

CHANGING THE WORLD
WITH S&T INFRASTRUCTURE, DATA

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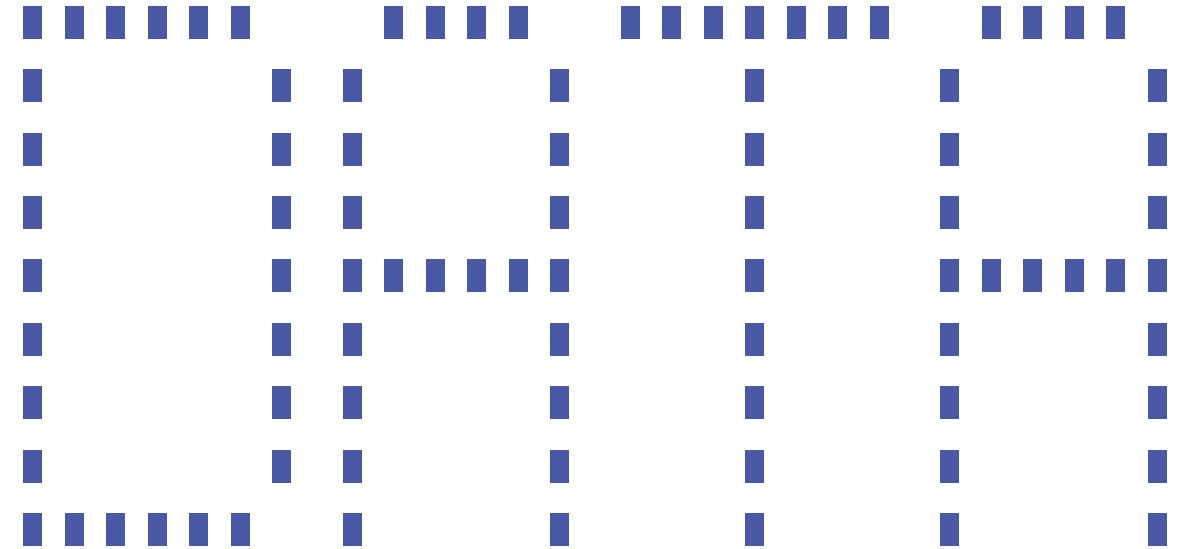


KOREA INSTITUTE OF
SCIENCE AND TECHNOLOGY
INFORMATION

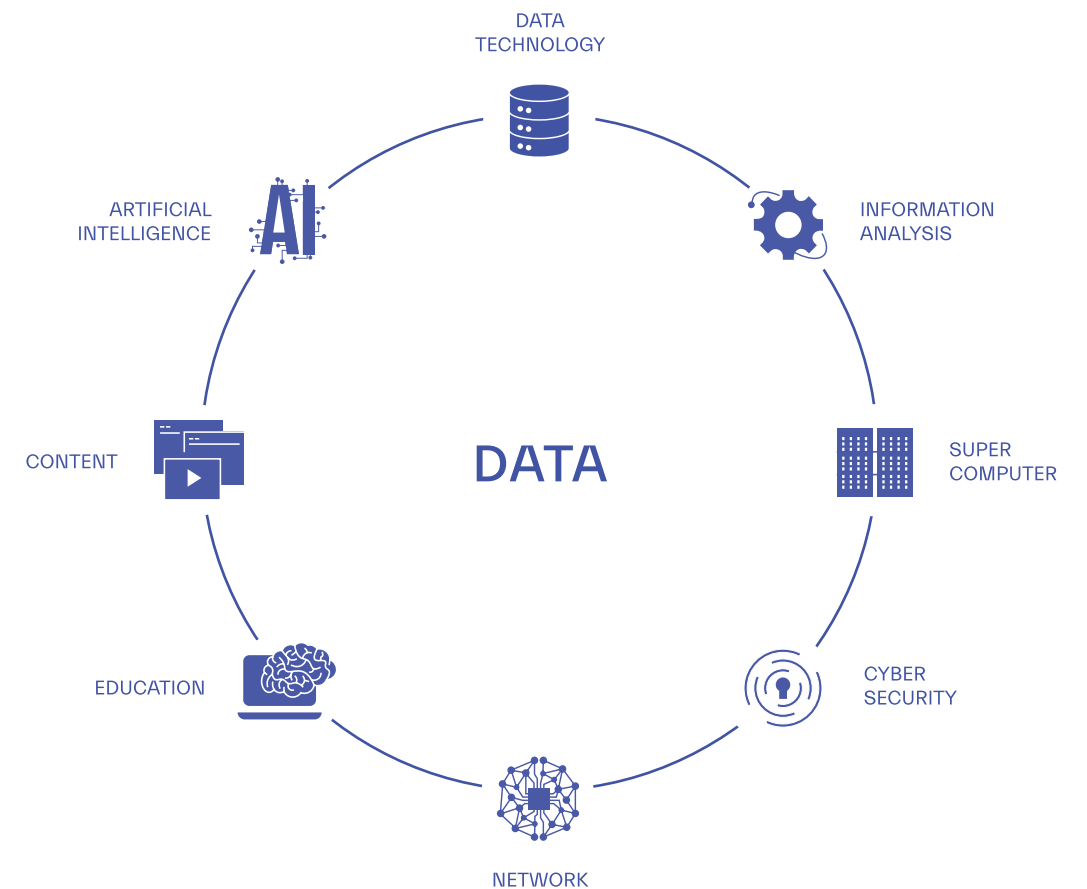


BIG D·X, MORE AGILE

We are facing giant waves of digital transformation.
 In times of chaos, when we cannot see where the road leads and
 where it ends, innovation is a must for survival.
 And the driving force of innovation is data that we all can share and use.
 Changing the world with science and technology infrastructure and data,
 KISTI challenges the status quo and moves with agility
 to respond to digital innovation.



