Republic of Korea:

IMU group V membership application

Contents

Highlights of the Proposal
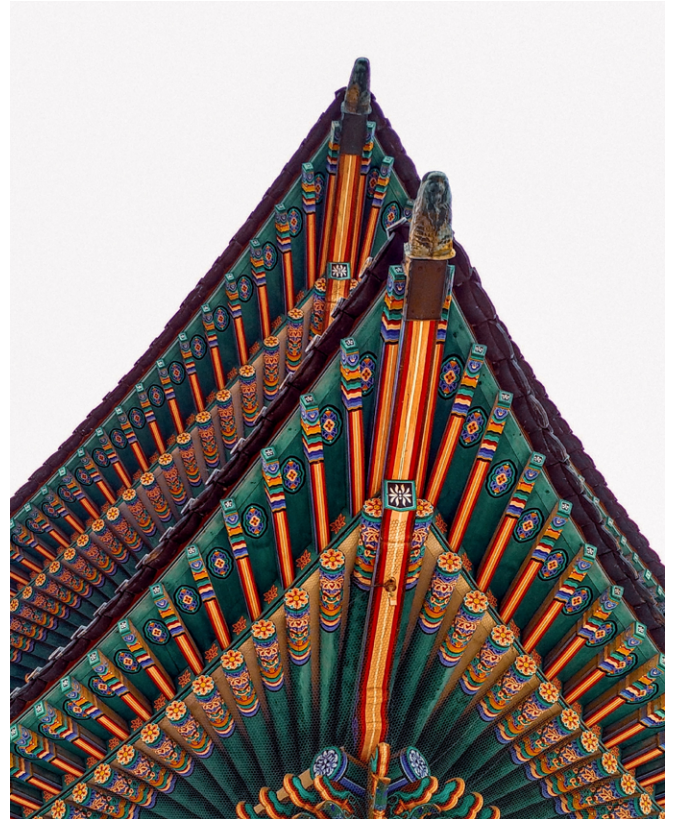
Section 1

Korea: the country of a truly exceptional development

During the last 50 years, Korea's GNI per capita has increased more than 970 times now placing Korea as the world's 10th largest economy. This growth was driven by the enthusiasm and respect for higher education that Korean people hold dear to their heart, at the center of which is mathematics.

Sections 2 & 6

Recent rise of mathematics in Korea

In spite of a relatively short history in modern mathematics, Korea achieved remarkable growth in mathematics, aided by the passion for education, unprecedented economic development, and considerable support from the government. Achievements that are particularly noteworthy: 15 Korean ICM speakers since 2006, the unprecedented upgrade from IMU Group II to Group IV in 2007, the successful hosting of Seoul ICM 2014, the increase in SCIE publications during 2007-2020 by more than 100%, SCIE publications per capita that would rank as the 8th among IMU Group V countries, countless international conferences covering a wide range of modern mathematics, and continuously outstanding performances at IMOs that signals a bright future of mathematics in Korea.

Sections 3 – 5

Departments, institutes, and research centers: the cornerstone of mathematics in Korea

Korea has numerous research-oriented mathematics departments, including Seoul National University, Korea Advanced Institute of Science and Technology, Pohang University of Science and Technology, Yonsei University, Kyungpook National University, and Pusan National University. Mathematics research institutes in Korea include Korea Institute for Advanced Study, Institute for Basic Science, and National Institute for Mathematical Sciences. There are also several active research centers funded by the government, located at various university campuses.

Section 6

Women in mathematics in Korea

Korean Women in Mathematical Sciences is the very first mathematical association for women in Asia. Its extensive activities encourage women in mathematics both domestically and internationally as illustrated, for example, by the successful organization of ICWM 2014 in Seoul. The Korean government systematically and actively supports women in mathematics by employing policies to expand their role and participation.

1 Introduction

Korea's five-millennia-long history has contributed significantly to its illustrious cultural heritage and exotic charm. Often referred to as the "Land of the Morning Calm," Korea has a population of 51 million and a total land area of 100,000 km².

The Korean economy has relentlessly witnessed exponential growth. From 1962 to 2019, the country's GNI surged from USD 2.3 billion to a staggering (PPP) USD 2.25 trillion. The years of such rapid economic development propelled the country to become the world's 9th largest trading partner (5th by exports and 9th by imports). GDP in 2020 totaled USD 1.59 trillion, making the country the 10th largest economy in the world. Korea's semiconductor industry, in particular, has achieved a tremendous growth and is now the 2nd largest in the world. Names like Samsung, Hyundai, and LG have become global brands. On July 2, 2021, the United Nations Conference on Trade and Development (UNCTAD) unanimously raised Korea's status from a developing country to a developed country, reclassifying the nation from Group A (Asian and African countries) to Group B (developed economies). The upgrade was the first in the history of UNCTAD since its inception in 1964.

It is generally believed that such an economic miracle was made possible primarily due to the critical role education plays in Korean society and culture. With an illiteracy rate close to zero, children's education is often the highest priority for Korean families. This high regard for education and scholarship partly explains the stellar performance of young Korean students in the International Math Olympiad and the steady influx of gifted students into the mathematics profession.

2 Mathematics in Korea

Korea has 191 four-year universities and colleges, 42 of which offer PhD graduate programs in mathematics and/or mathematical education. The Korean Mathematical Society was founded in 1946 and now has 2,600 members. It joined IMU in 1981 as a Group I member and was raised to Group II in 1993, then to Group IV in 2007. The KMS currently publishes three research journals: the *Journal of the Korean Mathematical Society*, the *Bulletin of the Korean Mathematical Society*, and the *Communications of the Korean Mathematical Society*. In addition, five journals are published by the regional branch societies of the KMS. Mathematics in Korea in the modern sense has a relatively short history, although some evidence of mathematical research can be found dating back to the Joseon Dynasty (1392–1910) and preceding eras.

One year after Korea gained independence from Japanese rule, the predecessor of the Korean Mathematical Soci-

The three journals the Korean Mathematical Society publishes.

ety, known as the Joseon Society of Mathematics and Physics, was established in 1946. At the time of the foundation of the First Korean Republic Government in 1948, mathematics teachers and students at various colleges and schools paved the way for Korea's mathematics. Those interested in studying and researching mathematics had to overcome the challenges posed by the scarcity of books and journals on mathematics. In 1952, two years after the outbreak of the Korean War, the society was split into two guilds representing respective fields, thus bringing the Korean Mathematical Society into existence. Three years later, the society launched its first journal under the title, *Mathematical Education*.

Following the Korean War period, the mathematicians who had gone abroad to study received their degrees around 1960. While many of them chose to stay overseas to continue their research, several returned and greatly influenced mathematics in Korea. Rimhak Ree (1922–2005)

Rimhak Ree (1922–2005)

studied mathematics in Korea and taught at Seoul National University before going to Canada. He became a world authority on group theory and originated the so-called "Ree Group" in the 1960s. Dock Sang Rim was a researcher in algebraic geometry and contributed to Grothendieck's legendary SGA7. Other early pioneers in this period include Kyung-Whan Kwun and Chung Nim Lee in algebraic topology. In 1964, the society began publishing its journal under the new name, *Math*. Then, in 1967, the journal was divided into two biannual journals, the *Journal of the Korean Mathemat-*

ical Society and the *Bulletin of the Korean Mathematical Society*. This period in Korea is marked by a remarkably rapid growth in mathematics from world-class mathematical research to public awareness of the importance of mathematics.

