Contact List

Content	Contacts	E-mail	TEL	FAX
Kakenhi (P.19)/ Collaborative Research Promotion (P.20)/ Industry-Government-Academia Collaboration (P.22)/ Academic Guidance by Researchers (P.23)	Planning Division, Office for Social Collaboration, Collaboration Support Team	kaken@nii.ac.jp	03-4212-2170	03-4212-2120
Intellectual Property (P.21)	Planning Division, Office for Social Collaboration, Big Project and Intellectual Property Team	chizai_web@nii.ac.jp	03-4212-2124	03-4212-2120
TopSE (P.23)	GRACE Center	general@topse.jp	03-4212-2729	03-4212-2697
International Exchange (MOU) (P.24)/ (NII International Internship Program) (P.25)	Planning Division, International Affairs and Education Support Team	international@nii.ac.jp	03-4212-2165	03-4212-2150
International Exchange (NII Shonan Meeting) (P.26)	NII Shonan Meeting Administrative Office	shonan@nii.ac.jp	03-4212-2165	03-4212-2150
International Exchange (DAAD/JFLI) (P.27)	Planning Division, International Affairs and Education Support Team	international@nii.ac.jp	03-4212-2165	03-4212-2150
Graduate Education (P.28)	Planning Division, International Affairs and Education Support Team	daigakuin@nii.ac.jp	03-4212-2110	03-4212-2150
Science Information Network (P.32)	Academic Infrastructure Division, SINET Promotion Office	support@sinet.ad.jp	03-4212-2269	03-4212-2270
Supporting the Introduction of Cloud Computing (P.35)	Academic Infrastructure Division, Cloud Promotion Team	cld-office-support@nii.ac.jp	03-4212-2212	03-4212-2230
Authentication Infrastructure (P.36)	Academic Infrastructure Division, Academic Authentication Systems Office	gakunin-office@nii.ac.jp	03-4212-2215	03-4212-2230
Support of Inter-University Collaboration-based Information Security Framework (P.37)	Academic Infrastructure Division, NII-SOC Team	soc-office@nii.ac.jp	03-4212-2236	03-4212-2230
CiNii (P.38)	Scholarly and Academic Information Division, CiNii Desk	ciniiadm@nii.ac.jp	03-4212-2300	03-4212-2370
Institutional Repositories (P.39)	Scholarly and Academic Information Division, Institutional Repository Desk	ir@nii.ac.jp	03-4212-2350	03-4212-2375
Catalog Information Service (NACSIS-CAT/ILL) (P.40)	Scholarly and Academic Information Division, CAT/ILL Desk	catadm@nii.ac.jp	03-4212-2310	03-4212-2375
SPARC Japan (P.41)	Scholarly and Academic Information Division, SPARC Desk	sparc@nii.ac.jp	03-4212-2351	03-4212-2375
Education and Training Service (P.41)	Scholarly and Academic Information Division, Education and Training Desk	edu@nii.ac.jp	03-4212-2177	03-4212-2370
Open Science (P.43)	Research Center for Open Science and Data Platform	rcos-office@nii.ac.jp		
NII Library (P.45)	Scholarly and Academic Information Division, Library Desk	library@nii.ac.jp	03-4212-2142	03-4212-2180
Public Relations (P.46)	Planning Division, Publicity Team	kouhou@nii.ac.jp	03-4212-2145	03-4212-2150
News Releases/Media Relations (P.47)	Planning Division, Publicity Team/ Media Relations Desk	media@nii.ac.jp	03-4212-2164	03-4212-2150
Facilities/Location (P.52)	General Affairs Division, General Affairs Team	soumu@nii.ac.jp	03-4212-2000	03-4212-2035

NII Inter-University Research Institute Corporation / Research Organization of Information and Systems National Institute of Informatics

National Center of Sciences Bldg.
2-1-2 Hitotsubashi, Chiyoda-ku, Tokyo 101-8430
TEL: +81-3-4212-2000
https://www.nii.ac.jp/en/

NII 2018

Inter-University Research Institute Corporation / Research Organization of Information and Systems

National Institute of Informatics

Contents

Top Message

Masaru Kitsuregawa
Director General, National Institute of Informatics
Research Organization of Information and Systems

As Japan's only general academic research institution focusing on informatics, the National Institute of Informatics (NII) is advancing a full spectrum of research with a long-term view in mind, ranging from basic research to practical, hands-on research aimed at solving societal problems. At the same time, as an inter-university research institute, we are working to develop and provide a state-of-the-art academic-information infrastructure, as well as academic content and services that are critical to the research and educational activities of the academic community as a whole.

As we engage in activities that embrace both research and business, one of the most revolutionary innovations that NII has introduced is the Science Information NETwork (SINET), a network that links universities and research institutes from all over Japan in the form of SINET5, which achieves a speed of 100 gigabits per second (Gbps). Our accomplishments in creating a network that connects every single one of Japan's prefectures at a speed of 100 Gbps, forming one of the most powerful networks anywhere in the world, carries deep significance for Japan's academic community. After getting the network was up and running, we put another two years into making SINET5 even more robust, and in fiscal 2018, we will be boosting our network lines in Europe to 100 Gbps in response to strong hopes for this improvement. At the same time, we plan to strengthen and augment our US network lines from the Atlantic Ocean. Other plans include expanding from fixed networks to mobile networks, a move aimed at providing support for the development and expansion of diverse research in IoT.

In fiscal 2017, with support from the Japan Agency for Medical Research and Development (AMED), we worked together with the Japan Gastroenterological Endoscopy Society, the Japanese Society of Pathology, the Japan Radiological Society, and the Japanese Ophthalmological Society to build a cloud infrastructure for medical image big data, and established the Research Center for Medical Bigdata in order to promote the development of AI technology capable of image recognition, that will support medical care. The expectation is that medical images will continue to grow in volume in the future, and it goes without saying that a super high-speed network capable of 100 Gbps will play a vital role in compiling data for those images.

The trend toward open science is also accelerating, and the spotlight is focused on the handling of research data, in particular. Studies by the Cabinet Office, the Ministry of Education, Culture, Sports, Science and Technology, and the Science Council of Japan have proceeded to the point where the NII is now ready to take over and shift from the study stage to the realization of outcomes. With that aim in mind, we are now promoting international partnerships and areconstructing a testbed, with verification testing already underway in step with a number of research institutions. Given the diversity of academic fields, we are still finding our footing, but with the world already well into the "Age of Data", we hope to get the system in place and running as quickly as possible.

With more and more networks being created, obviously the foremost issue is security. At NII, we have been working since fiscal 2017 on a project to build an infrastructure for an information security system based on university partnerships. Over time, the effectiveness of the project has become increasingly visible. Because networks are constantly under attack, administrators need to be able to respond with lightning-fast rapidity, and we will continue to work on improvements in conjunction with our university partners.

We at NII are also putting much effort into endeavors with industrial and academic partnerships. In 2016, we launched the Research Center for Financial Smart Data with support from Sumitomo Mitsui Asset Management Company, Limited. We also established our Cognitive Innovation Center with support from IBM Japan, Ltd. In fiscal 2018, we established our new Research Center for Robust Intelligence and Social Technology, in partnership with LINE Corporation. We will continue to promote industrial and academic partnerships, and to engage in research and development aimed at finding diverse solutions, hand in hand with industry, as AI enters a new stage.

Along with projects such as SINET, NII also carries out practical, hands-on research that we hope to actually implement in society, with the aim of contributing to basic research in informatics and to the growth and development of society, making us a unique organization from a global standpoint. Naturally, the "by IT" component is important, but we also want to build a robust, flexible research system that maintains a balance between the "by IT" side and basic research in IT itself, as the "of IT" component. In fiscal 2017, with Associate Professor Ichiro Hasuo heading the ERATO project for the Japan Science and Technology Agency (JST), we established our Global Research Center for Systems Design and Mathematics, and through the Center, NII has been supporting basic research in software to promote the ERATO project. In the future, we intend to continue making basic research a focal point of our endeavors.