At KISTI, we focus on data. It not only includes “reliable” science and technology information and research data all over the world but also encompasses data processing and distribution, supercomputing, ultra-high-speed research networks, intelligent data analysis, and cybersecurity and data technology for safe data management. These serve as foundations for innovation, contributing to widening the scope of innovation in all areas.



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MESSAGE

Korea is pursuing digital transformation through its Digital New Deal Initiative. The wave of transformation goes beyond the world of business and ripples over every corner of our society, bringing change to the traditional structure of society.

In the era of digital transformation, data serve as core elements for production, along with the existing core elements, i.e., capital, labor, and physical resources. Making the most of data is a national priority to vitalize convergent research in science and technology, find future growth drivers, and make citizens' lives better.

As a national specialist in science and technology information, KISTI offers not only a vast array of data but also convergent science and technology knowledge infrastructure. These include local and international intelligence in science and technology, up-to-the-minute computing resources for data processing, ultra-high-speed research networks that facilitate data circulation, cybersecurity technologies for the safe handling of data, artificial intelligence and software that add more value to data, future analysis based on data, and assistance in data use and distribution.

With these efforts, KISTI played leading roles in the development of the nation's science, technology, and industry, built not only S&T Information infrastructure both locally and internationally but also a data dam of science and technology that will drive the success of the Digital New Deal, and established foundations for the national data ecosystem.

We at KISTI change the world with S&T infrastructure, DATA. Guided by this vision, we aim to take the lead in data-driven R&D innovation and create new value for the nation. We combine public, private, and science and technology data with the advanced infrastructure at KISTI to develop and offer solutions to national agenda and social issues, thereby contributing to the nation's prosperity and citizens' happiness.

We at KISTI will not remain a mere provider of science and technology data to industry, academia, and research institutes. We aim to solidify our position as the chief data officer in the nation's science and technology.

Powered by the agile strategy that empowers us to continue challenging the status quo, we at KISTI are moving faster and more dynamically than ever in our 60-year history.

Thank you.

**Data is the key element to digital transformation.
We will cultivate 'OPEN KISTI' so that
anyone can utilize data at any time.**



President, Kim Jae Soo

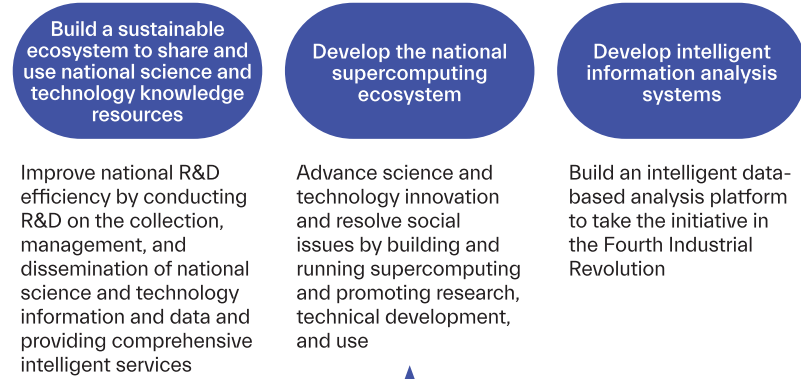
Kim Jae Soo

ROLES AND RESPONSIBILITIES

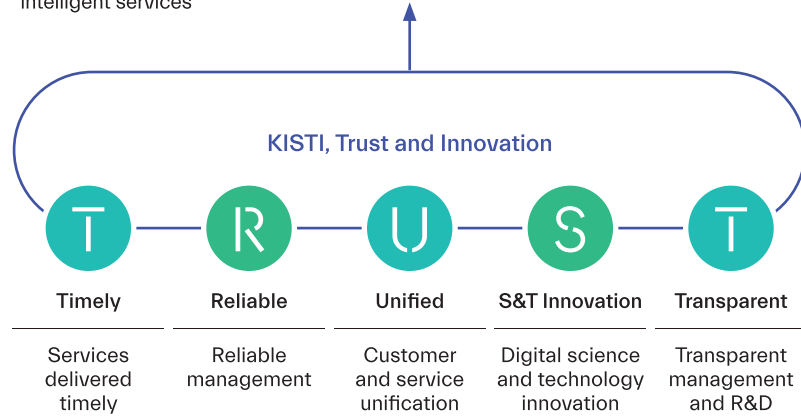
MISSION

As a leading national institute of science and technology information, develop and support core science and technology information resources and knowledge infrastructure and create an open, shared-data ecosystem, thereby contributing to the innovative growth of Korea and the quality of citizens' lives

