Chemistry, etc.
- Awardee **Byoung Koun Min** KIST
- Single research achievement
  Achieving Selective and Efficient Electrocatalytic Activity for CO2 Reduction Using Immobilized Silver Nanoparticles (JACS, 2015)

The 4th S-Oil Next Generation Scientists Awards

Purpose

To encourage scientists who are 45 years of age or under working at domestic universities or research institutes with outstanding research outcomes in 6 areas including physics, chemistry, physiology or medicine, chemical/materials engineering, energy, and IT

Number of people awarded

6 persons (one for each six fields)

Sponsorship

S-OIL Science Culture Foundation, is a public foundation established by S-OIL in 2011 to train talented people through international exchange activity, scholarship business, and research support for social return of the company's profit.

2022 Awardees (※ No winners in Chemistry this year)

Natural Science

- Awardee **Bumjoon Kim** POSTECH
- Major Achievements
  Square Lattice Iridates
  (Annual Review of Condensed Matter Physics, 2019)

Physiology · Medicine

- Awardee **Sangsu Bae** Seoul National University
- Major Achievements
  Adenine base editors engineering reduces editing of bystander cytosines (Nature Biotechnology, 2021)

Chemical engineering/Material engineering

- Awardee **Ho Seok Park** Sungkyunkwan University
- Major Achievements
  Revealing Molecular-Level Surface Redox Sites of Controllably Oxidized Black Phosphorus Nanosheets (Nature Materials, 2019)

Energy

- Awardee **Taeseup Song** Hanyang University
- Major Achievements
  Advantageous crystalline–amorphous phase boundary for enhanced electrochemical water oxidation (Energy & Environmental Science, 2019)

IT

- Awardee **Hyunjoo Lee** KAIST
- Major Achievements
  Miniature Ultrasound Ring Array Transducers for Transcranial Ultrasound Neuromodulation of Freely-moving Small Animals (Brain Stimulation, 2019)

The 12th 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**

2022 Awardees

Field	Category	Awardee	Advisor	Title of Thesis
Mathematics	Grand Award	**Daewook Kim** KAIST	**Jae Kyoung Kim** KAIST	Deterministic and Stochastic Mathematical Modeling and Analysis of Cellular Systems with Time Delay
	Excellence Award	**Junha Kim** Chung-Ang University	**Jihoon Lee** Chung-Ang University	Rotational and stratified effects on stability of the fluid equations
Physics	Grand Award	**Junho Seo** POSTECH	**Jun Sung Kim** POSTECH	Magnetic and topological properties of itinerant van der Waals magnets
	Excellence Award	**Byungmin Sohn** Seoul National University	**Changyoung Kim** Seoul National University	Emergent phenomena of perovskite ruthenate in ultra-thin regime
Chemistry	Grand Award	**Kyung Yeol Ma** UNIST	**Hyeon Suk Shin** UNIST	Growth of Single-Crystalline and Layer-Controllable HexagonalBoron Nitride
	Excellence Award	**Jiyeon Han** KAIST	**Mi Hee Lim** KAIST	Elucidation of the Intertwined Roles of Metals, Amyloid-β, and Neuropeptides in the Pathology of Alzheimer's Disease at the Molecular Level
Biology	Grand Award	**Nahye Kim** Yonsei University	**Hyoungbum Henry Kim** Yonsei University	Evaluation of Cas9 variants and base editors
	Excellence Award	**Eunjee Kim** POSTECH	**Kunyoo Shin** Seoul National University	Creation of human assembloid to study dynamic interaction between tumor and tumor stroma in human cancer
Chemical engineering/ Material engineering	Grand Award	**Un-Hyuck Kim** Hanyang University	**Yang-Kook Sun** Hanyang University	Improving the performance of Ni-rich layered cathodes by atomic and microstructure engineering for lithium ion batteries
	Excellence Award	**Kyeounghak Kim** POSTECH	**Jeong Woo Han** POSTECH	Computational studies of cation stability in perovskite based electrode materials for high performance solid oxide fuel cells
IT	Grand Award	**Nari Hong** KAIST	**YoonKey Nam** KAIST	Thermoplasmonics and hydrogel-based neural chip platform for manipulation of structure and function of neuronal networks
	Excellence Award	**Jaemin Yoo** Seoul National University	**U Kang** Seoul National University	Probabilistic Approaches for Node and Graph Classification

The 8th 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.