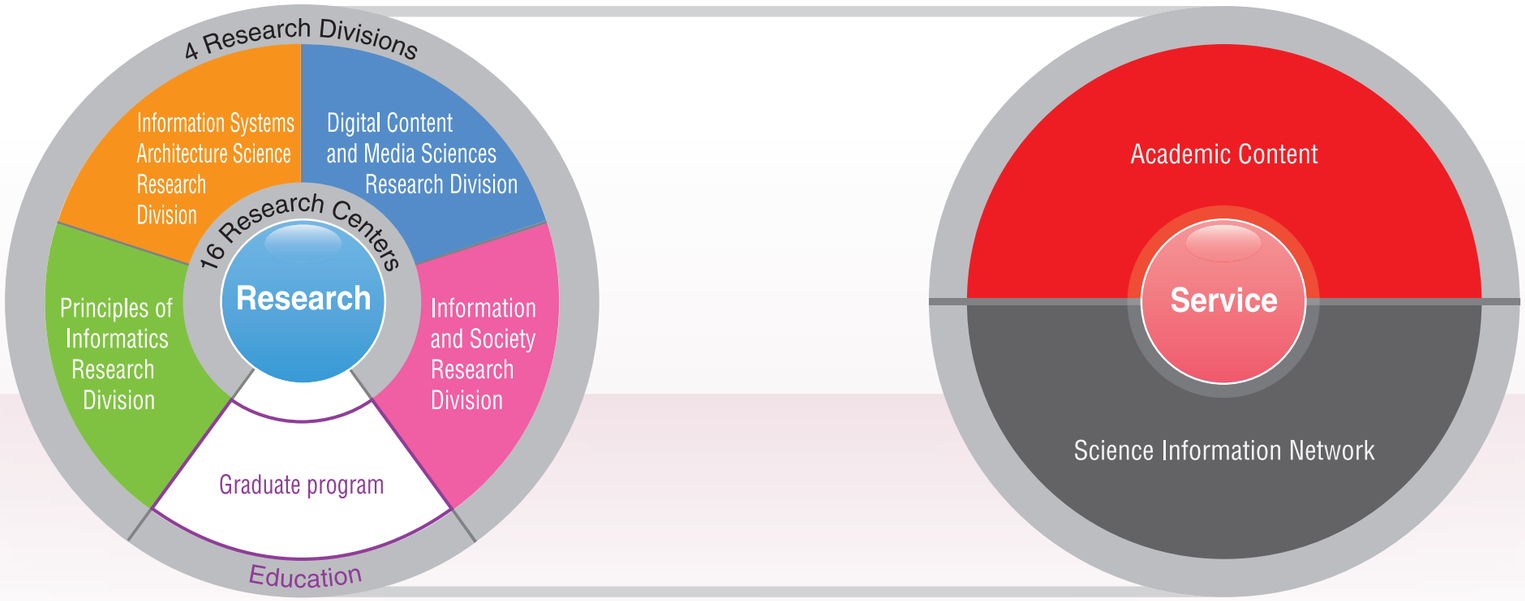
We are moving back to the basics and redoubling our efforts under the banner of "Think Together, Create Together".

We hope that you will kindly read the report of NII's research and business endeavors and give us various feedback and opinions. We sincerely ask for and appreciate your continued support of our activities.

Weaving Information into Knowledge

Informatics to Create Future Value on the Wheels of "Research" and "Service"

The National Institute of Informatics (NII) is Japan's only general academic research institution devoted to creating future value in the new discipline of informatics. From the basic methodology of informatics to cutting-edge themes such as artificial intelligence, Big Data, the Internet of Things (IoT), and information security, NII pushes forward with fundamental research valued from a long-term view as well as practical studies aimed at resolving current social problems.
NII is building and operating essential research and education information infrastructures for Japan's academic community, including the SINET5 (Science Information NETwork 5), while expanding and cultivating services such as the provision of academic content and service platforms. We are also offering services that utilize state-of-the-art technology by providing mutual feedback on the expertise gained through operations as well as from research.
NII uses these activities in its efforts to train talent and contribute to society at large, while also administering vital collaborative ties to private enterprise in addition to our connections with foreign/domestic universities and research institutions.
The National Institute of Informatics also is committed to providing graduate education that promotes creative, world-class scientific research with the aim of pioneering the development of leading-edge disciplines.



Research

Integrated Research from Basic Methodology to State of the Art

"Informatics" combines not only technologies like computer science and information/communications engineering but also the humanities, social studies, and the life sciences. This new academic domain involves every aspect of society. NII has established four basic Research Divisions—namely, Principles of Informatics, Information Systems Architecture Science, Digital Content and Media Sciences, and Information and Society—plus 16 Research Centers charged with systematically accomplishing specific tasks. From the basic methodology of informatics to state-of-the-art artificial intelligence, Big Data, the Internet of Things (IoT), and information security, NII advances the integration of research. We are also using our strengths even in graduate education to foster new leaders of an advanced information society.

Service

Services to Support Research Infrastructure and Education

NII coordinates with academic institutions and the research community. For starters, it built and now operates the Science Information NETwork (SINET5), the world's most-advanced, high-speed network linked to domestic and international sites. NII furthers the construction and provision of academic authentication infrastructure, Adoption and Support for Use of Cloud Systems, development of Research Data management platform, development of academic contents platforms in addition to the advancement of other utilize platform. Security Systems Grounded on Inter-University Collaboration, we also contribute to the building of systems to enable national universities and other academic institutes to respond rapidly to security incidents. In addition, NII strives to contribute to improving the international competitiveness of education research, accelerating studies on leading-edge topics, developing interdisciplinary programs, promoting more efficient research, and enhancing the functions of universities.

Graduate Program

Fostering New Leaders of an Advanced Information Society

Graduate education at the National Institute of Informatics involves (1) participation in courses at SOKENDAI (The Graduate University for Advanced Studies), (2) cooperation with other graduate schools, or (3) acceptance of special joint research fellows. SOKENDAI is the first graduate university in Japan established to push original, world-class scholarly research beyond the borders of conventional disciplines and to open up new paths of scientific inquiry. The National Institute of Informatics (NII) offers 3-year and 5-year Ph.D. course within SOKENDAI, in which it constitutes the Department of Informatics. Six areas of instruction are covered: fundamentals of information science, information infrastructure science, software science, information media science, intelligent systems science, and information environment science. These areas break out into more than 70 class subjects. The department is pleased to accept talented people from overseas by offering courses such as many English-language lectures as well as scholarship programs unique to each major. Working students account for around 20 percent of registered students.

Collaboration with Industry, Government, and Academia

While engaged in pragmatic research and development aimed at resolving social problems, NII promotes collaboration with industrial, governmental, and academic entities to find ways of implementing the fruits of research. Public appeals go out to universities, private-sector institutions and municipalities for investigative partnerships. NII's efforts include cultivating cybersecurity talent, advising academia via researchers (consulting), and supporting cooperative supplementary schools that encourage the collaborative approach by providing information gathered on the frontiers of research.

International Exchange

At NII, Global Liaison Office (GLO) was established to systematically promote international research exchange activities with foreign universities and research institutes. Its main roles are such as conclusion of international Memoranda of Understanding (MoU), enforcement of MOU Grant (Research Exchange Grant Program), and NII International Internship Program. NII also holds "Shonan Meetings", where the world's top-class researchers get together to have intensive discussions on the field of informatics by staying in a training-camp-style. NII is actively accepting researchers through German Academic Exchange Service (DAAD) and Japanese-French Laboratory for Informatics (JFLI) as well.

Research Divisions

NII advances research in the wide-ranging discipline of informatics through four core research divisions, which are the Principles of Informatics Research Division, the Information Systems Architecture Science Research Division, the Digital Content and Media Sciences Research Division and the Information and Society Research Division. Each conducts research ranging from basic to apply in its particular area.

Principles of Informatics Research Division

Senior Researcher: Takeaki Uno

We explore new principles and theories relevant to informatics, including algorithms and complexity theory, artificial intelligence, robotics, and quantum computing, and conduct research aimed at opening up new fields of study and developing new technologies that will support society in the future.

Fields of Research

Algorithms, artificial intelligence, machine learning, deep learning, big-data analysis, data mining, mathematical modeling, numerical analysis, computing science, Web informatics, neuroscience, quantum information, and leading-edge research with potential to discover new principles and theories at the frontiers of these areas or to create new applications.

Information Systems Architecture Science Research Division

Senior Researcher: Zhenjiang Hu

Conducts research on software and hardware architecture ranging from establishing innovative technologies to implementing practical systems, with the aim of improving the performance, quality, and sophistication of the computers and networks that form the basic components of IT.

Fields of Research

Post Internet, cyber-security infrastructure, software/hardware architecture, distributed cloud computing, programming languages, system performance and log analysis infrastructure, dependable systems, Internet of Things (IoT), and network/cloud visualization research.

Digital Content and Media Sciences Research Division

Senior Researcher: Atsuhiro Takasu

Conducts research on the analysis and creation of content and media, including code media and pattern media, basic technology for storing, retrieving, and organizing content, and the analysis of social media and interaction focusing on people and information.

Fields of Research

R&D related to natural language processing, computer vision, image processing, acoustical information processing, computer graphics, databases, human interaction, Web mining, social media, community analysis, media clone generation/recognition, machine learning, deep learning applications, etc.

Information and Society Research Division

Senior Researcher: Isao Echizen

Conducts interdisciplinary research combining information and systems technology with human and social sciences for logical decision making based on scientific data in a "cyber-physical integrated society", where the information world is integrated and linked with the real world.

Fields of Research

R&D related to protection and use of privacy information, next-generation anonymization, data governance, next-generation IR infrastructure theory, data policy theory, data use personnel development theory, digital communities, IT healthcare, data reliability evaluation, crowd sourcing, sharing economy, digital education, and open innovation platforms, and research in humanities and social sciences related to these topics.

Research Centers

To respond quickly to important social issues, NII has removed boundaries in our research system and established 16 research centers, building a system that enables researchers that have different specialties to focus research in specific fields with collaboration across fields.

Services and Operations

Research and Development Center for Academic Networks
https://www.nii.ac.jp/en/research/centers/network/

This center develops and delivers new services and functions to enhance the capabilities and efficiency of the Science Information Network (SINET): a crucial backbone network for more than 850 universities and research institutes in Japan.

Director: Shigeo Urushidani, NII Deputy Director General/Professor, Information Systems Architecture Science Research Division

Center for Global Research in Advanced Software Science and Engineering
http://grace-center.jp/?lang=en

This center is dedicated to the integration of research, implementation, and education aimed at developing twenty-first-century software infrastructure, through collaboration with both Japanese and international research institutions, as well as through industry–academia collaborations. It also aims to cultivate world-class researchers and technologists to serve as a nucleus for next-generation efforts in this field.