Korea achieved extraordinary economic growth in just a few decades. The thirst for economic growth and education, together with the government's substantial support on basic studies, including mathematics, contributed to Korea's rise to the IMU Group IV in 2007 from Group II in 1993. This unprecedented advancement in IMU history is well-mirrored by the success of the Seoul ICM 2014 with a total of 5,217 registrants and 21,227 visitors partaken in the Congress and its public outreach programs. Figure 1 and Table 1 show how rapidly research has progressed in Korea since 2007.

Some notable achievements by the Korean mathematical community include the establishments of the Korea Institute
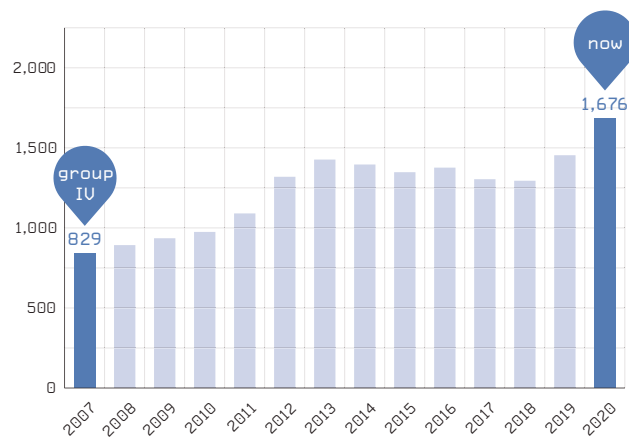

Figure 1 SCIE publications in Korea (2007–2020)

for Advanced Study and the National Institute for Mathematical Sciences, a world ranking of 11th in the number of SCI papers, a proliferation of world-class domestic mathematicians, and outstanding outcomes at IMOs. While the quality and quantity of mathematical research in Korea increased exponentially, Korea's phenomenal performance at IMOs is observed at the other end of the horizon, under-scoring the public's growing interest in mathematics. Since Jun-Muk Hwang, Jeong Han Kim, and Yong-Geun Oh delivered invited lectures at Madrid ICM 2006, many Korean mathematicians have been invited to ICM (see Table 3).

(Left to right) Jun-Muk Hwang, Jeong Han Kim, Yong-Geun Oh

Table 1 SCIE publications of group V countries and Korea (2007–2020)

YEAR	USA	UK	Russia	Japan	Italy	Israel	Germany	France	China	Canada	Brazil	Korea
2007	8,453	1,693	1,442	1,650	1,914	643	2,465	2,653	5,688	1,581	658	829
2008	9,048	1,838	1,827	1,691	2,151	778	2,772	3,008	6,545	1,736	779	885
2009	9,203	1,899	1,835	1,898	2,213	721	2,745	3,141	7,759	1,837	872	928
2010	9,046	1,872	1,891	1,749	2,264	707	2,752	3,211	7,825	1,713	826	966
2011	9,229	1,905	1,877	1,822	2,308	720	3,013	3,313	8,549	1,741	871	1,085
2012	9,746	1,987	1,841	1,931	2,460	721	3,043	3,393	9,981	1,767	970	1,310
2013	9,417	2,111	1,826	1,921	2,438	668	3,152	3,528	12,094	1,787	989	1,417
2014	9,667	2,130	1,954	1,895	2,462	743	3,273	3,358	13,490	1,765	1,092	1,388
2015	9,877	2,207	2,241	2,018	2,653	751	3,472	3,562	12,500	1,774	1,145	1,341
2016	10,019	2,302	2,273	1,849	2,497	776	3,446	3,619	12,216	1,754	1,289	1,368
2017	10,262	2,457	2,335	2,069	2,616	781	3,569	3,565	13,020	1,809	1,340	1,300
2018	10,490	2,461	2,432	2,059	2,685	804	3,759	3,524	14,665	1,848	1,456	1,298
2019	11,369	2,754	2,569	2,144	2,796	860	3,926	3,830	16,991	1,929	1,632	1,443
2020	11,407	2,782	2,831	2,340	3,213	893	4,105	3,867	20,670	2,061	1,762	1,672

Table 2 SCIE publications per capita in of group V countries and Korea (2020)

	USA	UK	Russia	Japan	Italy	Israel	Germany	France	China	Canada	Brazil	Korea
Pub	11,407	2,782	2,831	2,340	3,213	893	4,105	3,867	20,670	2,061	1,762	1,676
Pop*	331	67.9	146	126	60.5	8.66	83.8	65.3	1,439	37.7	213	51
Pub/Pop*	34.5	41.0	19.4	18.6	53.1	103.0	49.0	59.2	14.7	54.7	8.3	32.9

* measured in millions

Table 3 Korea's ICM speakers

Name	Year	Section	Affiliation
Jun-Muk Hwang	2006	Algebraic & Complex Geometry	KIAS
Jeong Han Kim	2006	Combinatorics	Microsoft & Yonsei Univ.
Yong-Geun Oh	2006	Geometry	Wisconsin Univ. & KIAS
Hee Oh	2010	Lie Theory & Genearlizations	Yale Univ. & KIAS
Jong-il Park	2010	Topology	Seoul National Univ.
Jun-Muk Hwang	2014	Plenary Lecture	KIAS
Seung Yeal Ha	2014	Mathematical Physics	Seoul National Univ.
Seok-Jin Kang	2014	Algebra	Seoul National Univ.
Bumsig Kim	2014	Algebraic & Complex Geometry	KIAS
Byunghan Kim	2014	Logic & Foundations	Yonsei Univ.
Ki-Ahm Lee	2014	Partial Differential Equations	Seoul National Univ.
June Huh	2018	Combinatorics	IAS & KIAS
JongHae Keum	2018	Algebraic & Complex Geometry	KIAS
Byeong U. Park	2018	Probability & Statistics	Seoul National Univ.
Hyeonbae Kang	2022	Stochastic & Differential Modelling	Inha Univ.
Sug Woo Shin	2022	Number Theory	UC Berkeley & KIAS

Participants at Seoul ICM 2014

3 Mathematics Departments in Korea

The essential foundation of Korean mathematics research and education lies in the mathematics departments and research centers. These departments and institutions practice pure mathematics research in core fields as well as diverse applied research that stretches from science, technology, and sociology to the public domain. Through this in-depth and broad-scoped research, mathematics talents are actively discovered and fostered. In Sections 3, 4, and 5, we introduce the mathematics departments, research institutes, and research centers that represent Korea.

Seoul National University

Seoul National University was founded as a state-funded university in 1946 and its department of mathematics was established in the College of Liberal Arts and Sciences in the same year. After the main campus was relocated to Gwanak, the mountains south of Seoul, in 1975, the department became part of the College of Natural Sciences and was renamed the Department of Mathematical Sciences in 2001. The department has expanded dramatically since then. Today, it counts 36 tenured and tenure-track faculty, 16 lecturers, 38 postdocs, and 205 master's and PhD students.

The research of the department covers major areas of pure and applied mathematics, including algebra, number theory, geometry, topology, harmonic analysis, partial differential equations, mathematical physics, operator theory, probability theory, quantum information theory, combinatorics, numerical analysis, machine learning, and cryptography. The department offers bachelor's degrees in mathematics and a joint degree in mathematical finance as well as master's and PhD degrees in mathematics. In 2020, 53 students were admitted for a bachelor's degree in mathematics and mathematical finance and 39 students were admitted to the graduate program.

The Research Institute of Mathematics adjacent to the department and affiliated with the university hosts numerous conferences, workshops, and seminars. The department also operates two research centers, the Indus-

trial & Mathematical Data Analytics Research Center (IMDARC) and the more recently established Center for Quantum Structures in Modules and Spaces (QSMS), both funded by the National Research Foundation of Korea.