2022 Awardees

Sunmin Park Hoseo University

• Major achievements

Protein and fat intake interacts with the haplotype of PTPN11_rs1106 6325,RPH3A_ rs886477and OAS3_rs2072134 to modulate serum HDL concentrations in middle-aged people (Clinical Nutrition, 2020)

The 7th Cargill-KAST Bioscience Award

2022 Awardees

Inho Kim Dankook University

• Major achievements

Bacteriophage cocktail supplementation improves growth performance, gut microbiome and production traits in broiler chickens (Journal of Animal Science and Biotechnology, 2021)

Cheol-Heui Yun Seoul National University

• Major achievements

Self-reactivity controls functional diversity of naive CD8+ T cells by co-opting tonic type I interferon (Nature communications, 2021)

The 2nd Amgen-KAST Biotechnology Award

Purpose

To contribute to the development of Korean biotechnology by inspiring, motivating, and rewarding young researchers in Korea for their outstanding achievements in life science and bioengineering

Number of people awarded 1 postdoctoral researcher, 1 next-generation scientist

2022 Awardees

Next generation scientist category

Heebeom Koo Catholic University

• Major achievements

Copper-Free Click Chemistry: Applications in Drug Delivery, Cell Tracking, and Tissue Engineering (Advanced Materials, 2022)

Post-doctorate study category

Jinyoung Kim Catholic University

• Major achievements

An autophagy enhancer ameliorates diabetes of human IAPP-transgenic mice through clearance of amyloidogenic oligomer (Nature Communications, 2021)

Jinkyu Lee Hanyang University

• Major achievements

Directed Regeneration of Osteochondral Tissue by Hierarchical Assembly of Spatially Organized Composite Spheroids (Advanced Science, 2021)

The 2nd 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. It's awarded once in two years.

Number of people awarded 1 person

2022 Awardee

Seung Hong Choi Seoul National University

• Major achievements

Localized delivery of theranostic nanoparticles and high-energy photons using microneedles-on-bioelectronics (Advanced Materials, 2021)

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.

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. Through this project, KAST aims to respect and support persons of distinguished services to science and technology of Korea and to contribute to enhancing the honor and price of the personnel in science and technology and to a social culture where persons in science and technology are respected.

KAST selected 32 persons of distinguished service who led the development of the Republic of Korea in 2017, followed by selecting 16 persons in 2018, followed by selecting 12 persons in 2019, followed by selecting 12 persons in 2020, followed by selecting 8 persons in 2021 and have been protecting the honor of scientists and engineers.

In 2022, KAST designated 4 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 2022.' In addition, KAST produced various scientific cultural contents such as interviews, lectures, dedication lectures, etc., to make sure the public easily access the contributions of Persons of distinguished service to science and technology.

Persons of Distinguished Service to Science and Technology of 2022 (4 persons in total)

Natural Science

The late Dr. Han Sik Yoon (1929~2008)

Chief researcher at Korea Institute of Science & Technology

- Secured independent source technology through development of high-strength aramid pulp
- Investigated the principle of molecular growth and packing by which polymerized synthetic fiber can be formed like natural pulp
- Korea-based scientist who achieved global renown for his scientific achievements

Life Science

Prof. Sung-Hou Kim (1937~)

Honorary professor at the University of California, Berkeley, USA

- Established position as primary authority of tDNA structure research in international science
- Discovered the cause of cancer manifestation, developed anti-cancer drugs and launched a venture startup building on his research on protein structure
- Pioneered new horizons for proteomics and genomics through linkage with AI and big data