Director: Shinichi Honiden, NII Project Professor

Center for Cloud Research and Development
https://www.nii.ac.jp/en/research/centers/ccrd/

This center promotes research and education utilizing IT by promoting R&D in collaboration with universities and other research facilities, aimed at providing state-of-the-art academic information infrastructure utilizing cloud technologies on the Science Information Network (SINET).

Director: Kento Aida, Professor, Information Systems Architecture Science Research Division

Center for Cybersecurity Research and Development

Through R&D that leverages knowledge acquired from the creation and operation of academic information infrastructure, this center helps to ensure the security and operational efficiency of university research environments in cyberspace and to cultivate human resources in collaboration with universities.

Director: Hiroki Takakura, Professor, Information Systems Architecture Science Research Division

Research Center for Knowledge Media and Content Science

This center pursues advanced research on the analysis and extraction of knowledge from academic papers and other academic content, as well as empirical R&D for promoting the distribution of academic knowledge.

Director: Akiko Aizawa, NII Acting Director General/Deputy Director General/Professor, Digital Content and Media Sciences Research Division

Research Center for Community Knowledge

This center conducts practical R&D promoting next-generation information sharing, including activities focusing and analyzing processes that form shared knowledge between people and other people or machines, and that disseminate research results.

Director: Noriko Arai, Professor, Information and Society Research Division

Center for Dataset Sharing and Collaborative Research
https://www.nii.ac.jp/en/research/centers/dsc/

This center develops useful datasets for informatics research and makes them available to researchers. In addition, it conducts R&D on the creation of datasets and on systems for their utilization, and promotes joint usage and research in informatics.

Director: Keizo Oyama, Professor, Digital Content and Media Sciences Research Division

Research Center for Open Science and Data Platform
https://rcos.nii.ac.jp/en/

This center conducts R&D on an infrastructure which allows researchers to manage, publish and search research data. The R&D is conducted in collaboration with universities and research centers in Japan and serves the paradigm shift to Open Science in Japan.

Director: Kazutsuna Yamaji, Professor, Digital Content and Media Sciences Research Division

Big Research Projects

Global Research Center for Quantum Information Science
https://qis1.ex.nii.ac.jp/qi/

As an international hub for advanced research on quantum information science and technology, this center promotes quantum information science and explores the potential of quantum information technologies. Also educates international personnel who will lead medium-to-long-term research focused on specific goals.

Director: Kae Nemoto, Professor, Principles of Informatics Research Division

Global Research Center for Cyber-Physical Systems

In collaboration with industry, government, and academia, this center researches and develops social cyber-physical systems (CPS) aimed at creating new value and addressing social issues by linking the real world with cyberspace.

Director: Jun Adachi, NII Deputy Director General/Project Professor

Global Research Center for Big Data Mathematics
https://bigdata.nii.ac.jp/wp/english/

Research base for the JST ERATO Kawarabayashi Large Graph Project. This world-class hub for research on big data mathematics, with a central focus on developing high-speed algorithms, conducts advanced research and professional development.

Director: Ken-ichi Kawarabayashi, Professor, Principles of Informatics Research Division

Global Research Center for Systems Design and Mathematics (Established November 2017)

JST ERATO HASUO Metamathematics for Systems Design Project Research Base This research base aims to support manufacturing from specification measures to the design, manufacture and maintenance of industrial products by incorporating knowledge of formal methods from software engineering.

Director: Ichiro Hasuo, Associate Professor, Information Systems Architecture Science Research Division

Research Center for Medical Bigdata (Established November 2017)

This research center is furthering the construction of cloud platforms for big data of medical imaging that utilizes the SINET5 Science Information Network built and operated by NII, as well as the development of Artificial Intelligence (AI) that helps doctors in diagnoses by analyzing the large volume of medical images which are collected from medical academic societies.

Director: Shin'ichi Satoh, Professor, Digital Content and Media Sciences Research Division

Industry–Academia Collaborations

Research Center for Financial Smart Data
https://rcfsd.github.io/en/

This center pursues the development of technology for financial information analysis by turning big data into "smart data", and through statistical analysis and modeling of economic and social phenomena, to enable more precise predictions of the future, natural language processing, and machine learning.

Director: Masaru Kitsuregawa, NII Director General

Cognitive Innovation Center

This center strives to generate innovations to tie state-of-the-art cognitive technologies incorporating artificial intelligence techniques to new businesses and services in society and industry. It also works at raising awareness to promote social implementation of such technology.

Director: Mitsuru Ishizuka, NII Project Professor

Center for Robust Intelligence and Social Technology (Established April 2018)

This center researches and develops infrastructure for information technologies that address social problems, such as disaster prevention, education, and disadvantaged support, by placing emphasis on robust intelligence and social technologies with an intellectual prowess developed in unwavering response to ever-changing real world issues.

Director: Masaru Kitsuregawa, NII Director General

Principles of Informatics Research Division

<Mathematical Informatics>

Assistant Professor:
Yoichi Iwata
Ph.D. (Information Science and Technology)

Specialties: Exact algorithms; Parameterized complexity; Algorithms using real-world input structures
Research themes: Algorithms for computations using computers. There are limits to optimization, but theoretical worst cases are considered. Developing and analyzing algorithms that work effectively for special cases appearing in real applications.

Professor:
Takeaki Uno
Ph.D. (Science)

Specialties: Development of high-speed algorithms for large-scale computation in data mining and genome informatics; Analysis of computation for distributed and especially enumeration algorithms, methods for building and accelerating industrial computation models, scheduling, facility placement, etc.
Research themes: Program theory (algorithms) for processing large amounts of information quickly; Efficiently finding data features; Technology to make data more easily comprehensible. Many applications including matchmaking, advertising, and intestinal bacteria.

Professor:
Ken-ichi Kawarabayashi
Ph.D. (Science)

Specialties: Graph coloring problems in discrete math; Structural graph theory and its applications to algorithms; Network flow and disjoint path problems
Research themes: Discrete mathematics, particularly graph theory and theoretical computer science. Global research in discrete graph theory. Many themes requiring mathematical theory. Also interested in application to needs in real society.

Associate Professor:
Masako Kishida
Ph.D.

Specialties: General control theory and related topics
Research themes: Mathematical methods for control and optimization, focusing on uncertainty. Recently also particular interest in building a new theory of networked control, for performing control through networks, and developing mathematical approaches to solving various problems.

Assistant Professor:
Ryota Kobayashi
Ph.D. (Science)

Specialties: Data mining; Computational neuroscience; Machine learning
Research themes: Big Data analysis, examining information processing mechanisms mainly in the brain, nerve cells and nerve circuits, to study the underlying rules. Explaining the overall rules governing phenomena in the economy and society.

Associate Professor:
Yuji Nakatsukasa
Ph.D. (Mathematics)

Specialties: Numerical linear algebra; Eigenvalue problems, numerical analysis; Approximation theory of functions
Research themes: Researching subjects that focus on eigenvalue problems of matrices as well as the approximation theory of rational functions with the aim of developing numerical methods. Interest in theories related to other fields is recently driving efforts to apply high-dimensional integration of numerical analysis theories.

Professor:
Ken Hayami
Ph.D. (Engineering)

Specialties: Numerical analysis and numerical linear algebra (Development and analysis of iterative methods for large systems of linear equations and least squares problems), Numerical solution of inverse problems
Research themes: Developing algorithms to solve least squares problems using iterative methods. In test computations, results were shown to be found in dramatically fewer iterations than earlier iterative methods. Beyond mathematical interest, these results have applications in engineering as well.

Assistant Professor:
Yu Yokoi
Ph.D. (Information Science and Technology)

Specialties: Distributed algorithms; Combinatorial optimization; Matching theory; Market design
Research themes: Matching theory applied to, for example, university advancement selection systems and medical residency assignment systems, and approaches combining computer science and combinatorial optimization. Designing efficient algorithms for avoiding improper participation and producing fair matching.

Associate Professor:
Yuichi Yoshida
Ph.D. (Informatics)

Specialties: Constant time algorithms; Property testing; Constraint satisfaction problems; Discrete optimization
Research themes: Theory and application of algorithms for analyzing large-scale data quickly. Focus on theoretical guarantees of computing time and accuracy using theoretical tools such as randomized computation and discrete optimization.

<Mathematical Logic>

Professor:
Makoto Tatsuta
Ph.D. (Science)

Specialties: Software verification; Separation logic; Theory of programs; Type theory; Constructive logic
Research themes: Theory of types in programming languages and their abstraction, "type theory." In 2007, solved the 20th of 22 important and difficult type theory problems. Research results are being used in implementing large-scale high quality programs.

<Quantum Information>

Professor:
Kae Nemoto
Ph.D. (Science)

Specialties: Quantum information and computation; Quantum optics; Theoretical physics
Research themes: Creation and explanation of new quantum realms using hybrids of various elements, properties and methods, such as diamond NV centers and superconducting devices, with the goal of realizing various quantum technologies anticipated to overcome fundamental limitations.

Associate Professor:
Keiji Matsumoto
Ph.D. (Mathematical Science)

Specialties: Quantum information and computation
Research themes: Search for potential for quantification by introducing information theoretical approaches to entanglement research. The goal is to produce new concepts by integrating quanta and information, as well as physics and Information Science at a deep level.

<Intelligent Informatics>

Associate Professor:
Ryutaro Ichise
Ph.D. (Engineering)

Specialties: Machine learning; Knowledge Systems; Data mining
Research themes: Knowledge processing technology combining various types of information to discover useful knowledge within it. Developing revolutionary technology to integrate differing types of data, and for data mining and knowledge discovery.