KAIST

The establishment of the Department of Mathematical Sciences at Korea Advanced Institute of Science and Technology (KAIST) dates back to the Department of Mathematics and Physics at the Korea Advanced Institute of Science (KAIS) that was founded in 1971 as Korea's first graduate school specializing in science and engineering. Currently, the department has 33 tenured and tenure-track professors, a notable increase from 18 professors back in 1990. The department has 238 undergraduate students and 125 graduate students, making it the second-largest mathematics school in Korea. Since 1990, the department has awarded 300 PhDs and 1,200 bachelor's degrees. Graduates work in various industry sectors, including academia, research institutes, accountancy and finance, insurance, information technology, and cybersecurity. Many of the department's bachelor's degree recipients pursue an advanced degree in engineering, computer science, economics, biology, or business management. Approximately half of the incoming graduate students enter a PhD program and many doc-

torate holders work in academia and research institutes.

Undergraduate students have the opportunity to study abroad at 121 prestigious schools with student exchange agreements with KAIST, such as the Hong Kong University of Science and Technology, KTH Royal Institute of Technology, Nanyang Technological University, and the Technical University of Munich.

There are five major research groups within the department: algebraic geometry, number theory, and representation; PDE, mathematical biology, and applied analysis; discrete mathematics; geometry and topology; and probability and statistics. Renowned research centers affiliated with the department include the Integrated Mathematics Education and Research Center (BK21 Plus), Stochastic Analysis and Application Research Center, KAIST Advanced Institute for Science-X, and KAIST Mathematics Fusion Research Station. The department also runs research cooperation programs with KIAS and the Pioneer Research Center for Mathematical and Computational Sciences at the Institute for Basic Science (IBS).

POSTECH

POSTECH (Pohang University of Science and Technology) was founded in the year 1986 by the Pohang Steel Company (POSCO) with the goal of becoming a world-class research institution. Its mathematics department was established in the same year with 6 professors and 20 undergraduate students, and the graduate program was established in the following year. POSTECH mathematics program brings together faculty and students interested in solving challenging problems and expanding human's intellectual horizon by reflecting and integrating mathematical discoveries into the permanent body of mathematical knowledge. POSTECH's education model focuses on a small group of exceptional students, while providing the faculty

the best research-conducive environment to bring about a wide arrange of results from pure to applied mathematics.

Despite its relatively small size, the faculty members' research interest ranges widely from traditional topics to new rapidly-developing topics, including geometry and topology, algebra and number theory, analysis and partial differential equations, and applications of mathematics. In 2003, the department received the highest honor from the Korean Council for University Education amongst all undergraduate and graduate mathematics programs.

The department offers master's and Ph.D. degrees as well as an Integrated Program (MS/PhD). Currently, 58 undergraduate and 61 graduate students are enrolled. Twenty-two full-time faculty members run the following research centers and institutes: the Institute for Basic Science-Center for Geometry and Physics (IBS-CGP), POSTECH Mathematics Institute (PMI), the Center for Research in Topology (CRT), the Mathematical Institute for Data Science (POSTECH MINDS), and BK21 FOUR POSTECH Mathematical Science Division. The department continues in making intensive efforts to improve the level of research and teaching at the department so that it could become comparable to that of the world's top 20 universities within the next 15 to 20 years.

Yonsei University

Yonsei University is one of the oldest universities in Korea, where mathematics was taught from the beginning. Yonsei's mathematical research has expanded to the scale that its leading mathematics professors, Jeong Han Kim in combinatorics and Byunghan Kim in logic and foundations, were invited to ICM as speakers. There are currently 24 tenured and tenure-track professors leading research and education in their respective fields. These include algebraic geometry, symplectic geometry, algebraic number theory, analytic number theory, logic and foundations, combinatorics, har-

monic analysis, partial differential equations, bio-mathematics, numerical analysis, probability, financial mathematics, and mathematical fluid dynamics. More than 120 graduate students and over 160 undergraduate students in the department are growing into global mathematicians, scientists, and experts in various industrial sectors. Most master's and PhD students are supported by BK21, a national support project for graduate students initiated in 1999. Furthermore, the department hosts the Center for Mathematical Analysis & Computation, funded by the National Research Foundation of Korea from 2015 until 2022. The department is internationally recognized for producing world-class scholars working actively in various areas of mathematics.

Sungkyunkwan University

The Mathematics Department at Sungkyunkwan University is dedicated to excellence in its undergraduate and graduate programs. Its faculty and lecturers share a passion for teaching and a deep commitment to research. The department strives to nurture and prepare its students both at the undergraduate and graduate level for successful careers in mathematical sciences, whether in academic, governmental, or industrial positions. Its mission is to systematically cultivate competent talents who can solve complex problems of modern technological society with mathematical

creativity and thinking ability. The department consists of 23 faculty members, approximately 60 graduate students, and over 180 undergraduate students. The faculty has research interests in various area of mathematics. Students are supported by numerous awards and scholarships. The department is part of BK21 Mathematical Science division for fostering excellent future leaders, and the Applied algebra and Optimization Research Center (AORC), which is one of the four advanced science research centers in mathematics solely funded by the Korean government.

Kyungpook National University

The Department of Mathematics at Kyungpook National University (KNU) enjoys a rich history dating back to the College of Arts and Sciences establishment in 1952, seven years after the founding of the university. Its graduate school was established in 1953 and is now organized into ten research groups: topology, numerical analysis, mathematical and computational biology, nonlinear functions, nonlinear dynamics, graph theory, algebra, partial differential equations, medical imaging, and complex geometry. The department's mission is to provide an environment where students can become competent in mathematics and its applications to contribute to the society.

Since 1952, a total of 2,561 undergraduates, 407 master's, and 126 PhD students have completed their degrees. The present department consists of six full professors,

one associate professor, eight assistant professors, 158 undergraduates, and 35 graduate students. The faculty has a broad range of research interests, spanning the major fields of contemporary pure and applied mathematics.

Over the last decade, the department has hosted several national projects, funded by the National Research Foundation of Korea, which have strengthened the educational and research capacity of the graduate school: World Class University, BK21 Plus, CK, and BK21 FOUR. In particular, until Aug 31st, 2027, the department will be supported by the BK21 FOUR grant to further develop the department as a world-class research-centered department.

In 1958, the Kyungpook Mathematical Journal was launched by the department as the first international mathematical journal in Korea. This is a peer-reviewed journal that publishes research articles in all fields of pure and applied mathematics. Editorial members consist of 6 managing editors and 34 associate editors. The journal has been listed in SCOPUS since 2010 and in ESCI since 2018.

Pusan National University

Pusan National University was founded in 1946 and its department of mathematics was founded seven years later in 1953. The department offers bachelor's, master's, and PhD degrees in mathematics. Today, the department consists of 16 faculty members (8 full professors, 3 associate professors, and 5 assistant professors), 20 postdocs, and 67 graduate students.

The department's research covers a broad range of theoretical mathematics (algebra, analysis, geometry, topology) and applied mathematics (bio-mathematics, data assimilation, financial mathematics, numerical analysis).

The graduate program at the department has been supported by BK21 from the Ministry of Education and Human Resources Development of the Korean government. The program enables the department to maintain and develop its graduate program in terms of education and research.

Bachelor's program at the department offers both theoretical and applied programs. The theoretical program is for students who wish to study advanced mathematics in various fields in theoretical mathematics. The applied program, on the other hand, is geared toward students seeking industrial careers and provides students with courses such as actuarial mathematics, mathematical algorithm, and mathematical programming.

The department, furthermore, hosts the Industrial Mathematics Center with research interests in finance, fishery, and manufacturing based on big data. Professors, postdocs, and graduate students at the center investigate industrial problems in cooperation with business entities, which resulted in numerous scientific achievements and patents.