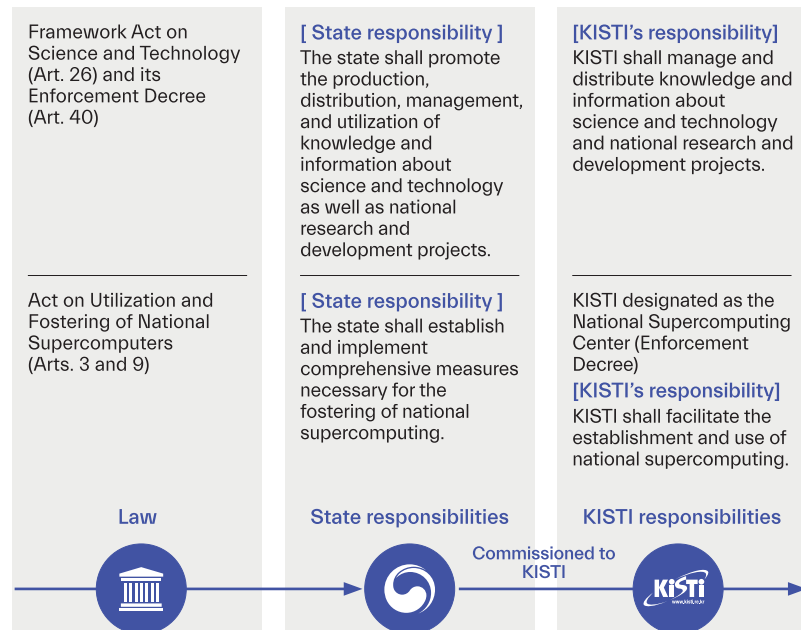
R&R



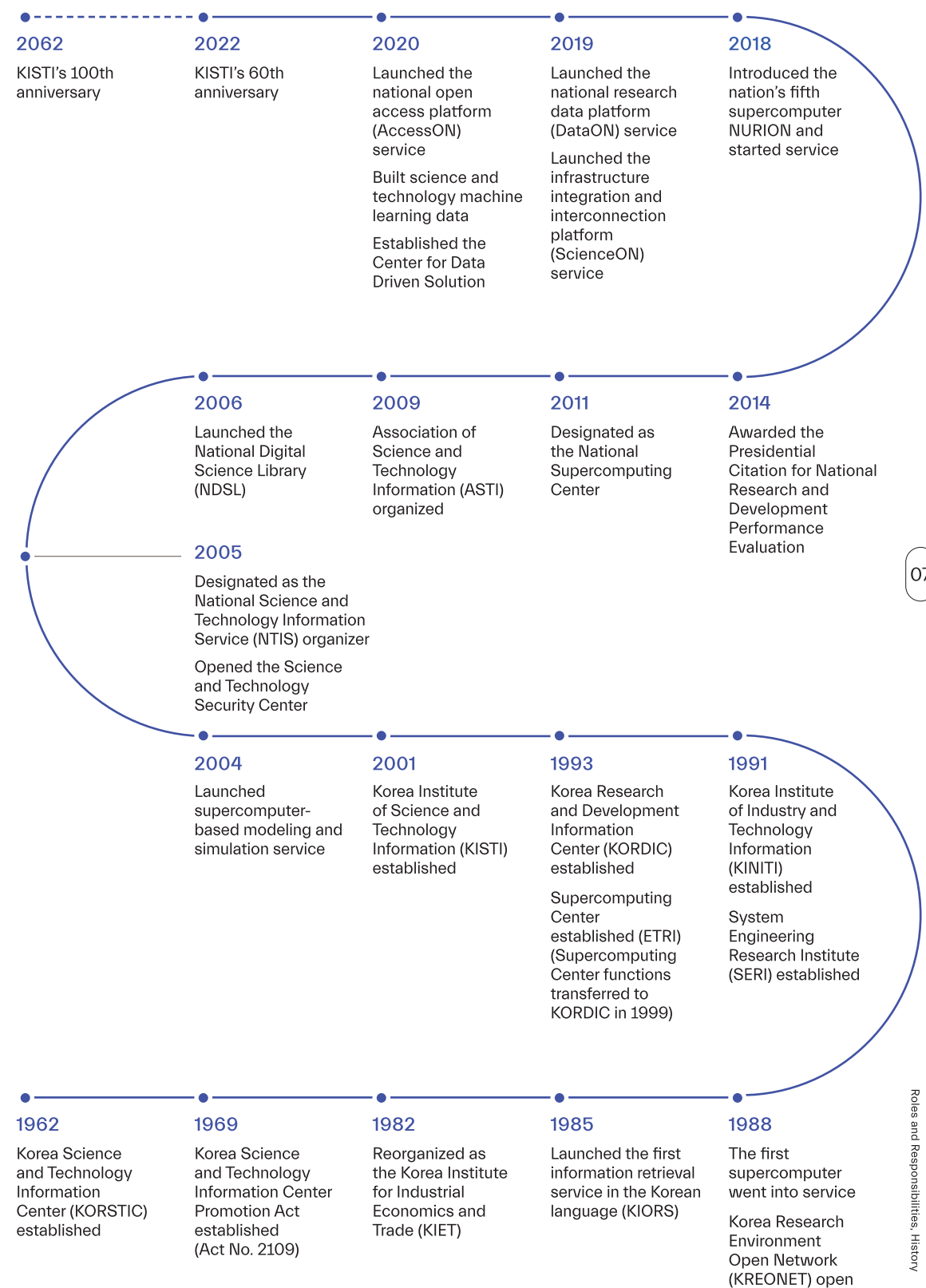
CORE VALUE



KISTI's responsibilities commissioned by the state (Framework Act on Science and Technology)



HISTORY



STRATEGY AND PERFORMANCE GOALS

Develop a digital transformation support system in science and technology to vitalize the national open science ecosystem.