Associate Professor:
Tetsunari Inamura
Ph.D. (Engineering)

Specialties: Human – robot interaction; Synthetic study of robot intelligence based on stochastic information processing; Neurorehabilitationusing VR
Research themes: Intelligent robots that communicate with humans via words and physical gestures. Research platforms enabling communication with robots in VR spaces is in development with the aim of realizing intelligence that takes into account social embodiment through large-scale communication over many hours.

Professor:
Katsumi Inoue
Ph.D. (Engineering)

Specialties: Artificial intelligence platforms; Knowledge representation and inference; Induction and abduction; Relational learning; Logic programming; Constraint programming
Research themes: Artificial intelligence approaching a theory of intelligence. Building a theory for inference and learning, developing efficient algorithms and implementing them with computers to contribute to advancement of science and understanding in society.

Professor:
Ken Satoh
Ph.D. (Science)

Specialties: Artificial intelligence; Juris-informatics
Research themes: Logic-based artificial intelligence for many years. More-recently, as a part of the new field integrating the law and informatics, called juris informatics, implementing the Japanese theory of presupposed ultimate facts in the logic programming language, PROLEG.

Associate Professor:
Mahito Sugiyama
Ph.D. (Informatics)

Specialties: Machine learning; Data mining
Research themes: Fundamental theory and practical technologies related to data analysis methods, focusing on machine learning theory, such as data mining and statistical methods. Special attention is given to statistical theory for preserving the reliability of information gained from data.

Professor:
Hideaki Takeda
Ph.D. (Engineering)

Specialties: Knowledge sharing systems; Semantic Web; Design theory
Research themes: Artificial intelligence coexisting and co-creating with society. Building and applying large-scale knowledge graphs as semantic Web research that will enable smooth sharing of information between people and computers.

Assistant Professor:
Shingo Murata
Ph.D. (Engineering)

Specialties: Cognitive robotics; Deep learning; human-robot interaction; Computational psychiatry
Research themes: Research aims to theoretically understand the constructive approach to calculation methods that succeed in human-like cognitive functions by integrating perspectives, such as cognitive neuroscience, robotics, and machine learning, to realize cognitive robots able to cooperate with others (human or robot).

Information Systems Architecture Science Research Division

<Network Architecture>

Associate Professor:
Shunji Abe
Ph.D. (Engineering)

Specialties: Performance analysis and quality control methods through communication traffic measurement; IP network communication performance improvement; Network architecture
Research themes: Developing methods for controlling communication volume to realize efficient and secure communication networks and evaluating and improving performance. Work on SINET, from design and construction to operations and management. Increasing efficiency of information and communications, also contributing to reducing energy consumption and environmental impact.

Associate Professor:
Kensuke Fukuda
Ph.D. (Engineering)

Specialties: Measurement and analysis of Internet traffic; Network science
Research themes: The Internet as an autonomous distributed system. When the overall volume of communication is measured, it increases and decreases, fluctuating according a 1/f law. Searching for possible overall control of the Internet by understanding this mechanism.

Associate Professor:
Megumi Kaneko
Ph.D. (Engineering)

Specialties: Wireless communication engineering; Wireless resource allocation; Protocol design for mobile communication systems
Research themes: Data volume is expected to increase explosively, while radio resources (bandwidth) are approaching their limits. Research on allocation of radio resources and prevention of interference for 5G mobile communications systems and next-generation wireless access networks.

Associate Professor:
Takashi Kurimoto
Ph.D. (Engineering)

Specialties: Network system architecture; Network protocols
Research themes: New network services using NVF, SDN and other technologies with the goal of increasing reliability and stability while reducing costs. Also, realizing safe and high-speed network services in cooperation with SINET.

<Information Network>

Professor:
Shigeo Urushidani
Ph.D. (Engineering)

Specialties: Dynamic resource optimization technologies for multi-layer networks; Universal switching system architecture
Research themes: Innovative network architecture and service control and management technology with the goal of implementation on SINET. Developing original NII functionality in collaboration with system vendors. Developing various services such as the world's first L1 on-demand service.

Professor:
Yusheng Ji
Ph.D. (Engineering)

Specialties: Network architecture; Radio resource management; Communication service quality control
Research themes: Construction of information and communication networks, which are infrastructure for many advanced activities in society, and in particular, implementing fast, high-quality, and sustainable wireless access services supporting the demands of future mobile communications traffic.

<Computer Architecture>

Professor:
Hiroki Takakura
Ph.D. (Engineering)

Specialties: Cyber security; High-reliability networks; Anomaly detection
Research themes: Security measures to protect confidential information from cyber attacks, which become more ingenious each year. In addition to preventing damage before it happens, it is also important to take measures to minimize damage. Continuous pursuit of changing attacker methods and designing measures that are flexible and dynamic.

Professor:
Kento Aida
Ph.D. (Engineering)

Specialties: Parallel and distributed computing; Cloud computing; Grid computing
Research themes: Parallel-distributed computing platform technology enabling multiple computing resources connected by a network to be used as a single resource. Promising for use in consolidating advanced information platforms such as clusters, grids and clouds.

Associate Professor:
Michihiro Koibuchi
Ph.D. (Engineering)

Specialties: Computer system networks; Large-scale parallel computing systems
Research themes: Design of lossless networks, which connect computer systems to networks efficiently, without loss of data. Liquid submersion cooling technologies for computers. One dream is to design the world's first supercomputer network.

Professor:
Masahiro Goshima
Ph.D. (Informatics)

Specialties: Processor architecture; Memory architecture; Digital circuit technology
Research themes: The unrelenting acceleration of computers as the foundation of development of the information society. Even in the past ten years, clock speeds have remained relatively stable, but effective speeds have increase by a factor of ten. Ongoing research to extend this trend for another ten or twenty years.

Associate Professor:
Atsuko Takefusa
Ph.D. (Science)

Specialties: Parallel and distributed processing; Cloud infrastructure technologies; Intercloud technologies
Research themes: Building a new information platform that will seamlessly integrate the Cloud, SINET and on-demand academic networks internationally. Enabling creation of new applications using safe, broadband networks and the Cloud.

Professor:
Hiromichi Hashizume
Ph.D. (Engineering)

Specialties: Digital signal processing; Indoor navigation; Visible light communication
Research themes: The need for special technologies, besides GPS, for indoor navigation where GPS signals cannot reach. Focus on new positioning technologies using sound waves, light and radio waves and their applications for use on smartphones.

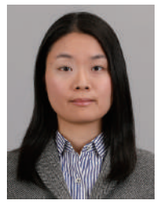
<Software Infrastructure>

Assistant Professor:
Hiroyuki Kato
Ph.D. (Engineering)

Specialties: Optimization for casual queries to database; Fundamental issues on optimizing queries to XML databases
Research themes: The huge information space formed with the proliferation of the Internet. Mechanisms are needed to extract the required information from databases in many varied formats in order to utilize them adequately. Advancing research on the query language, XQuery, to improve usability.

Professor:
Zhenjiang Hu
Ph.D. (Engineering)

Specialties: Programming languages; Functional programming; Parallel programming; Bidirectional transformation languages, and their implementation
Research themes: Research aims to create systematic approaches and support environments for the realization of highly-reliable and highly-effective software while bringing new points-of-view to programming methodology by numerically taking into account rigorous science and engineering in computer programs.



Assistant Professor:
Kanae Tsushima
Ph.D. (Science)

Specialties: Programming languages; Functional programming; Program debugging; Development support
Research themes: Difficulty in writing correct programs when unsafe programs are rejected as type errors. Debugging methods for correcting type errors, enabling inexperienced programmers to write safe programs easily.

Associate Professor:
Ichiro Hasuo
Ph.D. (Computer Science)

Specialties: Informatics infrastructure; Computer systems and networks; Algebra
Research themes: Mathematical methods (formal methods) for software design. Through investigating the mathematical logic in formal methods, abstraction and generalization, overcoming software application categories to achieve broad application in areas such as industrial product design.

Associate Professor:
Nobukazu Yoshioka
Ph.D. (Information Science)

Specialties: Security software engineering; Privacy engineering; Software engineering
Research themes: Methods for deciding security requirements and design using security patterns for building secure software systems. Also, mechanisms for building software that takes user privacy into consideration.

Professor:
Tomohiro Yoneda
Ph.D. (Engineering)

Specialties: Asynchronous circuit technology and dependable VLSI platform technologies
Research themes: Asynchronous circuit technology, which solves various issues associated with using a global clock in synchronous circuits and makes it easier to implement faster, low-power circuits. Also, technologies to improve hardware reliability and security.

<Software Engineering>

Assistant Professor:
Taro Sekiyama
Ph.D. (Informatics)

Specialties: Programming language theory; Type systems; Software verification
Research themes: Research integrates static and dynamic verifications that use type systems. The integration of static verification able to conduct comprehensive inspections and dynamic verifications able to use information during execution will realize flexible program validation systems tailored to the requirements of software and the development phase.

Associate Professor:
Fuyuki Ishikawa
Ph.D. (Information Science and Technology)

Specialties: Software engineering; Formal methods; testing; Autonomous and smart systems; Computing for services; Cyber-physical system
Research themes: The catch phrase for research is "Smart Systems and Smart Dependability Assurance." In anticipation of leading-edge application systems, the research works in technologies that include verification, extrapolation, optimization, automatic test generation and self adaption by utilizing a wide range of models with various requirements, specifications and designs.