4 Mathematical Research Institutes in Korea

School of Mathematics in Korea Institute for Advanced Study (KIAS)

Korea Institute for Advanced Study (KIAS) was founded in 1996 by the Korean government to promote research excellence in the basic sciences. As a flagship of the basic sciences in the region, KIAS provides a venue for advanced learning and the active discovery of new ideas. KIAS is an arena for dynamic scientific interactions. KIAS attracts scientists from all over the world for collaborative research, sabbatical leaves, and other various research activities. In pursuit of fulfilling its mission, KIAS also hosts numerous meetings, seminars, workshops, and seasonal programs. KIAS, aspiring to become a world-class hub of research activities, welcomes opportunities to interact with research communities around the world.

The School of Mathematics supports scholarship in a broad range of pure and applied mathematical sciences, including algebra, number theory, geometry, topology, global analysis, mirror symmetry, partial differential equations, etc. The fundamental objective of the School is to create new mathematical knowledge and nurture young mathematicians by exposing rising talents to the full spectrum of mathematical sciences. Because most significant mathematical discoveries have often benefited from cross-fertilization of ideas from different mathematical fields, the School maintains research on diverse areas in mathematics. At the School of Mathematics at KIAS, there are currently 10 faculty members, 1 distinguished professor, and 10 KIAS scholars. At the Center for Mathematical Challenges, there are 1 distinguished professor and 5 fellows.

Institute for Basic Science (IBS)

IBS was established in 2011 as Korea's first dedicated basic science research institute. By studying the fundamental principles of nature, basic science is essential in creating new knowledge from which significant societal transformations are derived. IBS promotes the highest quality of research that will increase the national basic science capacity and generate new opportunities at the national level. IBS specializes in long-term projects that require large groups of researchers. By creating solid synergies from outstanding talents, autonomous research support systems, and its world-class infrastructure, IBS is steadily growing into a major basic research institute that meets the global standards of excellence.

The IBS Center for Geometry and Physics (IBS-CGP) supports establishing and developing the emerging field of symplectic algebraic topology through a collaborative effort by experts in fields such as symplectic geometry, dynamical systems, algebraic geometry, and mathematical physics.

Discrete Mathematics Group (DIMAG) investigates various research subjects in discrete mathematics, including graph theory, extremal combinatorics, combinatorial optimization, matroid theory, and discrete algorithms. In addition, it aims to create an attractive and active research hub, facilitating collaborations by organizing seminars, workshops, and conferences.

The research at IBS Center for Complex Geometry (IBS-CCG) is centered around the interaction of algebraic geometry and differential geometry. This interaction is much more natural and transparent when working with complex numbers than real numbers. IBS-CCG aims to develop novel methodologies to attack challenging problems on systems of polynomial equations and differential equations. The geometric nature of systems of equations is reflected in their symmetries and invariants; so the main techniques this center employs involve Lie theory.

Biomedical Mathematics Group aims to develop mathematical toolboxes for investigating multiscale dynamics of living organisms from intracellular to intercellular and systemic level and apply them to identify causes of and treatment strategies for circadian rhythms sleep disorders at the level of molecules, networks, and systems.

The Data Science Group at the Pioneer Research Cen-

ter for Mathematical and Computational Sciences focuses on problems in computational social science, which can have a significant impact for future societies. In particular, this group contributes to developing state-of-the-art methodologies for handling large-scale heterogeneous data via deep learning and AI. The Data Science Group strives to advance the data science research field via developing new ways of computing that go beyond the limits of current machine learning and deep learning. Through research, this group provides a better understanding of the complex human-socio systems by suggesting qualitative data analysis methods to interpret large-scale heterogeneous data. Furthermore, the development of new methodologies will contribute to tackling social issues for the future society such as fake news, filter bubble, and insomnia, by building and applying AI-driven data science methodologies.

National Institute for Mathematical Sciences (NIMS)

NIMS has contributed to Korea's scientific technology and economic development through interdisciplinary and industrial problem-solving research. To meet such national and social demands, NIMS places its goal on conducting strategic R&D, including industrial mathematics, finding and solving mathematical problems in the industry and the public sector, and returning the results. NIMS thereby tries to contribute to the world through mathematics.

NIMS actively pursues R&D partnerships with businesses to promote innovative ideas in mathematics, assists in developing start-ups that can surprise the world, establishes a problem-solving system, and creates specialized programs for start-ups engaging in mathematics. Upon leveraging its partnerships and balancing growth across all fields of mathematics as its assets, NIMS maximizes mathematical problem-solving ability with balanced development and cooperation in all areas of mathematics and endeavors to contribute directly to the nation and society through industrial mathematics.

To this end, NIMS maximizes its efforts in contributing to the public's daily life by expanding the role of mathematics upon combining the will and capabilities of all its members. NIMS connects mathematicians, scientists, and engineers with national agendas to secure national competitiveness as a leading mathematical research institute. It provides a collaborative mathematical sciences research hub that can develop mathematical solutions supporting industrial technology development and disseminate mathematical knowledge by training the next generation of researchers.

5 Government Supports & Mathematical Research Centers in Korea

In 2010, the National Research Foundation of Korea (NRF), funded by the Ministry of Science & ICT and the Ministry of Education, had supported 484 grants, including six research groups, with a total annual budget of about USD 26 million. This year, the Korean government plans to support 1,100 grants, including 17 research groups, with a total of about USD 57 million, more than doubling within a decade (see Figure 5).

Among government-supported programs, two are particularly noteworthy: the Science Research Center (SRC) and the Priority Research Institute (PRI) Program. Science Research Center develops global competitiveness in core research areas and expands Korea's national basic research capacity by identifying and fostering outstanding research groups that possess creativity and capability, producing creative convergence-oriented researchers for the next generation through the promotion of group research, and supporting the creation of quality jobs for young researchers. Priority Research Institute Program develops university-affiliated research centers to primarily function as research hubs, encouraging university research centers to become more specialized and specific in their focus and supporting the identification and nurturance of outstanding young researchers. The table below lists the centers and the institutes supported by the programs since 2010, followed by brief introductions of selected key research centers.
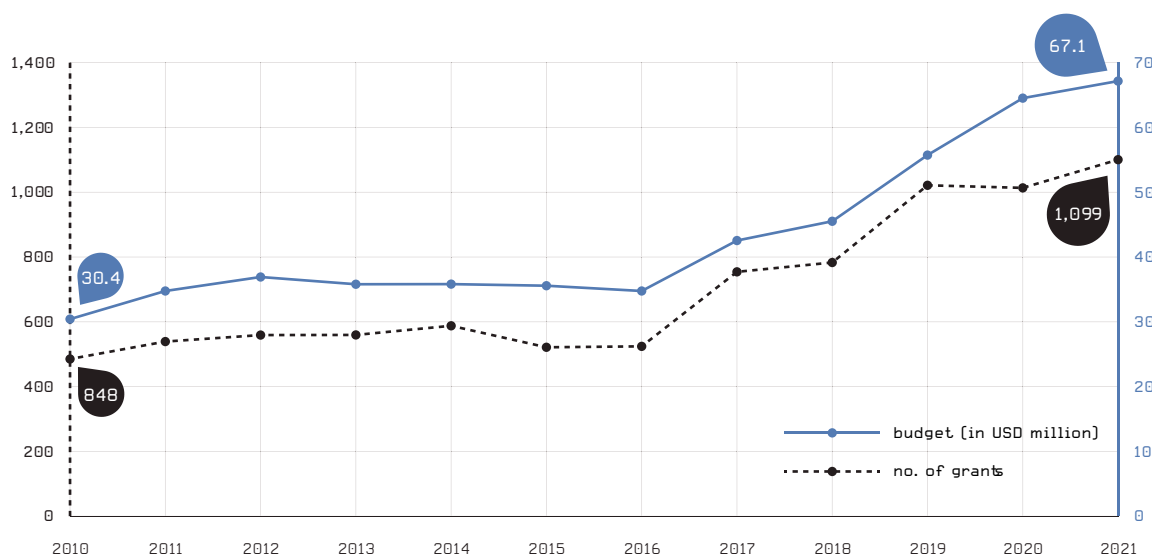