Engineering

The late Dr. Min-Che Chon (1922~2020)

President of Chon Engineering

- Lead construction of the Ulsan Refinery Plant as the technology director of Daehan Petroleum Corporation
- Designed factories and exported construction technology by establishing legendary firms of Chon Engineering and Shinhan
- Machinery and Construction
- Contributed to the systematization of chemical engineering through establishment of chemical engineering related associations

Convergence

The late Dr. Byung Woo Kong (1906~1995)

Director of former Hangeul (Korean alphabet) Cultural Center and former Kong Ophthalmology Clinic

- Led popularization of ophthalmology treatment by establishing and operating the Kong Ophthalmology Clinic
- Dedicated to rehabilitation movement for visually disabled persons using occupational training such as typing, etc.
- Contribution to Hangeul computerization by supporting the development of Hangeul fonts for computers and word processors

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

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

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

Dedication lecture

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

Publication of policy proposals

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

Public Promotion

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

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

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

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

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

Since 2017, KAST have been selecting outstanding young scientists under the age of 45 as members of Y-KAST and supporting their exchanges with Young Academies of other countries.
In 2022, KAST has elected 26 next generation science and technology leaders, who have produced outstanding results as independent researchers, as Y-KAST members. 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.

Y-KAST Executive Committee for 2021-2022

General

Young Keun Kim
Chair of Y-KAST
Professor, Korea University (Fellow, KAST)

Policy Studies

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

Joonmo Ahn
Committee member
Professor, Korea University

Sungjoo Lee
Committee member
Professor, Seoul National University

Natural Sciences

Myoungjean Bae
Vice Chair of Y-KAST
Professor, KAIST

Jaewon Ko
Committee member
Professor, DGIST

Engineering

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

Junsuk Rho
Committee member
Professor, POSTECH

Changho Suh
Committee member
Professor, KAIST

Agricultural and Fishery Sciences

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

Soon-Kyeong Kwon
Committee member
Professor, Gyeongsang National University

Tae-Gyu Lim
Committee member
Professor, Sejong University

Medical Sciences

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

Mi-hyun Kim
Committee member
Professor, Gachon University

Beom Kyung Kim
Committee member
Professor, Yonsei University

Major activities in 2022

2022. 10. Participating STS Forum Young Leaders Program and IAP Young Physician Leaders Program

Five Y-KAST members attended the STS Forum Young Leaders Program held in Kyoto, Japan, and discussed the recent trends and role of science and technology. One Y-KAST member participated in the IAP Young Physician Leaders Program and shared ideas about leadership in science and technology.

2022. 11. Attending the 5th Worldwide Meeting of Young Academies

The meeting was hosted by the Global Young Academy, the National Academy of Sciences, the Royal Society of Canada and IAP. Y-KAST members participated to exchange views of young scientists on major issues in the global science and technology community.

2022. 11. Hosting 2022 YKAST-YAS Bilateral Symposium

Y-KAST held the third YKAST-YAS Bilateral Symposium with the Young Academy of Sweden (YAS) under the theme of "Science and Technology for Our Society." A total of 13 members from both young academies attended and actively involved in academic interaction.

2022. 11. Signing Memorandum of Understanding between Y-KAST and Young Academy of Sweden(YAS).

Both academies reached the understanding to strengthen the ongoing bilateral cooperation to inspire, promote and disseminate research and the expertise of younger researchers.

2022. 12. Hosting the Y-KAST Members' Day 2022.