Digital Content and Media Sciences Research Division

<Foundations of Content Management>

Associate Professor:
Norio Katayama
Ph.D. (Engineering)

Specialties: Data management technology for video corpus analysis
Research themes:
High-speed, efficient analysis of multimedia databases storing large amounts of video data. Focusing on grid and SMP as key technologies, and devising databases and algorithms for them.

Assistant Professor:
Yusuke Komiyama
Ph.D. (Agriculture)

Specialties: Open science; Research data management infrastructure; Semantic Web; Linked Data; Bioinformatics
Research themes:
Consolidation of the open science platform for long-term storage and sharing of research data from universities and research facilities, as an urgent issue in the academic information field. Provision of a safe, convenient data management infrastructure service using SINET, Gakunin, the Cloud and other sources.

Professor:
Atsuhiro Takasu
Ph.D. (Engineering)

Specialties: Text and sensor data mining; Structural pattern matching; Cyber-physical data base systems
Research themes: Building a society in which useful information can be extracted from large data sets to accumulate information and knowledge for humankind. Mechanisms to integrate, manage and analyze large-scale data sets to achieve this.

Professor:
Akihiko Takano
Ph.D. (Science)

Specialties: Informatics of association; Algebra of programming
Research themes:
Supporting search for highly reliable information on the "想/IMAGINE" platform, an intelligent digital information space utilizing suggestion functionality. At the same time, building an information service that will be public intellectual property to expand ways of thinking and promote deeper thought.

Professor:
Kazutsuna Yamaji
Ph.D. (Engineering)

Specialties: Research data sharing and metadata management; Platform system activating the research community
Research themes:
Development of technology supporting Open Science, for publishing and sharing research results such as papers and research data. Develop a world-leading research data infrastructure adapted to research work flows and provide services to universities and research facilities in Japan.

<Text and Language Media>

Professor:
Akiko Aizawa
Ph.D. (Engineering)

Specialties: Natural language analysis and automatic construction of language resources; Text mining and knowledge search; Intelligent language interfaces
Research themes: Methods for analyzing natural language text using computers to obtain and use knowledge; Platform technology to acquire terminology, assessing uniformity, document structure, etc.; interfaces supporting reading and writing of documents by humans.

Professor:
Keizo Oyama
Ph.D. (Engineering)

Specialties: Data analysis of web user behavior and improvement of access to information; Web information retrieval technology; Full text search technology
Research themes: Technology to support efficient finding and extracting of information required by the user from the Internet and various other databases, using various data reflected in user behavior.

Associate Professor:
Teruhito Kanazawa
Ph.D. (Engineering)

Specialties: Construction of infrastructure for Open Science Repository; Bibliography and person identification; Machine learning; Big data processing; Integrated metadata for Linked Open Data
Research themes: Analysis of logs of human interests and behavior, following the two main themes of Big Log Data Analysis, and Deep Log Data Analysis. Expand and deepen "mass customization", advancing smart technology to meet the individual needs of users. Cultivating new demand.

Professor:
Yusuke Miyao
Ph.D. (Information Science and Technology)
Moved to The University of Tokyo in August 2018

Specialties: Syntactic parsing and semantic parsing; Information extraction; Information retrieval
Research themes: Natural language processing, focusing on syntactic analysis and its applications. To identify the complex structure, semantics and intelligence mechanisms in language requires breakthrough discoveries from statistical modeling. Also developing syntactic analyzers and applications.

<Pattern Media>

Associate Professor:
Junichi Yamagishi
Ph.D. (Engineering)

Specialties: Speech information processing; Speech-based human machine interaction; Speech-based assistive technology
Research themes:
Development of speech synthesis that is smart; speaking selectively and responsively according to the desires and state of the user. Broad expansion into fields such as medicine, social welfare and the arts. Proposing new ideas and returning useful technologies to society.

Assistant Professor:
Ryoichi Ando
Ph.D. (Design Engineering)

Specialties: Computer graphics; Physical simulations; Computational fluid dynamics
Research themes: Developing new computation methods for numerical fluid dynamics to implement beautiful computer graphics. Producing new algorithms that can handle spray and swirls efficiently and building mathematical models for describing such natural phenomena with simple mathematical formulas. Particularly interested in visual and mathematical beauty.

Assistant Professor:
Satoshi Ikehata
Ph.D. (Information Science and Technology)

Specialties: Computer vision; Computer graphics
Research themes:
Advanced 3D computer vision using digital cameras, distance sensors and other technologies. Implementing practical 3D reconstruction technology that can be used in many fields such as geography, construction, medicine and entertainment.

Associate Professor:
Asanobu Kitamoto
Ph.D. (Engineering)

Specialties: Data-driven science; Humanities informatics; Big data analysis of global environment and disasters; Open science; Image analysis
Research themes: Technologies such as image analysis, databases and machine learning that are fundamental to expansion of data driven science into various fields such as the global environment, natural disasters, and the humanities, and "super-interdisciplinary expansion" of research results using Open Science approaches.

Associate Professor:
Kazuya Kodama
Ph.D. (Engineering)

Specialties: A study on structure of multi-dimensional image information and communication systems of distributed shared image environment with real time quality control
Research themes: Methods for freely changing the viewpoint or focal point after a photograph has been taken. Innovate technologies for capturing, storing, transmitting and displaying 3D images using multi-dimensional signal processing of the light being viewed within the space producing the image, and building advanced viewing environments.

Professor:
Imari Sato
Ph.D. (Interdisciplinary Informatics)

Specialties: Physics-based object shape and reflectance modeling; Creation of spatially immersive displays for human–computer interaction
Research themes: Extracting information from body and hand gestures; imaging technologies for future living spaces that display images in preferred locations. Reproducing luster and other material qualities under different lighting environments. Optical correction technologies for projectors.

Professor:
Shin'ichi Satoh
Ph.D. (Engineering)

Specialties: Video analysis, retrieval, and knowledge discovery based on broadcast video archives; Image retrieval
Research themes: Building visual systems able to understand meaning in video similarly to how humans do. Technologies to determine names from facial images, establishing search technologies for objects and events portrayed in video. Participating in overseas R&D projects and refining technologies.

Professor:
Akihiro Sugimoto
Ph.D. (Engineering)

Specialties: Sensing and understanding human activities in daily life; Real-time 3D environment recovery using RGBD cameras; Computer vision under the existence of digitization errors
Research themes: Broad research, on visual information processing from theoretical to system building, giving particular thought to the nature of "seeing". In particular, reexamining problems in computer vision from a mathematical and engineering perspective to build a visual mathematics.

Assistant Professor:
Kenshi Takayama
Ph.D. (Information Science and Technology)

Specialties: Computer graphics; User interfaces; Geometric modeling
Research themes: Intuitive interfaces for interactive 3D modeling. Mainly modeling technologies for the surface conditions and internal structure of 3D objects, and repartitioning input shapes into high-quality meshes.

Associate Professor:
Gene Cheung
Ph.D. (Science)
Moved to York University in October 2018

Specialties: 3D imaging; Graph signal processing; Sleep monitoring and analysis
Research themes:
Optimization, design and development of free viewpoint television and related systems from a total process perspective. Developing the potential of TV and other movie and imaging systems with systems that excel at interactive compression and transmission.

Associate Professor:
Yinqiang Zheng
Ph.D. (Engineering)

Specialties: 3D reconstruction, Photometric computer vision, Hyperspectral imaging
Research themes: In computer vision, 3D reconstruction for recovering shape from 2D images and technologies focusing on color in images. Enabling better shoe fitting in online shopping by reconstructing foot shape in 3D. Creating new businesses in this way.

Assistant Professor:
Hiroshi Mo
Ph.D. (Engineering)

Specialties: Case-based video indexing; Intelligent video structuring
Research themes:
Development of essential technologies for active selection of broadcast programs, such as on-demand viewing. Devising and implementing schemes to clearly show what is in the image, index it and automatically organize it. Building reliable archives, and using video as knowledge.

Digital Content and Media Sciences Research Division

<Human and Knowledge Media>

Associate Professor:
Kenro Aihara
Ph.D. (Engineering)

Specialties: Context analysis for cyber-physical systems; Planning support for lifelong learning in the humanities
Research themes: Context estimation platform technology through collection and analysis of behavior logs. Search for ways to support human creativity. R&D on learning systems utilizing intellectual resources such as culture and the arts. Dynamic understanding from tourism data.

Associate Professor:
Frederic Andres
Ph.D./HDR

Specialties: MindFlow; Opinion mining; Agricultural management based on collective intelligence; Image learning ontology; Social project management platforms
Research themes: A distributed semantic service and social project platform for collective intelligence applications. Providing image learning ontology and stress ontology management services, which are core research technologies.

Associate Professor:
Ikki Ohmukai
Ph.D. (Informatics)

Specialties: Construction and use of semantic Web and Linked Open Data; Data sharing in academic information distribution
Research themes: The spread of the semantic Web and Linked Open Data as technological infrastructure for Open Data and Open Science and development of various support tools. Also closely involved in development and operation of CiNii, the academic information service provided by NII.

Professor:
Helmut Prendinger
Ph.D.

Specialties: Real-time multi-user multi-agent systems; Personified characters and avatars in virtual worlds; Distributed, highly extensible, highly-efficient real-time systems; Cooperative human/machine interfaces; Multi-modal interfaces
Research themes: The broad potential of drones as new social infrastructure. Development of core technologies for effective utilization in more fields using information engineering. Focusing effort on information processing research using collision avoidance algorithms and deep learning.

Associate Professor:
Mayumi Bono
Ph.D.