Figure 5 Grant funded by the Korean government

Name of institutes/centers	Hosting site	Period	Type
The Center for Quantum Structures in Modules and Spaces [QSMS]	Seoul National University	2020-2027	SRC
Stochastic Analysis and Application Research Center [SAARC]	KAIST	2019-2026	SRC
Industrial and Mathematical Data Analytics Research Center [IMDARC]	Seoul National University	2017-2022	ERC
Finance·Fishery·Manufacture Industrial Mathematics Center on Big Data [F²M IMC]	Pusan National University	2017-2022	ERC
Applied Algebra and Optimization Research Center [AORC]	Sungkyunkwan University	2016-2022	SRC
Center for Mathematical Analysis and Computations [CMAC]	Yonsei University	2015-2022	SRC
Algebraic Structure and its Applications Research Center [ASARC]	KAIST	2007-2016	SRC
Ewha Institute of Mathematical Sciences [EIMS]	Ewha Womans University	2009-2025	PRI
POSTECH Mathematics Institute [PMI]	POSTECH	2007-2016	PRI

Center for Quantum Structures in Modules and Spaces (QSMS)

The center for QSMS is a science research center at Seoul National University and is funded by the National Research Foundation of Korea since summer 2020.

The research at QSMS is centered around the quantized algebraic structures naturally arising from representation theory, number theory, and geometry. It aims to investigate these algebraic structures and find concrete connections among them. The topics include: (1) algebraic and arithmetic structures of quantum groups, quiver Hecke algebras, and their representation theory; (2) topological and quantized algebraic structure of symplectic geometry, and Floer theory; and (3) the connection between modular forms, quantum groups, symplectic geometry, and mirror symmetry, especially from the viewpoint of cluster algebra, a relatively new algebraic structure, which has now turned out to have a wide connection with and applications to various areas of mathematics and mathematical physics since it was introduced in 2000.

In this center, there are ten university faculty members from five major universities in Korea, who are the leading experts in the areas of representation theory, number theory, and geometry, and 30 members of postdoctoral research fellows and graduate students.

Stochastic Analysis and Application Research Center (SAARC)

Established in 2019, SAARC at KAIST gathers experts in the fields of probability theory, applied probability, and analysis to create a new field that combines them to solve problems for which the stochastic approach is essential. The main goals of the center are to suggest research directions in probability theory and related fields and to raise national competitiveness through research on AI and Big Data. It currently consists of 12 professors, 1 research professor, 7 postdocs, and 45 graduate students, organized into 3 subgroups. Group 1 (probability theory) conducts research on probability theory based on an analytic approach and develops theoretical tools for probability theory by studying universal properties in various probabilistic models. Group 2 (applied probability) conducts research on artificial intelligence and machine learning based on probability theory and proposes reliable and stable machine learning methods. It aims to secure AI technologies that can be applied to the industry. Group 3 (stochastic PDE) conducts research on stochastic PDEs that include various random effects and proposes new mathematical models that can explain natural and social phenomena more realistically and understand their properties.

Industrial and Mathematical Data Analytics Research Center (IMDARC)

Founded in 2017, IMDARC is one of the most comprehensive research centers in Korea. The center has expanded considerably over the last 4 years, in part, due to the significant funding from the National Research Foundation of Korea (approximately USD 7 million from 2017 to 2022). The center serves with the vision of bringing the best researchers from diverse fields. Today, IMDARC is comprised of 16 professors, 8 postdocs, 40 PhD students, and 11 master's students. Its members have published on average 8-15 SCI(E) papers, applied for 2-5 patents, held 1-2 conferences/workshops per year, and signed MOUs with 7 industrial institutions.

The primary objective of IMDARC is to serve as a platform for resolving and advising on various mathematical issues arising from industry fields. Through this platform, IMDARC is aiming to connect the mathematics community with companies in emerging industries. IMDARC consists of three groups. Group 1 primarily focuses on developing homomorphic encryption for machine learning and artificial intelligence and the next-generation cryptosystem for newly arising security issues from quantum computing. Group 2 works on researching modern data analysis technology relying on advanced mathematical theories from topology, combinatorics, and dynamical systems, and it applies this technology to actual industrial data. Group 3 primarily solves financial industry problems by developing prediction models based on deep learning and theoretical financial mathematics tools.

Center for Mathematical Analysis and Computations (CMAC)

The development of communication technology and software applications has had a profound impact on modern life worldwide. For example, a myriad of scholarly articles is easily accessed by a simple search on a web browser such as Google, and wide-ranging and in-depth information has become readily available through websites such as Wikipedia. Historically disconnected fields now interact and merge regularly. New areas of studies are emerging rapidly and mathematics is not immune to these recent trends. Mathematics has two faces: one is of wonder and curiosity ingrained in pure mathematics and the other of practicality and utility sought by applied mathematics. Mathematics in Korea has evidently emphasized the pure side thus far.

Nonetheless, applied and industrial mathematics has become increasingly popular and is now heavily appreciated. To meet the needs of our transforming society and technology, applied and industrial mathematics must be expanded rapidly. CMAC, founded in 2015 and currently joining efforts of 13 professors from multiple universities, is instituted to meet the demands of applied and industrial mathematics research.

Applied and industrial mathematics is concrete, transient, and rapidly changing, but its problems are as difficult and complex as any other scientific challenges. CMAC has chosen research projects not only from classical topics such as turbulence, Navier-Stokes problems, and their numerical computations, but also from contemporary software challenges such as medical imaging, data science, and machine learning.

Applied Algebra and Optimization Research Center (AORC)

The AORC was established in June 2016 at Sungkyunkwan University with support from the National Research Foundation of Korea. The goal of the AORC is to encourage, promote, and carry out collaborative research leading to innovative interdisciplinary study in selected strategic fields of applied algebra and optimization. The center focuses on combinatorial and optimization problems related to big data analysis and other application areas. Research activities cover a wide range of mathematics and its applications in data science and information security. To achieve this goal, the center supports various research programs and activities. It has also established an international network through agreements with strategically chosen global research centers.

The ongoing research activities at AORC include: research seminars, invited talks, colloquiums, intensive lecture series, workshops, conference, post-doctoral programs and visitor programs. These activities are organized by its three research groups: Combinatorial Structure and Algorithm, Matrix Analysis and Optimization, and Algorithmic Number Theory.

The AORC members are composed of 12 mathematics faculty from three different organizations in Korea, 12 postdocs, 20 graduate students, and 13 SAB members. The AORC offers up to three-year Postdoctoral Fellowships for recent PhD scholars. The postdocs receive a great deal of guidance and ample opportunities to collaborate with core researchers at the AORC. The Graduate Research Fellowship Program recognizes and supports outstanding graduate students pursuing research-based master's and doctoral degrees. It also offers Undergraduate Research Program for facilitating research experiences for undergraduates with AORC faculty members across the disciplines.

Finance·Fishery·Manufacture Industrial Mathematics Center on Big Data (F²M IMC)

Finance·Fishery·Manufacture Industrial Mathematics Center on Big Data of Pusan National University was organized in 2017 to develop industrial mathematics. Taking advantage of the geo-economical characteristics of Pusan, the center provides theoretical support for various fields, including finance, fisheries, and the manufacturing industry. In the past, the center has played a crucial role in predicting the credit card default of Pusan Bank and developed mathematical models to assess and manage the fisheries resources to support the work of the National Institute of Fisheries Science. The center has also helped improve the printing process of World Komax, a Pusan-based label printing company with four overseas production plants. Currently, the center has 1 senior researcher, 11 co-researchers, and 55 participating researchers.