Performance Goals

Digital transformation of science and technology information building and sharing systems	Vitalization of cloud-based national research data sharing and use	Intelligent service platform to strengthen open science services
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Research Accomplishments

<p>Developed the national open access platform (AccessON)</p> <ul style="list-style-type: none"> Secured full texts of papers for national R&D open access (43.8%) 	<p>Built the national research data platform (DataON)</p> <ul style="list-style-type: none"> Data links between 3.88 million studies locally and internationally 	<p>Built and promoted the knowledge infrastructure service platform (ScienceON)</p> <ul style="list-style-type: none"> NTIS as an intelligent service system
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Build environments for the joint use of future-ready supercomputing to take the lead in the nation's supercomputing ecosystem.

Performance Goals

Advance supercomputing infrastructure and service systems	Solve big problems in science, engineering, industry, and public sectors with supercomputing	Build environments for the joint use of supercomputing
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Research Accomplishments

<p>Established plans to build and operate the sixth supercomputer</p> <ul style="list-style-type: none"> Stabilized operations and advanced services of the fifth supercomputer Built a data computing service system based on large research equipment 	<p>Identified and resolved petaflops-(PF) level grand-challenge problems</p> <ul style="list-style-type: none"> Developed a highly parallel numerical library for large-scale computing Developed high-precision simulation-based digital twin-core technology and artificial-intelligence-based simulation platform technology 	<p>Established plans and developed technologies for cloud-based joint use services</p> <ul style="list-style-type: none"> Established plans and developed hardware and software technologies for heterogeneous-architecture-based supercomputing
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Build an intelligent system for convergent analysis of data to vitalize the national science and technology innovation ecosystem.

Performance Goals

Develop science-technology-industry convergent analysis models and provide insights	Build an intelligent R&BD analysis platform for national R&D value creation	Build and vitalize an on-demand regional innovation ecosystem support system
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Research Accomplishments

<p>Analysis platform interlinking data analysis resources used by 1,219 institutions</p> <ul style="list-style-type: none"> Developed 11 future technology sensing models Identified 12 innovation cases using the analysis model 	<p>Developed a model to build a market-centered technology commercialization support system and technical transfer in the public sector</p> <ul style="list-style-type: none"> Developed a packaged R&D investment platform and used it for policy development support 	<p>Support for KISTI family businesses, joint research by knowledge research groups, and support for collaboration with large enterprises</p> <ul style="list-style-type: none"> Developed solutions and launched services for urban disaster management, response to Japanese export restrictions, harmful gas detection in industrial complexes, and early diagnosis of laryngeal cancer
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Build a data-and AI-based digital transformation system for timely response to national and social issues.

Performance Goals

Build a science and technology data dam and develop plans to use it	Resolve national and social issues and create innovative cases based on the digital transformation
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Research Accomplishments

<p>Provided 11 types of science and technology machine learning data and identified 20 models for data utilization</p> <ul style="list-style-type: none"> Data collection in national strategic areas: 200,000 sets for materials, and 80,000 sets for cancer genomes 	<p>Two pilot applications and demonstrations for tailored problem-solving</p> <ul style="list-style-type: none"> Three innovative cases using modeling and simulation based digital engineering, big data, and AI
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DIVISION OF NATIONAL S&T DATA

- Digital Curation Center
- Open Access Center
- Research Data Sharing Center
- Convergence Service Center
- NTIS Center

The Division of National S&T Data focuses on the transition of science and technology R&D in all disciplines to a digital open science system by integrating and opening science and technology information, national R&D information, and research data. To do so, the division develops information management and sharing systems for public access and use of science and technology information, interconnects and expands national science and technology knowledge infrastructure for open research environment, and establishes national research data collection, management, and distribution systems to support national innovation.

R&D/Services

ScienceON

Integrated science and technology knowledge infrastructure service
Provides science and technology information, research data, R&D information service, analysis service, HPC-based service, and system infrastructure, among others.

AccessON

National open access platform
Provides searches for and full texts of open access papers worldwide, online joint authorship for open access publication, and self-archiving for researchers and journals.

NTIS

National science and technology information service
Provides information on national R&D projects including program and project overviews, workforce, research facilities and equipment, accomplishments, etc.

KESLI

Electronic information co-purchasing consortium
Provides academic, research, and industrial institutions with subscriptions to a range of electronic academic research information.

DataON

National research data platform
Aims to improve the efficiency of national R&D investment and research productivity by allowing researchers to search, share, and manage research data both locally and internationally and share and jointly use data with peers.

SAFE

Scholarly ecosystem Against Fake publishing Environment
Provides information on poor local and international academic events and relevant trends to establish a healthy research culture and prevent researchers from being involved in poor research activities.