Specialties: Understanding multimodal interaction; Understanding conversational structures in multi-party interaction
Research themes: Creating a data set for recording, analyzing and researching the diverse expanse of sign language. Reexamination of communication theories, which have been created to deal with spoken language, by looking at the interactive behaviors of sign language, which has strong iconicity and conveys meaning by providing an image of the phenomenon within the scenario.

Professor:
Seiji Yamada
Ph.D. (Engineering)

Specialties: Artificial intelligence; Human – agent interaction; Intelligent interactive systems
Research themes: Many AI agents do not operate independently, without human assistance. Development of systems with close cooperation between humans and AI agents. Interaction design technology incorporating GUI design and human cognitive models.

Assistant Professor:
Yi Yu
Ph.D. (Information Science)

Specialties: Multi-media data mining and recommendations using multi-modal analysis with images, video and music
Research themes: Multimedia analysis of videos, photographs, music and comments uploaded to the Web from users' devices. Finding and recommending content suitable for individuals' preferences. Mining social trends through participatory sensing.

Information and Society Research Division

<Information Use>

Professor:
Noriko Arai
Ph.D. (Science)

Specialties: Information sharing, cooperative systems R&D; Artificial intelligence; Mathematical logic
Research themes: Information technology enabling information and knowledge to be shared smoothly. Research on the potential and limitations of artificial intelligence starting with the question, "What if a robot were to be admitted to the University of Tokyo?" Also, issuing skills needed for the 21st century from an education oriented science research laboratory.

Professor:
Shin Nakajima
Ph.D.

Specialties: Software dependability; Formal methods; Automatic verification
Research themes: Formal methods for developing highly reliable software utilizing mathematics. With the arrival of the IoT age and with software permeating social infrastructure, the ability to ensure reliability, based on uncertainty, is essential for safety in society.

Associate Professor:
Miho Funamori
M.A. (Science)

Specialties: Multi-faceted university IR systems; Open science; Research data management
Research themes: An IR framework and analysis methods to support university management, and development of models. Consideration of the nature of scholarship in the digital age, including Open Science, and contribution to transition in Japan's academic institutions.

Professor:
Ichiro Satoh
Ph.D. (Engineering)

Specialties: OS and middleware for distributed systems including cloud computing and IoT
Research themes: New network technologies and applications using mobile agent software, which can run processes while moving freely between computers. Mobile phone software development tools that are being used by major manufacturers.

Assistant Professor:
Kouichirou Ueki
M.A. (Science)

Specialties: Development of next-generation information systems
Research themes: Methods for flexible information processing. Specifically working on neural networks and genetic algorithms. The starting point for research is what we have learned about computers and primates at university and graduate school.

Associate Professor:
Takayuki Mizuno
Ph.D. (Science)

Specialties: Statistical analysis, modeling, prediction, and control of socioeconomic phenomena based on big data; Econophysics
Research themes: Analysis of Big Data using methods from physics and using econophysics to explain phenomena in economics and society. Aim to derive a universal equation for "booms" from this perspective. There is also potential to predict future bubble crashes and prices slumps and to control booms.

Assistant Professor:
Masako Furukawa
M.A. (Literature)

Specialties: Learning analytics and standardization; Development and evaluation of MOOC and other e-learning materials
Research themes: Building a system platform for collecting and analyzing learning logs, which contain learning behavior history data from university and other online learning sites and MOOCs, providing feedback to students, instructors and educational institutions, and otherwise providing effective educational support using learning logs.

Professor:
Noriko Kando
Ph.D. (Library and Information Science)

Specialties: Evaluation of information access technologies; Exploratory search and user interface; Cognitive research for exploratory search; Extracting attitudes and relations from text
Research themes: Search systems for cases when the answer cannot be anticipated, or when the user does not know where to start. The objective is to build a mechanism to gather useful information, satisfying the underlying needs of a query.

Associate Professor:
Hironobu Gotoda
Ph.D. (Science)

Specialties: Stereoscopic displays; Acoustic rendering systems; Similarity search for 3D models
Research themes: Modeling, to recognize and draw objects using computers. Establishing a matching technology able to find two objects that are similar would enable, for example, computing 3D data from objects in photographs.

<Science Information>

Associate Professor:
Yuan Sun
M.A. (Education)

Specialties: Education; Psychological statistics; Test theory; Bibliometrics
Research themes: Estimating the learning processes of individual learners based on theoretical models of learning processes and learning behavior data, and developing algorithms for adaptively scheduling learning and teaching. Contributing to realizing optimal personalized learning.

Associate Professor:
Masaki Nishizawa
Ph.D. (Science)

Specialties: Quantitative investigation of academic research findings in media reports; Investigation study on network structure of information sciences related research and its trends; Empirical analyses on network for industry – government–university cooperation in Japan
Research themes: Search for the starting point of research that produces excellent results. Specifically, studying the research progression and what support was received in the past from a database of research papers. The objective is to be able to invest appropriately in R&D that has potential.

<Information Public Policy>

Professor:
Isao Echizen
Ph.D. (Engineering)

Specialties: Information security; Media security; Privacy protection technology
Research themes: Establishing security and privacy protection technologies at the boundary between cyber space and real space. Contribution to increasing information security in real society through research on biological information protection technology and technologies for generating and recognizing media clones.

Associate Professor:
Hitoshi Okada
Ph.D. (International Public Policy)

Specialties: Critical growth factors of e-commerce and e-money; University Information Security Policy Portal (UISPP)
Research themes: Block chain technology, which supports distributed virtual currencies, can be applied in wide ranging scenarios for transactions on the Internet. Building systems to demonstrate operating potential and performing validation tests. Scholarly analysis of issues such as legal systems, and demonstration of application in the economy and society.

Research

Large-scale Project Involvement

AMED ICT Infrastructure Establishment and Implementation of Artificial Intelligence for Clinical and Medical Research

Japan Agency for Medical Research and Development (AMED) Research Project; This project promotes research to establish ICT infrastructures, including clinical and medical research with emphasis such as leading-edge information and communication technologies relevant to clinical and medical research, to provide evidence necessary for clinical development of medical technologies originating in Japan, which leads to the improvements of the medical quality in Japan and the heightening of accessibility (equalization) to receive general medical treatment throughout the country.

New Support for Medical Care Using IT

NII Research Supervisor: Shin'ichi Satoh, Professor, Digital Content and Media Sciences Research Division/Director, Research Center for Medical Bigdata

In cooperation with medical academic associations supported by Japan Agency for Medical Research and Development (AMED), this research center is furthering the construction of cloud platforms for big data of medical imaging that utilizes the SINET5 (1) Science Information Network built and operated by NII as well as the development of artificial Intelligence (AI) that helps doctors in diagnoses by analyzing the large volume of medical images which are collected from medical academic societies. NII established the Research Center for Medical Bigdata in November 2017 to research and develop these fields with this center at the core.

Construction of a Big Data Cloud Platform for Medical Imaging

Data is collected from hospitals and other medical institutions and anonymized by each medical society, and then the data is transferred to the servers of the medical societies to facilitate a big data cloud platform for medical imaging from the medical society servers. The big data platform leverages the features of SINET5, which connects every prefecture throughout Japan at ultrahigh-speed lines of 100 Gbps, as well as the enhanced Virtual Private Network (VPN) provided by SINET5 to transfer medical imaging information that demands confidentiality over a safe network environment (Figure). By taking advantage of a cloud system, researchers from the medical field nationwide can easily use big data for medical imaging to promote research that leverages a large volume of data unavailable up until now.

Development of AI Medical Imaging Analysis Technology

We are conducting a large-scale project to develop medical imaging analysis technology that uses deep learning and image recognition, which are core AI technologies, by gathering medical images from more than 10,000 cases from around Japan through each medical society. Therefore, a joint research and development system made up of the University of Tokyo, Nagoya University and Kyushu University as well as NII is stepping up to the challenge of resolving these problems by putting in place each research theme. Together with experts who have engineering and informatics viewpoints, doctors active as on-site medical professionals, engineers as well as other related parties, the configuration of a bilateral coordination system that goes beyond medical fields is also an important theme.

One purpose of medical imaging analysis technology is to find slight inconsistencies between areas suspected of a lesion and normal areas in images. In an effort to bring this technology to fruition, we are working in a process where we first create data for learning that matches areas proven in medical examinations of case images conducted by doctors who are experts in their field to learn doctor diagnoses. Computers can then be taught using the data for this learning as well as data for healthy individuals to output results for discussions with doctors.

Our primary goal is to surpass the level of average doctors in determining diseases often seen in a large number of cases. We then hope to prevent oversights and contribute to the efficiency of tasks by supporting doctors in imaging diagnostics and examination fields.

(1) SINET5: The Science Information NETwork, built and operated by NII. Since its official launch in April 2016, SINET5 has connected all regions of Japan via an ultra-high-speed network offering data rates of 100 Gbps, as well as faster Japan–U.S. channels also offering 100 Gbps and new channels connecting Japan and Europe. More than 850 universities and research institutions across Japan, including all 86 of Japan's national universities, are members of the network.