The areas of research at the center focus on its primary objectives in (1) providing solutions for industrial problems arising in finance, fishery, and manufacturing fields, (2) developing professional human resources and constructing education infrastructure in industrial mathematics, and (3) social contributing with industrial mathematics research efforts. Specifically, the projects in the finance field include expanding portfolio optimization models to the real estate market, designing mathematical models that capture residential mortgage demands and MBS supplies, and discovering and solving other industrial mathematical problems of finance-related companies. In fisheries, the projects include analyzing bottom trawl fishery resources through geomathematical statistical models, developing maps of changes in domestic fish species and habitat distribution due to climate change, and discovering and finding solutions for other industrial mathematical problems of fishery-related institutes. In manufacturing, the projects include collecting recent research results and constructing analysis platforms in machine learning and deep learning, and discovering and solving other industrial mathematical problems arising in manufacturing, medicine, and education.

Ewha Womans University - Institute of Mathematical Sciences (EIMS)

Ewha Womans University is a private research university in Seoul. Founded in 1886 as a girls' school by an American Methodist missionary, Mary Scranton, Ewha was one of the first universities officially instituted in Korea. It grew into one of the world's largest women's university, now comprised of 14 colleges and 13 professional schools.

As the institute's name suggests, an essential feature of EIMS, founded in 1998, is diverging beyond independent studies of mathematics. It creates an interdisciplinary environment that integrates and amalgamates all fields of mathematical sciences such as pure mathematics, applied mathematics, statistics, and theoretical physics. As this research-based environment allows interdisciplinary research beyond the independent study of a single field, EIMS has used this feature to focus on "research by mathematical sciences that forms the foundation for the advancement of science and high-tech industry." Among various fields of application, EIMS studies theories and applications that form the foundation for advanced technology by specializing in research related to studies of statistical techniques for information protection, image processing, and biomedical care.

The institute maximizes its research capacity in cryptography, image processing, and statistical techniques in biomedical technology. The aim for specialized research is closely related to information science, life science, and nanoscience, which are all based on the development of mathematics, statistics, and theoretical physics. EIMS will be designated as the university's institute of specialized research to enhance the synergy of all research results and the institute's projects in technical research by cooperating with other specialized organizations to conduct joint research. The research at EIMS is not limited to studies based only on theories in mathematical science but expands to developing technology that the industry can directly utilize.

International Congress of
Women Mathematicians at
Ewha Womans University, 2014

6 Korean Women in Mathematics

The Beginning of Korean Women in Mathematical Sciences

Korean Women in Mathematical Sciences (KWMS), the first mathematical association for women in Asia, held its first general meeting and inaugural international conference in June 2004. In the early 1990s in Korea, although more than 40% of math major college students were women, mathematics departments had only a mere handful of female faculty members. Koreans' heavy investment in education resulted in a decrease in the gender gap, especially in college enrollment since the 1970s. However, this did not translate into equality in the job market. There are still significant gender gaps when it comes to job opportunities in mathematics and sciences. Women in mathematics fare slightly better than women in other sciences and engineering because mathematics instructors are high in demand at the college level. Many women mathematicians were hired during the 1970s and early 1980s to address this deficit. Sadly, the next two decades experienced no growth in the employment of women mathematicians. Around 2000, the Korean government established a nationwide system to promote women's participation in politics and decision-making processes. An attempt to foster female professionals and increase women's involvement in research was realized by enacting the Law to Support and Cultivate Female Human Resources in Science and Technology in 2002. In 2003, based on this law, an academic affirmative action plan, the Recruitment Quota System, came into effect to allocate a certain percentage of positions for women in faculty recruitment at universities funded by national or provincial governments. These encouraging changes in the scientific community became a major driving force in the establishment of KWMS. In June 2004, more than 160 women mathematicians gathered at KIAS for the first time at the aforementioned inaugural international KWMS conference and passionately demonstrated their high-quality research and leadership abilities.

Activities of KWMS

The primary purpose of KWMS is to support equal opportunities, research, and the exchange of information among women in mathematical sciences. With this aim, KWMS has organized two annual meetings from 2004 until 2018. The general meeting, which was held every June, had a scientific program with invited lectures, contributed lectures, poster presentations, and open lectures and forums on gender equality in mathematics education and the empowerment of women mathematicians. From the beginning, KWMS also held annual winter meetings in different regions of Korea, which the female mathematicians organized in the local institutions throughout Korea. These meetings played an essential role in demonstrating women's academic voice within

International Conference for Women in Mathematics, 2009

the mathematics community in each region. For these meetings, the majority of the speakers are women, while men are not excluded as speakers. Since 2010, the winter meeting has been called the "Leaders Forum for the Careers of Next Generation of Women Mathematicians." These winter meetings were still regional events hosted by local sectors of KWMS. They served as a venue of education to inspire local undergraduate and graduate female students in mathematics majors and high school students interested in mathematics. Women mathematicians from different walks of life joined forces to serve as team mentors to prospective mathematicians during each event. However, as KMS became more involved in the community, some of the programs KWMS ran for many years at the winter meetings were installed in different organizations or institutions. Hence, in 2019, KWMS decided to combine the two annual meetings. The first combined conference was held at Seoul National University in August 2019. In an effort to raise the next generation of scientists and mathematicians, KWMS also organized many annual "fun-fests," such as the middle school math research contest, Sudoku competitions, and middle school math storytelling competitions. A separate workshop by two young women mathematicians titled "Women in Geometry and Topology" at POSTECH was another effort.

The Second ICWM in Seoul, 2014

In preparation for observing its 10th anniversary in 2014, KWMS planned a new leap through an expanded international exchange. In August 2014, KWMS organized the International Congress of Women Mathematicians (ICWM 2014) during Seoul ICM 2014. ICWM 2014 in Seoul, in collaboration with the IMU, was its official founding convention after the first event Hyderabad ICM 2010, India. TOGETHER 2014, a special travel grant project of ICWM 2014, is aligned with the vision of NANUM 2014, which means to share and supported 1,000 mathematicians from developing countries to attend Seoul ICM 2014. TOGETHER 2014 was intended to encourage at least 100 women mathematicians from developing countries by offering partial travel support to participate in both ICM 2014 and ICWM 2014. Such effort to reach out to the international math community was an expression of solidarity that stems from the KWMS members' experience of navigating through the challenges and hardships women encountered in their scholarship.

The Future of Korean Women in Mathematical Sciences

KWMS strives to carry on its founding mission: love for academics, passion for equality and justice, consideration for minorities, and concern for the next generation of women mathematicians. Another growth area is to strengthen their connections throughout Asia as well as other continents. For many years, KWMS invited women mathematicians from different parts of Asia to enhance its intracontinental network. Recently, Kyewon K. Park, with the help of Marie-Françoise Roy (chair of CWM, IMU), formed a working committee of six people–Motoko Kotani (Japan), Polly Sy (Philippines), Dongmei Xiao (China), Sanoli Sy (India), and Le Thanh Nhan (Vietnam)–to discuss a forum and an alliance among women mathematicians in Asia. The committee plans to initiate a preliminary meeting to establish an Asian women's mathematics organization at the Asian Mathematics Conference in Halong, Vietnam, at the end of 2021 or the beginning of 2022.