DOI

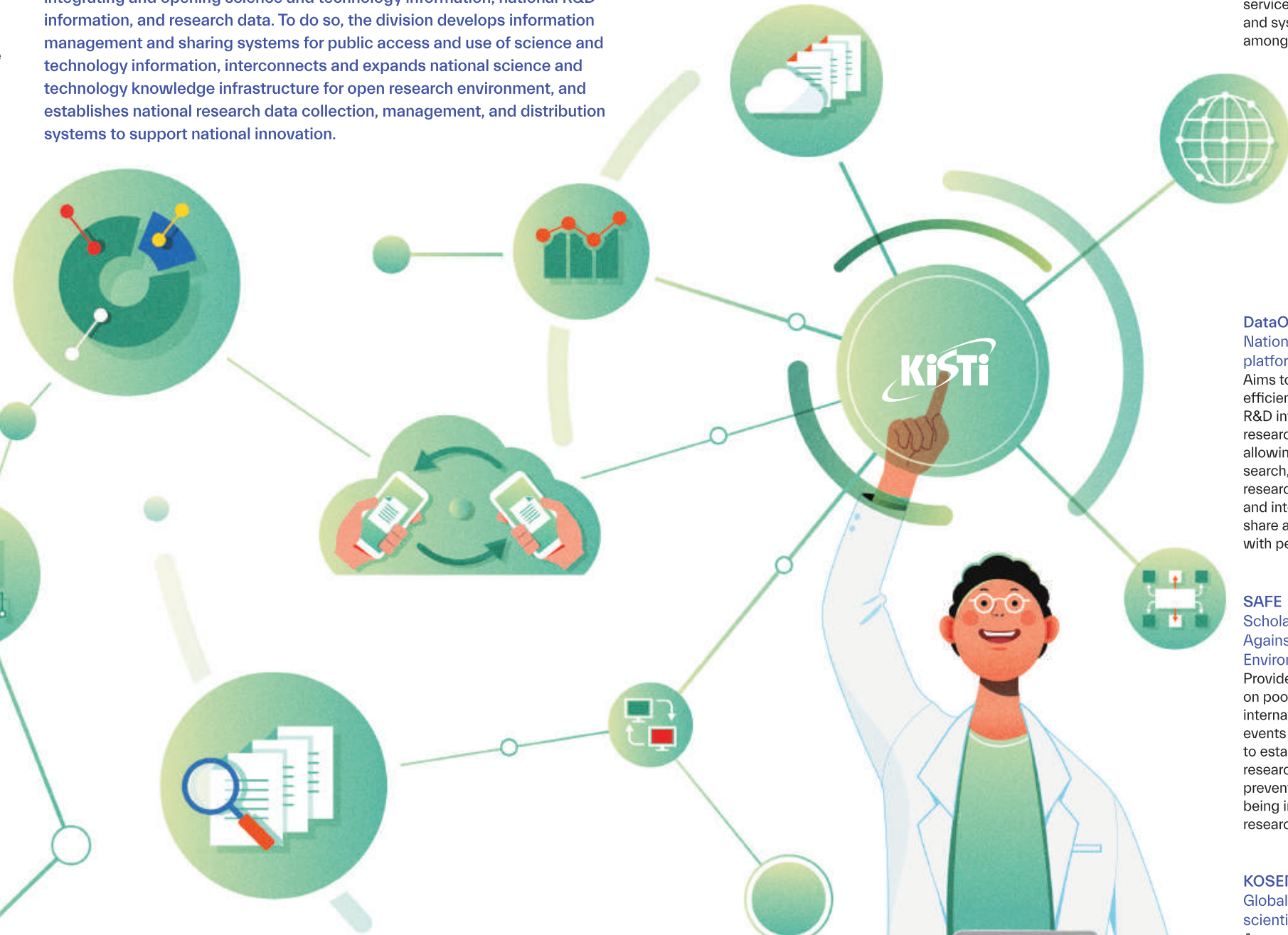
Digital object identifier (DOI) registration agency in Korea
Registers and manages DOIs to facilitate convenient and permanent access to and citation of research content produced in Korea.

KOSEN

Global network of Korean scientists and engineers
A community of Korean scientists and engineers working in 70 countries worldwide. Provides KOSEN reports on the latest research developments, trend reports, and the Q&A service "What is?".

KoreaScience

International circulation of Korean academic journals
An open platform of science and technology information that supports the international circulation of academic papers.



1. MORE OPEN, S&T DATA

DIVISION OF NATIONAL SUPERCOMPUTING

- Center for National Supercomputing Strategy and Policy
- Supercomputing Infrastructure Center
- Global Science experimental Data hub Center
- Supercomputing Application Center
- Intelligent Simulation Center
- Dept. of HPC Convergence R&D Platform
- Center for Supercomputing Technology Development

The Division of National Supercomputing manages the National Supercomputing Center designated by the Ministry of Science and ICT. It focuses on building big science convergent R&D environments based on the national supercomputing infrastructure and data and making thorough preparations for the timely installation of the nation's sixth supercomputer. By taking advantage of KISTI's position as a core data hub, it also pursues innovation toward intensive AI support and the establishment of the KI Cloud that will serve as the platform for the joint use of the supercomputers.

MORE INNOVATIVE, SUPERCOMPUTING



R&D/Services



Nurion
National supercomputing infrastructure
Efficiently builds and systemically manages the national supercomputers for their its sustainable use and establishes foundations for the development of science and technology.

Data computing infrastructure
Environment for the use of big data in large-scale research equipment
Allows Korean researchers to share and analyze large-scale research data without temporal and spatial limits.

KI Cloud
Cloud-based joint use service
Allows not only computational science researchers but also AI and big data researchers to use KISTI's supercomputer Nurion in the cloud environment.

Bio big data
National bio big data environment
Builds a national bio data station and provides bio and medical big data research environments.

M&S
Modeling and simulation technology support
Provides software to predict and demonstrate the performance of products by making and running them in virtual space. Also provides small and medium enterprises with engineering analysis and consulting services for product design and performance tests.

EDISON
Convergent computational science platform
A platform that combines computational science with data/AI to drive innovation in science and engineering R&D including materials, bio, and drug development.

Development of high-performance computing technology
Original technology and foundations for commercialization
Develops core technologies to build ExaFLOPS supercomputers powered by an original processor and combines these technologies with various up/downstream industries.