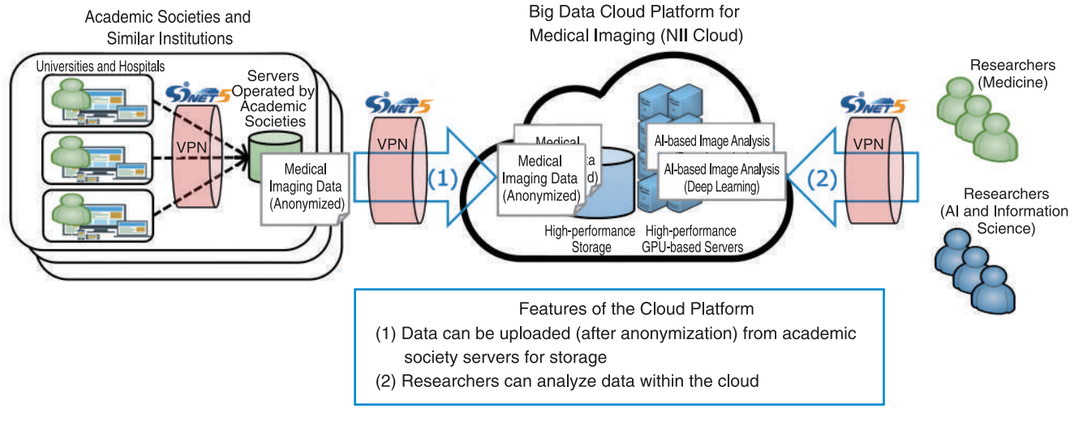


Figure: Overview of cloud platform. Medical institutions, universities, and other organizations use the cloud platform via a high-performance virtual private network (VPN) provided by the Science Information Network, SINET5.

JST ERATO

ERATO stands for the Exploratory Research for Advanced Technology project spearheaded by the Japan Science and Technology Agency (JST). Under the guidance of distinguished leaders, this project aims to create seeds of revolutionary technologies based on new scientific knowledge while driving the innovation of scientific technologies able to revolutionize society and the economy by promoting basic exploratory research filled with creativity.

HASUO Metamathematics for Systems Design Project

Research Director: Ichiro Hasuo, Associate Professor, Information Systems Architecture Science Research Division/Director, Global Research Center for Systems Design and Mathematics

In the manufacturing industry today, progress is being made towards fundamentally changing the way manufacturing processes—from design to production—are carried out by introducing automation and software support based on advanced information processing technologies. In light of this, the HASUO Metamathematics for Systems Design Project aims to introduce results from the field of software science into traditional manufacturing technologies and build software tools for supporting various aspects of manufactured product development—from specification development to design, implementation, and maintenance. NII established the Global Research Center for Systems Design and Mathematics in November 2017 as a research base.

Leveraging Formal Methods in Manufacturing

Specifically, by incorporating mathematically based system design techniques used in software science known as "formal methods", the project will explore methodologies for software support covering quality assurance and efficiency in "cyber-physical systems", such as cars and other manufactured products. Up until now, formal methods have dealt with "discrete elements" involving calculation by computer, but in order to apply formal methods to physical information systems, they must be extended to encompass "continuous elements" of physical systems such as continuous dynamics, probability, and time (Figure 1). This project's unique approach to this theoretically difficult problem is to analyze mathematically the extension processes themselves and acquire universal knowledge by constructing higher-order (meta-level) theories that will allow various formal methods to be extended simultaneously (Figure 2).

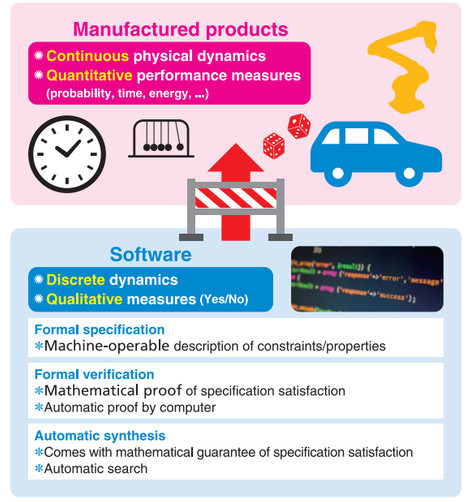


Figure 1: Extending formal methods: From software to physical information systems

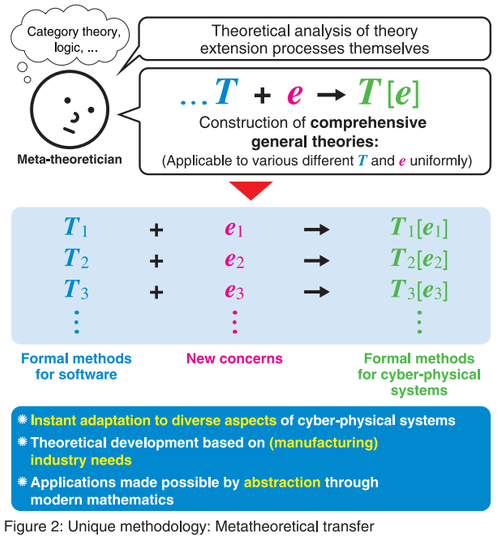


Figure 2: Unique methodology: Metatheoretical transfer

This meta-level approach is a very theoretical one that employs various abstract mathematical techniques, such as logic and category theory. At the same time, a hallmark of this project is its focus on applying these theoretical research results to real problems faced by industry.

Application for On-site Manufacturing Needs

The project includes two approaches to application. The first is to support real-world product design processes using formal methods in collaboration with domestic and foreign companies. Rather than trying to reform entire design processes, this will involve specific, practical efforts, such as reducing the time required for a certain test from three days to half a day. This will be made possible by formulation based on a theoretical approach and a flexible response to problems. The use of theoretical results will facilitate matching with specific industry needs.

The second approach to application is to investigate the role of formal methods in pioneering software-based product design processes. Here, in collaboration with researchers developing the autonomous driving system Autonomoose at the University of Waterloo in Canada, the project conducts groundbreaking research on industry application of formal methods using Autonomoose as a testbed.

Research

Large-scale Project Involvement

JST CREST

Core Research for Evolutionary Science and Technology (CREST). This program promotes original basic research to a high, international standard, toward achieving certain national strategic goals, and team-based research oriented to producing excellent results that will contribute greatly to scientific and technical innovation in the future.

[Advanced Core Technologies for Big Data Integration]

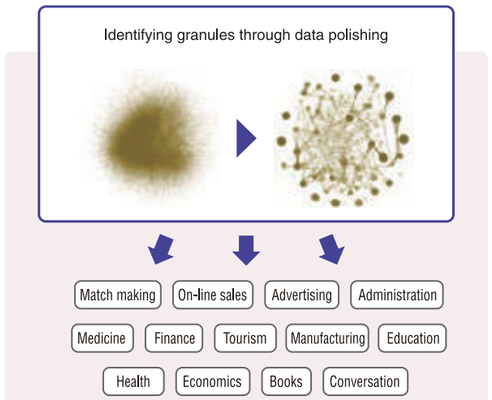
Research Supervisor: Masaru Kitsuregawa, NII Director General
Research Area Advisors: Mitsuru Ishizuka, NII Project Professor

As ICT permeates society, the amount and diversity of data in various fields is increasing exponentially. To realize integrated analysis of big data spanning these fields, and to create, enhance and systematize next-generation infrastructure technologies, two NII researchers are representing work on their respective research issues under guidance from Research Supervisor and NII Director General Masaru Kitsuregawa, and Domain Advisor, Specially Appointed Professor Mitsuru Ishizuka.

Data Particlization for Next Generation Data Mining

Research Director: Takeaki Uno, Professor,
Principles of Informatics Research Division

With the arrival of the Big Data age, it has become possible to use various data from the physical and social sciences, economics and other fields. Analyzing diverse and noise-filled data to find meaning and hidden properties can lead to new scientific discoveries, more detailed understanding of social structures, and development of new products and customer services. What is important here is to extract the part of the data related to the meaning or property of interest. Data mining is the technology for finding this part of the data, but it is difficult to find the appropriate structures at an appropriate computational cost. In this project, we have defined this partial data using a structure called a cluster, and developed a technology called data polishing, which can extract meaning from the data relatively easily. Innovative technologies that are faster and more accurate than before will enable various types of big-data applications. We have already applied these technologies to matchmaking data used in many enterprises, including Internet advertising, newspaper articles, purchase data and intestinal bacteria data, and produced a range of knowledge.

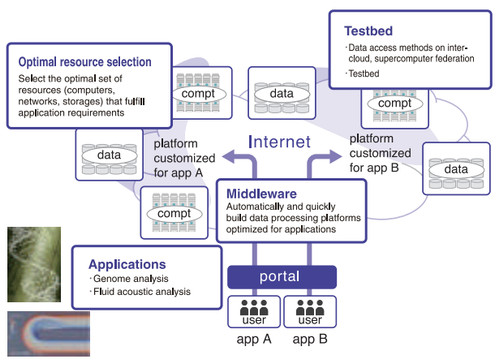


Research on Application-centric Overlay Cloud Technology Utilizing Inter-cloud

Research Director: Kento Aida, Professor, Information systems Architecture Science Research Division

As the performance of supercomputers, clouds and the networks that connect them has increased, the Inter-cloud, which connects multiple clouds through high-speed networks, is being built, making it possible to use them for large-scale data processing. However, with current technology, users must configure computers and networks individually to build a computing platform for processing data, and this creates significant technical and time barriers. The objective of this research is to develop infrastructure technology for quickly and automatically building large scale data processing platforms optimized for each application utilizing multiple clouds connected by networks. The results of this research will enable high-performance, easy processing of large scale data using clouds. We intend to collaborate with researchers in the fields of genome analysis and fluid acoustic analysis to develop applications in these fields, and also to build and operate infrastructure together with researchers in information infrastructure centers in universities and other institutions. This research is being done in collaboration with research groups at Hokkaido University, the National Institute of Genetics, the Tokyo Institute of Technology, and Kyushu University.