Korean Mathematics in Numbers

International Mathematical Olympiad

The first Korean Mathematical Olympiad was held in November 1987 and the Korean Mathematical Olympiad representatives obtained excellent scores in their first participation at the Australian IMO, ranking 22nd among 49 countries. Korea's very first IMO medalist in 1988, Young-Hoon Kiem, has become an outstanding algebraic geometer now at Seoul National University.

While the quality and quantity of mathematical research in Korea have increased exponentially, Korea's phenomenal performance surge at IMO is observed at the other end of the spectrum, underscoring the public's growing interest in mathematics. One salient fact observed in Korea's IMO tradition is that many of the IMO medalists (over 60%) maintain their strong interest in mathematics and eventually go on to major in mathematics in college, with many advancing to graduate school to pursue a PhD degree in mathematics.

Starting with Korea's first IMO medalist Young-Hoon Kiem, a sizable number of Korean IMO medalists have become promising mathematicians with permanent positions. These include Sang-hyun Kim (geometric group theory, KIAS), Dano Kim (algebraic geometry, Seoul National University), Kyungyong Lee (representation theory, University of Alabama), Suk Woo Shin (number theory, UC Berkeley), Yongsoo Song (cryptography, Seoul National University), Ji Oon Lee (probability, KAIST), Insuk Seo (probability, Seoul National University), Junehyuk Jung (number theory, Brown University), Kyeongsu Choi (geometric analysis, KIAS), Kyeongsik Nam (probability, KAIST), Yoonsuk Hyun (cryptography, Inha University), and Ringi Kim (graph theory, Inha University). Moreover, many medalists are currently pursuing PhD degrees or holding postdoctoral positions in mathematics.

Table 4 Korea's IMO performance

Year	Rank	Year	Rank
2021	3	2004	12
2020	4	2003	6
2019	3	2002	6
2018	7	2001	4
2017	1	2000	4
2016	2	1999	7
2015	3	1998	12
2014	7	1997	11
2013	2	1996	8
2012	1	1995	7
2011	13	1994	13
2010	4	1993	15
2009	4	1992	15
2008	4	1991	17
2007	3	1990	32
2006	3	1989	28
2005	5	1988	22

Korean Participants at IMO 2017

Korean Participants at IMO 2012

Government Supports.

In 2010, the National Research Foundation of Korea (NRF), funded by the Ministry of Science & ICT and the Ministry of Education, had supported 484 grants, including six research groups, with a total annual budget of about USD 26 million. This year, the Korean government plans to support 1,100 grants, including 17 research groups, with a total of about USD 57 million, more than doubling within a decade (see Figure 5 in Section 5).

Samsung Supports

Several Korea-based global companies, including Samsung and POSCO, support mathematics community in Korea.

In August 2013, Samsung launched a ten-year grant program to support creative and innovative research and developments in the areas of basic science, novel materials, and information and communication technology. For basic science, an independent legal entity named Samsung Science and Technology Foundation (SSTF) was established. SSTF nurtures basic science, including mathematics, physics, chemistry, life science and their convergence area, and provides long-term supports for research projects. In the mathematics area, 58 proposals have been selected.

Year	2013†	2014	2015
Proposals	3	8	6
Grant amount*	1,565	4,350	2,650

Year	2016	2017	2018
Proposals	8	8	6
Grant amount*	3,970	4,650	3,450

Year	2019	2020	2021†
Proposals	7	9	3
Grant amount*	4,582	5,610	1,240

* measured in millions
† half-yearly figure

Korean Mathematicians as Invited Speakers

Selected list of conferences at which Korean mathematicians have participated as invited speakers

- AMS sectional meeting 2019, University of California, Riverside
- Asian Mathematical Conference 2016
- International Congress of Mathematicians 2006, 2010, 2014, 2018
- International Conference on Optimization Techniques and Applications (NACA-ICOTA) 2019
- International Conference on Applications of Fluid Dynamics 2018
- International Conference on Differential & Difference Equations and Applications 2019
- International Conference on Mathematical Inequalities and Applications (IC-MIA) 2018
- International Conference on Nonlinear and Variational Analysis 2019
- The 1st Prima Congress 2009
- The 2nd Pan-Pacific International Conference on Topology and Applications
- The 6th Asian Conference on Nonlinear Analysis and Optimization
- IC-Analysis and Its Applications (ICAA) 2018
- The 6th International Eurasian Conference on Mathematical Sciences and Applications

- The 8th International Conference on Inverse Problems and Related Topics
- The 10th Asian Logic Conference 2008
- The 13th International Conference on Fixed Point Theory and Its Applications (ICFPTA) 2019
- The 18th International Conference on Systems Biology 2017
- The 27th International Conference on Finite and Infinite Dimensional Complex Analysis and Applications (ICFIDCAA) 2019
- The 31st International Symposium on Algorithms and Computation (ISAAC) 2020
- The International Conference on Algebra and its Applications 2017
- Mathematical Society of Japan spring meeting 2016
- Transpennine Triangle Topology (TTT) 104 Conference
- Workshop on Fixed Point Theory and Optimization 2020
- World Congress of Computational Mechanics 2016

Korean Mathematicians as Editors

Selected list of journals for which Korean mathematicians are contributing as editors

- Advances and Applications in Fluid Mechanic
- Algebra and Discrete Mathematics
- Analysis and Mathematical Physics
- Bulletin of Mathematical Sciences
- Complex Analysis and its Synergies
- Communications and Computer Sciences
- Communications in Pure and Applied Analysis
- Compositio Mathematica
- Computational Methods in Applied Mathematics
- Designs, Codes and Cryptography
- Dynamics of Partial Differential Equations, Methods and Applications of Analysis
- European Journal of Mathematics; Forum of Math, Pi
- Forum of Math, Sigma; Groups, Geometry, and Dynamics
- IEICE Transactions on Fundamentals of Electronics
- IEIE Transactions on Smart Processing & Computing
- International Mathematical Research Notices
- International Journal of Computer and Mathematics
- International Journal of Number Theory
- Inverse Problems
- Inverse problems and imaging, Inverse Problems in Science & Engineering
- Journal für die reine und angewandte Mathematik
- Journal of Biological Rhythms
- Journal of Combinatorial Algebra
- Journal of Geometric Analysis
- Journal of Gökova Geometry Topology
- Journal of Knot Theory and Its Ramifications
- Journal of Mathematical Analysis and Applications
- Journal of Mathematical Fluid Mechanics
- Journal of Mathematics in Industry Journal of Number Theory
- Journal of the Mathematical Society of Japan
- Kinetic and Related Models; Kyoto Journal of Mathematics
- Mathematika
- Monographs in Mathematics (Editor-in-Chief)
- Networks and Heterogeneous Media (Editor-in-Chief)
- PLOS ONE (Biophysics)
- Research in Number Theory
- Ricerche di Matematic
- Selecta Mathematica
- SN Partial Differential Equations and Applications
- the Ramanujan journal
- Tunisian Journal of Mathematics

Numerous International Meetings Hosted in Korea

The 12th International Congress on Mathematical Education (ICME-12) was held in Seoul, Korea, from July 8 to July 15, 2012. It provided for educators, researchers, and teachers a forum to accomplish the following goals: (1) to exchange pedagogical, educational, scientific, epistemological information on mathematics education; (2) to promote and stimulate interdisciplinary research in the area; and (3) to initiate a process to further develop a deeper insight into the educational aspects of teaching and learning mathematics. Its program included four plenary lectures, three plenary panels, four ICMI awardees lectures, three survey teams reports, five national presentations, 55 regular lectures, 37 topic study group meetings, and 17 discussion group meetings.