DIVISION OF DATA ANALYSIS

- Center for Technology Commercialization Research
- Center for R&D Investment and Strategy Research
- Future Technology Analysis Center
- Center for Global R&D Data Analysis
- Five branch Offices Nationwide (Seoul Metropolitan Area, Chungcheong Area, Honam Area, Busan Ulsan Gyeongnam Area, Daegu Gyeongbuk Area)

The Division of Data Analysis develops an intelligent data analysis system to facilitate future predictions, public technology commercialization, and regional R&D and establishes strategies for science, technology, and industry innovation. With these efforts, the division aims to accomplish the following: First, establish a system to respond to global technology issues to adapt to uncertainties in a timely manner. Second, create value in national R&D projects by developing an AI-based R&D commercialization analysis model and an intelligent R&BD analysis platform. Third, facilitate small enterprises' and startups' digital innovation and regional R&D by building on-demand regional R&D innovation support systems and vitalize an innovation ecosystem among industry, academia, research, and government. By doing so, the division supports industrial, academic, research, and government clients' science-based decision-making and provides analytical infrastructure for future predictions, thereby playing leading roles in the digital economy and society.



MIRIAN
A new technology dynamics analysis platform
Provides experts, whether they work in industry or academia, with the latest science and technology trend information and organized intelligence on promising future technologies.

**MORE EFFECTIVE,
DATA ANALYSIS**

R&D/Services

3.

COMPAS
Competitive intelligence analysis service
A repository of information on global competition and activities, including opportunities and threats, and competitors' technologies. Powered by large-scale information sources for R&D decision-making support such as papers and patents.

TOD
Technology opportunity analysis service
Provides ideas for companies' new business and product development, for example, user-based promising product exploration, competitor benchmarks, and product-technology relation analysis.

SmartK2C
Data-based technology commercialization platform
A web-based automated technology commercialization advisor that supports businesses' efforts for technology commercialization based on scientific methods and models.

KMAPS
Industry and market intelligence system
Automatically analyzes and provides key intelligence including market value estimates and prospects in major countries including the USA and Korea, up/downstream industrial structure analysis, competition landscapes, etc.

ASTInet
Association of Science and Technology Information
As a knowledge ecosystem built by KISTI, ASTInet creates a virtuous cycle that connects academia and industry and supports small and medium enterprises' technical development and commercialization.

StarValue
Technology valuation system
Calculates the economic value of candidates of technical transfers or commercialization in monetary value and conducts in-depth evaluations using income, market, and cost approaches to determine appropriate license fees or contribution ratios.

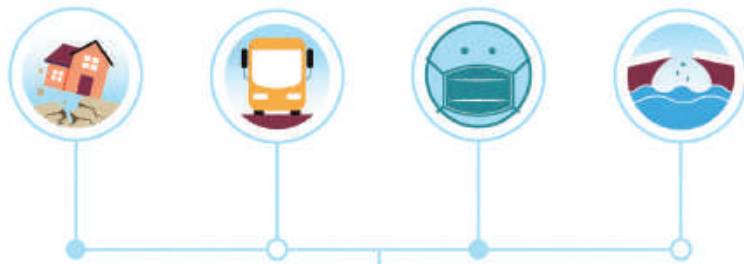
R&D PIE
Packaged R&D investment platform
An investment analysis system that manages and assesses R&D projects pursued by different government ministries and organizes workforce development, institutional improvement, and other measures into a single policy package.

DIVISION OF S&T DIGITAL CONVERGENCE

- KREONET Center
- Science and Technology Cyber Security Center
- Dept. of Datacentric Problem Solving Research
- Dept. of Machine Learning Data Research
- AI Technology Research Center
- Science Data Education Center
- Dept. of Information Strategy

Aiming to assist with the government's science and technology policy and develop a system to fulfill KISTI's roles and responsibilities effectively, the Division of S&T Digital Convergence centralizes the institute's data, network, and AI capabilities and underpins the digital transformation of science and technology. The highlights of its activities include building the "data dam" as a core element of the "Digital New Deal" finding data-based solutions to national and social issues, migrating its science and technology information services to cloud environments, fostering human resources for AI-big data convergence, and making science and technology data even more accessible to all based on the advanced national science and technology research network (KREONET) and cybersecurity technologies for mega-interconnectivity.

MORE RELIABLE, DIGITAL CONVERGENCE



R&D/Services

KREONET
 Korea Research Environment Open Network
 A world-class national research network that provides a safe and secure environment where major research institutes in industry and academia access up-to-the-minute research equipment including supercomputers, research big data, and peer researchers both locally and internationally.

GLORIAD
 Global Ring Network for Advanced Applications Development
 A high-performance global research network that directly connects to more than 36,000 international research networks in North America, Latin America, Europe, Asia, and Oceania for data-centric cooperative research.

S&T CSC
 Science and Technology Cybersecurity Center
 Ensures 24/7 uninterrupted security for KREONET, prevents damages from cyberattacks, and safeguards information systems and data possessed by state agencies.

Machine Learning Data
 Shares and uses machine learning data in large-scale science and technology research and supports problem-solving with the aim to take the lead in the data economy through AI-based technology innovation and contribute to the nation's digital transformation.