△ Presented the 2022 Y-KAST achievements and 2023 business plan △ Introduced the research fields of the new 2023 members

Y-KAST Members' Day 2022

Signing MOU Between Y-KAST and YAS

Y-KAST Members Elected in 2022

Natural Sciences

Jungsoo Kang Seoul National University
- Floer homology
- Hamiltonian dynamics
- J-holomorphic curve theory

Young-Pil Choi Yonsei University
- Partial Differential Equations
- Kinetic theory
- Fluid mechanics

Keun Su Kim Yonsei University
- Quantum Materials
- Electronic Structure
- ARPES

Heejun Yang KAIST
- 2D Materials
- Semiconductors
- Phase Transition

Myungeun Seo KAIST
- Controlled polymer synthesis
- Polymerization-induced nanostructuring
- Postpolymerization modification

Jerome K Hyun Ewha Womans University
- Light scattering and absorption
- Dynamic metasurfaces
- Structural colors

Inkyung Jung KAIST
- 3D genome organization
- Epigenetic gene regulation
- Bioinformatics

Hwajin Kim Seoul National University
- Air pollution
- Atmospheric Chemistry
- Global Warming

Engineering

Sung-Chul Bae Hanyang University
- Cement Chemistry
- Characterization
- Nanotechnology

Seung Hyun Cha KAIST
- Future cities
- Metaverse space design
- Human-space interaction

Daegyoum Kim KAIST
- Fluid-structure interaction
- Bio-inspired flow
- Multi-phase flow

Yun Seog Lee Seoul National University
- Thin-film processes and mechanics
- Low dimensional compound semiconductor
- Energy conversion and storage devices

Jun Hong Noh Korea University
- Next generation photovoltaics
- Energy conversion materials & devices
- Halide & Oxide semiconductors

Sohn, Seok Su Korea University
- High-performance Alloy Design
- Cryogenic and Hydrogen Environments
- Additive Manufacturing

Jonghwa Shin KAIST
- Metamaterials and Metasurfaces
- Nano-optical Materials
- Numerical Optimization

Minsoo Rhu KAIST
- Computer Architecture and System
- Artificical Intelligence and Machine Learning
- ASIC/VLSI chip design

Engineering

Min Seok Jang KAIST
- Active metaphotonic devices
- Two dimensional polaritons
- Inverse design

Ji-Wook Jang UNIST
- Photocatalyst
- Solar Hydrogen
- Artificial Photosynthesis

Jeehoon Han POSTECH
- Process Design and Modelling
- Life-Cycle and Techno-Economic Assessment
- Big Data Analytics and Artificial Intelligence

Agricultural and Fishery Sciences

Seungill Kim University of Seoul
- Genome evolution
- Comparative genomics
- Genome-based breeding

Jun-Hwan Kim Sunmoon university
- Bio-floc aquaculture
- Smart aquaculture
- Fish toxic physiology exposed to toxicants

Hong-Seok Son Korea University
- Fermented food
- Microbiome
- Metabolomics

Jang, Young Jin Seoul Women's University
- Functional food
- Sarcopenia
- Plant-based Protein

Medical Sciences

Yong-ho Lee Yonsei University
- Non-alcoholic steatohepatitis
- Diabetes
- Senescence (aging)

Suckchang Hong Seoul National University
- N-heterocycles
- Iron-catalysis
- Synthesis of bioactive compounds

Jung-Hwan Lee Dankook university
- Mechanobiology
- Biomaterials
- Cell therapy

KAST Fellows Elected in 2022

In 2022, KAST elected 28 new fellows. 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 101 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.

Policy Studies

So Young Kim KAIST
- R&D Policy
- S&T Workforce Policy
- Governance of Emerging Technologies

Natural Sciences

Myungjoo Kang Seoul National University
- Numerical Analysis
- Image Processing
- Deep Learning

Sung Keun Lee Seoul National University
- Physics and Chemistry of Earth Materials
- Earth and Planetary Interiors
- Silicate Melts, Glasses, and Magmas

Hong-Gyu Park Korea University
- High-performance topological nanolasers
- Optical applications of low-dimensional materials
- Chronic neural recording using nanostructures

Gyu-Chul Yi Seoul National University
- Semiconductor nanostructures and nanodevices
- Low-dimensional nanomaterials and quantum phenomena