Seoul ICME 2012

The Seoul ICM was held for nine days from the 13th through the 21st of August, 2014, at COEX in Seoul. With a total of 5,217 registrants from 122 countries, the Seoul ICM set a new record for the highest numbers of participants and countries in the history of ICM. The Congress was a scholarly festival of academic presentations and discussions and a feast of diverse cultural programs for adolescents and the general public. Also, this ICM noted the historic moment to witness the very first female Fields Medalist. Various public programs, held during the days of the Congress with an aim to popularize mathematics, were participated by 21,227 adolescents and the general

Seoul ICM 2014 Opening Ceremony

public. A total of 27,359 people participated at Seoul ICM.

It is a tradition of the Congress for international conferences in various mathematics fields to hold satellite conferences surrounding the dates of the Congress in the hosting and neighboring countries. At Seoul ICM, a total of 51 satellite conferences, 35 in Korea and 16 in neighboring countries, took place. Four award winner lectures, five laudations, two award lectures, four special lectures, 19 plenary lectures, 177 invited lectures, 646 short communications, and 388 poster presentations were made as the scientific program of the Congress. This includes the Emmy Noether Lecture by Georgia Benkart and the Abel Lecture by John Milnor. As a result, a total of 1,245 research results were introduced and participants were provided with an opportunity to peek into the most recent advancements in mathematics.

The Seoul ICM was positively evaluated not only on the quantity and quality of its scientific programs and on its smooth management, but also on its role in extending support for developing countries and reinforcing mathematical popularization. The Korean mathematical community has continuously expressed and emphasized the solidarity and support for mathematicians in developing countries striving amidst poor research environment. As a result of such efforts, the NANUM program invited 1,000 mathematicians from developing countries, of whom 664 participated in the Congress from 85 countries in South America, Southeast Asia, Eastern Europe and Africa. The financial support was granted in three categories: 45% senior mathematicians, 45% junior mathematicians and 10% advanced graduate students.

Seoul ICM 2014 NANUM - Asia

Upon this opportunity, IMU also organized and hosted the MENAO (Mathematics in Emerging Nation: Achievements and Opportunities) Symposium at the Congress venue on the day before the opening ceremony to discuss the measures in further supporting mathematics in developing countries. During this symposium, efforts to establish research fellowship for graduate students from developing countries were initiated and realistic fund raising plans were discussed. An important feature of Seoul ICM compared to its precedents is that it not only served as an academic event for scholars but also drew extended participation from the general public through various cultural programs.

MENAO 2014

In the evening of the opening ceremony, a public lecture was delivered by the honorary president of the Renaissance Technologies, James Simons, who is renowned for integrating mathematical theories into analyzing the stock market. Simons is also well-known for contributing a large portion of his assets to the advancement of science and education. During his public lecture in front of an audience of 5,000 on the very special role mathematics played in his life, Simons confidently assured that mathematics will be the greatest instrument in the scientific, technological, and economic advancement of the future.

The IMAGINARY exhibition, jointly offered by NIMS of Korea and Mathematisches Forschungsinstitut Oberwolfach of Germany, provided an opportunity for visitors to experience content-centered mathematical concepts through the application of state-of-the-art hardware such as touch panels.

The Bridges conference is the largest-scale mathematics-based international conference integrating mathematics and the arts. Bridges took place at Gwacheon National Science Museum, a subway-ride away from COEX, during the Congress days. It held various events and was visited by more than 50,000 people.

Seoul ICM 2014

2021
- The 10th World Congress in Probability and Statistics
- The 32nd International Symposium on Rarefied Gas Dynamics

2020
- Zoom Algebraic Geometry Marathon

2019
- Birational Geometry, Kaehler-Einstein Metrics and Degenerations: Moscow-Shanghai-Pohang
- Conference in Geometry and Representations
- IBS Symposium on Rare Isotope Sciences
- IBS Workshop on Graph Theory
- Inaugural France-Korea Conference On Algebraic Geometry, Number Theory and Partial Differential Equations
- International Conference on Matrix Theory and Applications
- International Conference on Systems Biology
- International Joint Conference on AI & Data Science
- Mathematical Aspects in Current Quantum Information Theory 2019
- Recent Advances in Nonlocal Kinetic, Fluid, and Diffusive PDEs

2018
- International Workshop on Graph Theory
- Joint Meeting of the Korean Mathematical Society and the German Mathematical Society
- Progress in Several Complex Variables
- The 13th East Asian School of Knot Theory and Related Topics
- Topology in Australia and South Korea

2017
- CMC Distinguished Lecture Series by Terence Tao
- CMC Thematic Program on Many-Body Interacting Systems and Optimal Mass Transport
- Flag Domains and Cycle Spaces
- International Workshop on Computational Mathematics
- PCAM Workshop - Interdisciplinary Workshop on Mathematics and Climate Change
- Sino-Korea Conference on Coding Theory and Its Related Topics
- String Field Theory of Landau-Ginzburg Models
- The 2nd Pan-Pacific International Conference on Topology and Applications
- The 12th ILJU School of Mathematics - Banach Spaces and Related Topics
- The 13th International Workshop on Differential Equations
- The 15th Asian Logic Conference 2017
- The 15th Geometric Topology Fair
- Thematic Program on the Mathematics of Quantum Field Theory
- Thematic Programme on Arithmetic Geometry and Quantum Field Theory

2016
- CMC Workshop on Collective Dynamics of Many-Body Systems and Related Topics
- CMC Winter School on Applied Math and Math. Physics
- International Conference on Inverse Problems and Related Topics
- International Workshop on Graph Theory and Combinatorics
- Mathematical Aspects in Current Quantum Information Theory (MAQIT)
- Mathematical Quantum Field Theory
- The 1st Seoul-Tokyo-Stanford Workshop on Financial Statistics and Risk Management
- The 11th ILJU School of Mathematics - Banach Spaces and Related Topics
- Workshop on Algebraic surfaces and Moduli

Selected list of international meetings in mathematical fields hosted and/or held in Korea

2015
- The 23rd International Conference on Domain Decomposition Methods
- The 27th International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2015)
- Geometry and Physics XIII - Pohang (GAP XIII)

2014
- ICM 2014
- ICM 2014 Satellite Conferences (Classification theory, Dynamical Systems and Related Topics, Geometry on Groups and Spaces, Knots and Low Dimensional Manifolds, Homological Mirror Symmetry and Symplectic Topology, Operator Algebras and Applications)
- From Mechanics to Geometry
- Geometry and Physics of Gauged Linear Sigma Model and Its Related Topics
- Landau-Ginzburg Theory and Fano Varieties
- Optimization and Algebraic Geometry
- The 8th ILJU School of Mathematics - Banach Spaces and Related Topics
- The 9th Pacific Rim Conference on Complex Geometry
- Variational Methods in Nonlinear Elliptic PDE's

2013
- CAU-Kyoto University Joint Workshop on Nonlinear PDEs
- POSTECH(Korea)-NCTS(Taiwan) Joint Workshop on PDEs
- TAPU Workshop on Knot Theory and Related Topics
- The 7th Applied Inverse Problem Conference
- Asian Mathematical Conference 2013
- Thematic Program on Complex Geometry,
- Workshop on Rigidity and Uniformization in Complex Geometry

2012
- International Congress on Mathematics Education 12
- Applied Harmonic Analysis 2012
- Elliptic and Parabolic PDEs and Related Topics
- KIAS International Conference on Coding Theory and Applications

2011
- The 6th China-Japan-Korea International Symposium on Ring Theory

2010
- Model Theory School and Conference in Seoul

2009
- Australia-Korea Mathematical Analysis Forum
- International Symposium on Symbolic and Algebraic Computation
- Joint Meeting of American Mathematical Society & Korean Mathematical Society

IMU group V membership application
of Republic of Korea

kms