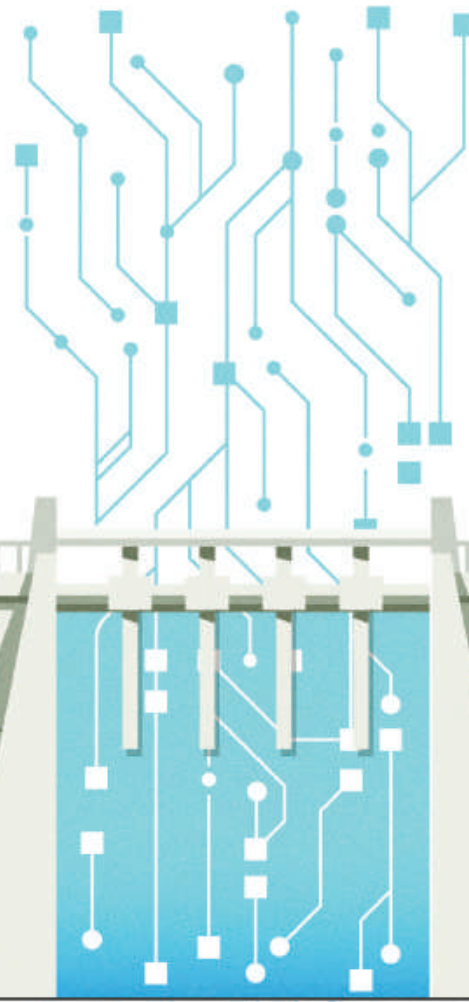
Data-based Smart City
 Uses AI to analyze data collected from local governments and harnesses the power of KISTI's AI and supercomputing technologies and data analysis capabilities to develop solutions to safety problems in citizens' daily lives.

Science Data Education
 Takes advantage of KISTI's strength to develop and offer data, HPC (supercomputing), and AI education, foster future-leading professionals, and develop and disseminate online and offline educational content.

AI Technology Research
 In-depth AI research and knowledge building with the aim to strengthen KISTI's AI capabilities for its future development.

Department of Informatization Strategy
 Builds and manages cloud information infrastructure as a core element of the digital transformation and pursues establishing a public cloud center for sustainable and safe services for the science and technology ecosystem.

Development of quantum encryption communication network technologies
 Researches and develops quantum encryption communication network technologies in proactive response to the lack of physical-layer security in existing optical communications and threats to existing encryption technologies with the aim to safeguard core research data stored in KREONET and different institutions' databases.



KISTI SERVICES

Powered by robust science and technology infrastructure including world-class data and supercomputing, KISTI runs a range of services to contribute to the promotion of the nation's science and technology and the development of relevant industries.

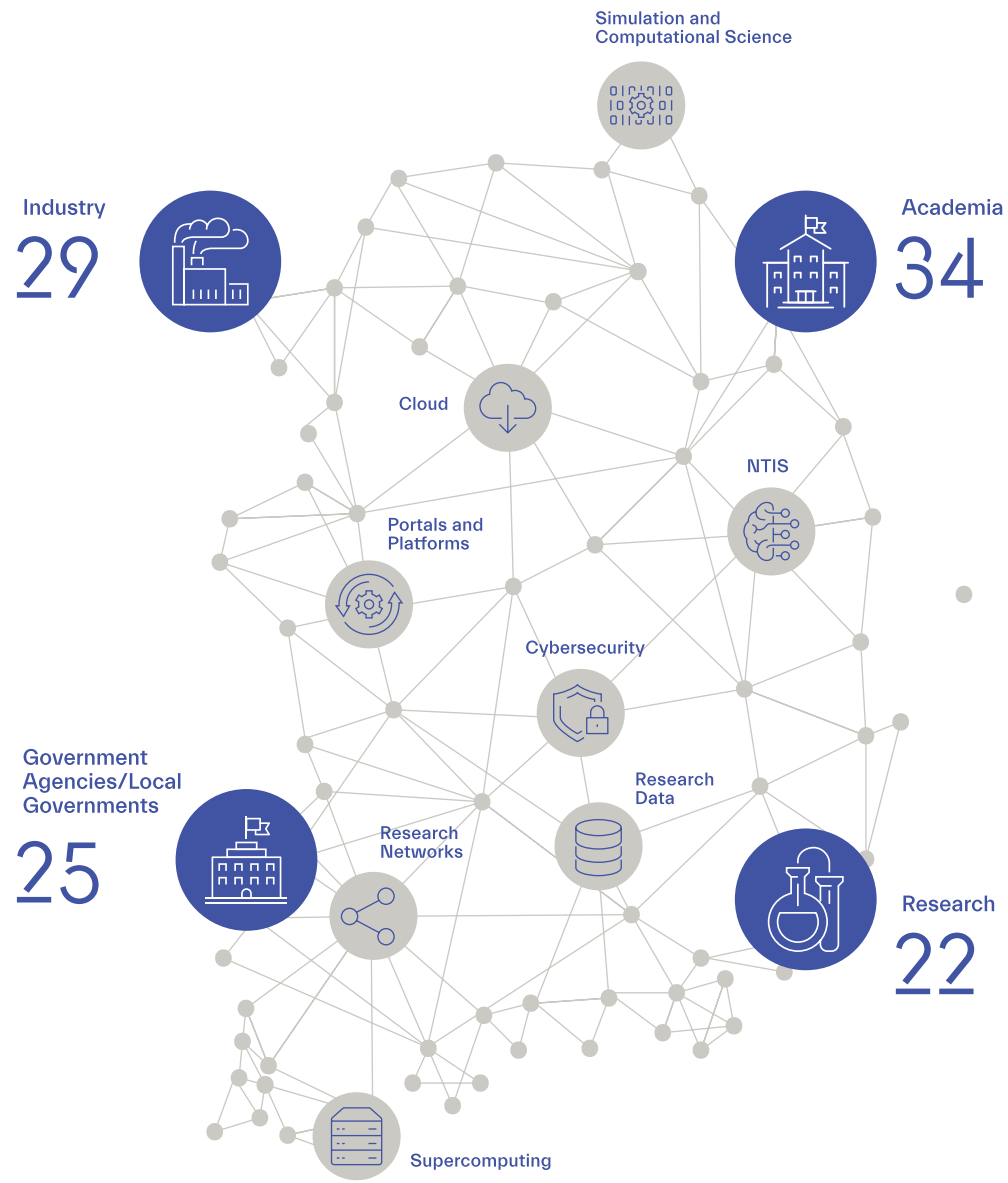
scienceon.kisti.re.kr
SCIENCE ON

KISTI's ScienceON is an intelligent science and technology knowledge infrastructure service that combines science and technology information, national R&D information, research data, analytical data, and supercomputing environments to empower researchers' R&D activities.