Wonshik Choi Korea University
- Imaging deep within complex scattering media
- Microscopy
- Solving inverse scattering problems

Jeong Young Park KAIST
- Surface science, nanoscience and catalysis
- Hot electron chemistry and catalytronics
- Nanotribology and scanning probe microscopy

Chung-Mo Park Seoul National University
- Plant photomorphogenesis & thermomorphogenesis
- Flowering time control
- Abiotic stress adaptation in plants

Ji Hoon Ahn Korea University
- Regulation of flowering time
- Ambient temperature-responsive flowering
- Regulation of florigen

Changyoung Kim Seoul National University
- Topological materials & unconventional superconductors
- Structure studies by angle resolved photoemission
- Orbital physics

Engineering

Eilhann E. Kwon Hanyang University
- Carbon Management for Achieving Environmental Sustainability
- Waste Valorization in the Thermo-Chemical Process
- Resource Recovery through Biorefinery Platfrom

Seung Hwan Ko Seoul National University
- Wearable electronics (transparent/flexible/ stretchable electronics)
- Soft robotics
- Micro/nano-scale thermal engineering

Sung-Hoon Ahn Seoul National University
- Design & Manufacturing
- Appropriate Technology
- Smart Materials

Kwang Ho Kim Pusan National University
- Hybrid Interface Materials for Future Innovation
- Hybrid Materials for Future Industrial Application
- Nano-hybrid Composite Materials for Advanced and Value-added Properties

Jaekook Kim Chonnam National University
- Materials for Next Generation Batteries
- Synthesis and Characterization of Electrode Materials
- Design of New Materials and Synthetic Route

Heung Nam Han Seoul National University
- Mechanical Behavior of Materials
- Microstructure and Process Design of Structural Materials
- Electrically-Assisted Forming and Electroplasticity

Yongtaek Hong Seoul National University
- Display
- Artificial Electronic Skin
- Stretchable Electronics

Jae Hyung Park Sungkyunkwan University
- Nanomedicine
- Therapeutic Exosome
- Polymeric Drug Delivery System

Hyung Joon Cha POSTECH
- Biomaterials
- Tissue Engineering and Regenerative Medicine
- Drug Delivery Therapy

Agricultural and Fishery Sciences

Ki Hun Park Gyeongsang National University
- Exporation of enzyme inhibitors from plants.
- Metabolite farming for producing nutraceutical substances.

Cheol-Heui Yun Seoul National University
- Vaccine/adjuvant development and immune memory
- Functional relationship between microbiota and host immunity
- Metabolic regulation and protective immunity

Won-Kyo Jung Pukyong National University
- Marine natural products
- Biomedical Engineering
- Marine-integrated Biohealthcare technology

Hyeon Gyu Lee Hanyang University
- Food Processing
- Functional Foods
- Food Encapsulation

Woo-Kyun Lee Korea University
- Forest management planning
- Climate change impact and Adaptation
- Geographic Information System (GIS) and Remote Sensing (RS)

Medical Sciences

Hyun Kook Chonnam National University
- Posttranslational modification and epigenetic regulation in cardiac hypertrophy/heart failure and skeletal muscular diseases
- Non-coding RNAs in cardiovascular remodeling

Jung-Joon Min Chonnam National University
- Nuclear Oncology
- Molecular Imaging and Theranostics
- Bacteria-mediated Cancer Immunotherapy

Dong-Gyu Jo Sungkyunkwan University
- Neuroscience, Neurodegenerative diseases, Alzheimer's, Parkinson's
- Extracellular vesicle, Exosome
- Aging, Epigenetics

Seong-Gyu Ko Kyung Hee University
- Herbal Medicine, Korean Medicine
- Cancer Research
- Natural Products, Natural Compounds, Pharmaceuticals


한국과학기술한림원
The Korean Academy of Science and Technology

2022

ANNUAL REPORT

The Korean Academy of Science & Technology

KAST 한국과학기술한림원
The Korean Academy of Science and Technology

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