DOMESTIC COOPERATION

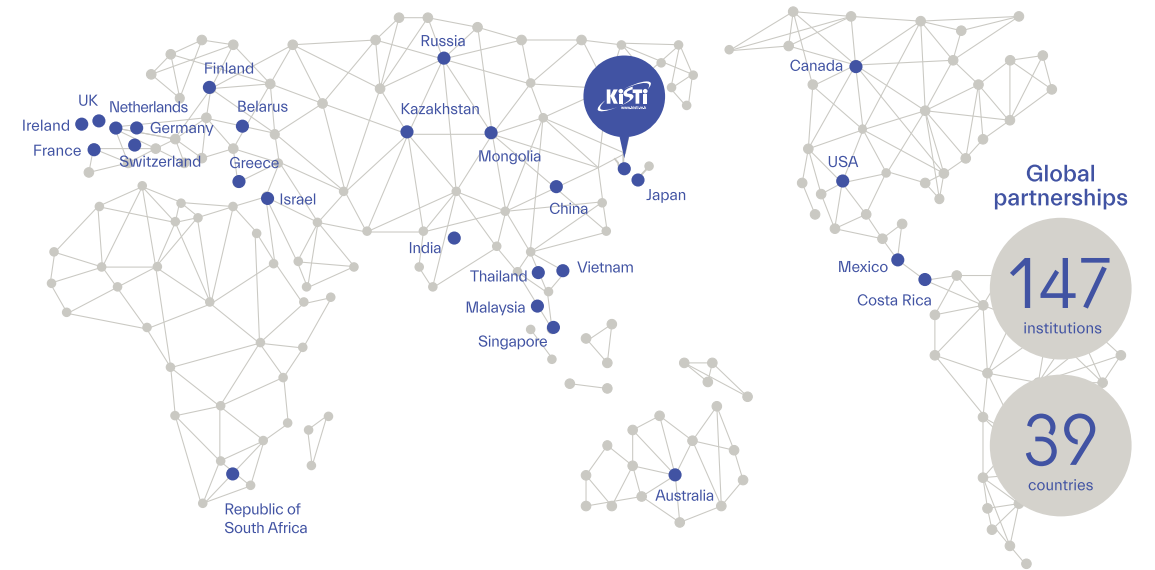
KISTI has strategic alliances with industry, academia, research, and government agencies in Korea and provides with Korea's largest science and technology knowledge base and world-leading infrastructure to help them realize regional innovation and pursue multifaceted exchange and cooperation to resolve regional issues.



As of Oct, 2021

INTERNATIONAL COOPERATION

KISTI works closely with leading research institutes around the world, including joint research and data exchange, to widen its international network further and strengthen its research capabilities.



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|---|--|--|
| <p>NTIS</p> <ul style="list-style-type: none"> Ministry of Science, Technology and Telecommunications, Costa Rica Belarusian Institute of System Analysis, Belarus | <p>Supercomputing</p> <ul style="list-style-type: none"> National Center for Supercomputing Applications, USA Tsukuba University, Japan | <p>Disaster Safety</p> <ul style="list-style-type: none"> Rutgers, The State University of New Jersey, USA |
| <p>Research Data</p> <ul style="list-style-type: none"> Athena Research and Innovation Center, Greece Australian Research Data Commons, Australia National Institute of Informatics, Japan National Institute of Information and Communications, Japan | <p>Hyperscale Research Data</p> <ul style="list-style-type: none"> European Organization for Nuclear Research (CERN), Switzerland Glasgow University Court, UK Ontario Institute for Cancer Research, Canada | <p>Digital Content Curation</p> <ul style="list-style-type: none"> Digital Curation Center, UK |
| <p>Cybersecurity</p> <ul style="list-style-type: none"> National Institute of Informatics, Japan National Institute of Information and Communications, Japan | <p>Research Network</p> <ul style="list-style-type: none"> Computer Network Information Center (CNIC), Chinese Academy of Sciences (CAS), China Internet2, USA | <p>Academic Papers and Resources</p> <ul style="list-style-type: none"> Japan Science and Technology Agency, Japan |

PROMOTING SCIENCE CULTURE

KISTI spares none of its knowledge and infrastructure to help the public understand science and familiarize themselves with science as part of culture. Science experiences and career development programs at KISTI include science lectures, educational donations, experiments and practices, and science content published in the Scent of Science.

Programs for Science Culture Promotion

- Welcome to KISTI
- Rainbow Talks
- Science Camps
- Convergent Job Training for Science Teachers
- Dream Makers
- Science Exhibitions

Scent of Science

Showing examples of science in everyday life, the Scent of Science provides scientific stories and useful scientific information through a variety of online and offline content.

scent.kisti.re.kr



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