Application-centric overlay cloud technology utilizing inter-cloud

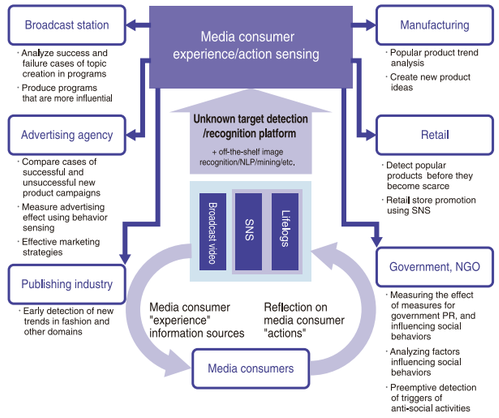


[Development and Integration of Artificial Intelligence Technologies for Innovation Acceleration]

Experience and Action Sensing of Media Consumers based on Unknown Target Retrieval and Recognition Framework

Research Director: Shin'ich Satoh, Professor,
Digital Content and Media Sciences Research Division

The ways that people access information have changed in recent years, with SNS such as Twitter and Instagram becoming major sources of information in addition to broadcast television and other conventional media. These are being used by an increasing number of people when forming opinions and purchasing behavior. Many people are also recording and publishing their own activities using SNS and lifelogs. It has thus become possible to observe the experience and behavior of these media consumers through appropriate analysis of media such as broadcast video, SNS, and lifelogs. This research will first establish an unknown target retrieval and recognition platform to detect significant changes and major trends in dynamically changing media such as broadcast television, SNS, and lifelogs. Based on the technology suite, we will build a framework to sense how people obtain information from broadcast videos and SNS and how people react following the obtained information. The framework will enable early detection of new trends such as brand new products, analysis of effective marketing strategies raising buying behavior, analysis of mechanism driving people for humanitarian behavior, and so on.



NTCIR

The NII Testbeds and Community for Information access Research (NTCIR) is a project to enhance information access technologies. NTCIR provides common evaluation infrastructure in and outside of Japan to support the understand and use of information by offering access information desired from a large amount of information. This is an international project established for a mutual learning forum by advancing, verifying and comparatively evaluating a variety of research through this common infrastructure.

Supporting Smooth Access to Desired Information and Informational Use

General Chair: Noriko Kando, Professor, Information and Society Research Division

The development of information access technologies with technology, such as informational searching, natural language processing and databases at the core, is growing in importance for the use of big data obtained from access to the web, text data, and various sensors. Evaluations based on a test collection, which is a testing data set with correct data, created as a result of collaborative work with researchers is indispensable in the assessment of information access technology. NTCIR started this project in 1997 and has contributed to the evolution of initiatives and technologies for over 20 years in the form of this evaluation infrastructure thanks to collaboration with a multitude of researchers. Evaluations exceed a total of 80 tasks with a total of 948 groups worldwide participating in these tasks. Furthermore, 4,146 research groups are currently using the NTCIR test collection for research purposes.
NTCIR generally selects several task in each year-and-a-half cycle to build a data set for effective validation and benchmarks of new methods as research platforms with the cooperation of roughly 150 research institutes and associations in Japan and overseas. A conference is held as an international meeting at the end of each cycle.

NTCIR Conference

Large-scale Project Involvement

ImPACT

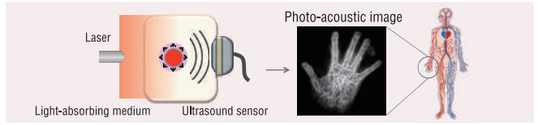
Impulsing Paradigm Change through Disruptive Technologies Program (ImPACT) is a program from the Cabinet Office Council for Science, Technology and Innovation (CSTI). It promotes high-risk, high-impact, challenging R&D that will produce revolutionary scientific and technological innovation that, if realized, will bring major changes to industry and society.

[Innovative Visualization Technology to Lead to Creation of a New Growth Industry]

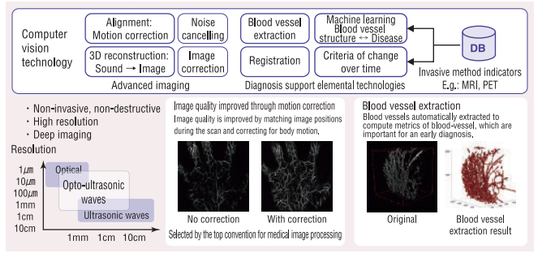
Project with NII researchers participating: Demonstration of value

Research and Development Supervisor: Imari Sato, Professor, Digital Content and Media Sciences Research Division

With the arrival of super-aging society, there is increasing demand for technical support to enable people to continue working while preserving their health and beauty. NII has participated in ImPACT to realize an early diagnosis of disease, and inspection of the internal structure, with advances in photo-acoustic imaging, which performs real-time 3D visualization of changes in properties and functions inside human bodies and substances, non-invasively and non-destructively. The photo-acoustic system is a promising new technology that integrates state-of-the-art laser and ultrasound technologies, where 3D structures of objects can be reconstructed by sensing emitted ultrasound from the objects that absorb near-infrared irradiation. It enables to image the state of the human body and objects whose insides are not visible, non-invasively and non-destructively. In this research, we develop computer-vision technologies to obtain clear images and extract bio-image features to support a diagnosis. For example, we proposed a registration method to generate high-quality 3D volumes in which vessels become clearly visible by aligning shot-volumes that are misaligned by body motions. We are also developing a technology that automatically models vascular structures, which helps in understanding blood vessel conditions strongly related to illnesses.



Opto-ultrasonic-wave imaging



Visualization and image analysis for medical imaging

[Advanced Information Society Infrastructure Linking Quantum Artificial Brains in Quantum Network]

Project with NII researchers participating: Quantum Artificial Brains

Research and Development Supervisor: Ken-ichi Kawarabayashi, Professor, Principles of Informatics Research Division

Optimization and efficiency are priority issues today as various networks and systems are becoming massive and more complex, such as the Internet as well as wireless communications and transport systems. Research groups with the participation of NII and other organizations developed and announced a system able to offer hands-on experience of new Quantum Neural Network (QNN) computers that use the quantum properties of light in November 2017. QNN is a new type of computer that takes advantage of the quantum-mechanical properties of new lasers known as optical parametric oscillator, which obtains dramatically higher speeds for approximate solutions than conventional computers. The same research group developed a QNN calculation device that stores the QNN, which had been a large proof-of-concept device up until now, in a housing able to install a data center and other components in addition to operating stably for extended periods of time through the adoption of a stabilization control mechanism for a light circuit. The group has also constructed a QNN cloud system where users have been able to use the QNN calculation device through the Internet. This system allows users to experience the QNN calculation device without needing to adjust optical test equipment, which required complex and specialized technology. NII mainly operates this system and is in charge of administration. A link to the QNNcloud System is provided below. https://qnncloud.com/

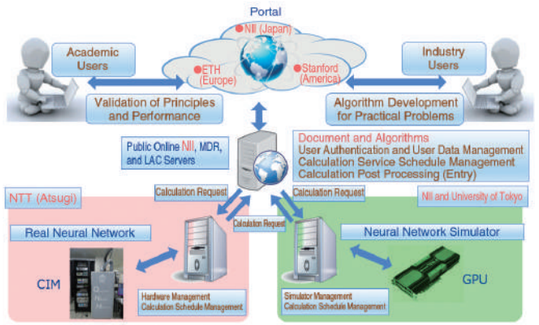


Figure: Structural Overview of the QNNcloud System

SIP

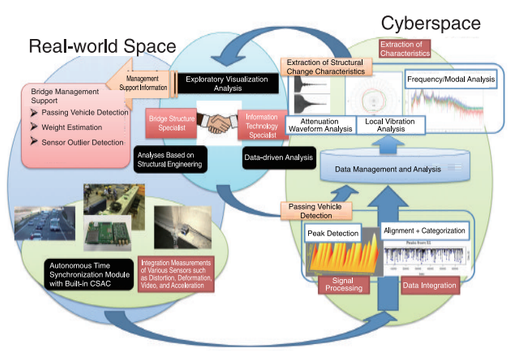
The Cross-ministerial Strategic Innovation Promotion Program (SIP) is a national project for science, technology and innovation (ST&I), spearheaded by the Council for Science, Technology and Innovation as it exercises a leading role in promoting ST&I beyond the framework of government ministries and traditional disciplines.

[Infrastructure Maintenance, Renovation and Management]

Research Topic for NII: R&D of Integrated Data Management Platform for Civil Infrastructure Sensing

Principal Investigator: Jun Adachi, NII Deputy Director General / Project Professor

NII has been working in collaboration with universities and industry to conduct researches on Cyber-Physical Systems (CPS) on a societal scale since 2011. CPS link and integrate physical systems functioning in the real world with information (cyber) systems that collect and analyze data obtained from the real world through various sensors. Based on the analysis, a decision will be made to resolve various issues in the real world. By this active cycle of data collection, analysis and intelligent feedback, CPS is expected to contribute to create new value as well as to the efficiency of social systems. With this CPS concept, NII has been working since 2014 in a SIP program titled "Infrastructure Maintenance, Renovation and Management." Our aim is to improve existing infrastructure maintenance process through information technology by designing an integrated data management platform for sensing bridges and other types of infrastructure.



Kakenhi

Grants-in-Aid for Scientific Research (Kakenhi) -Various research challenges, from basic to applied research-

Kakenhi provide broad support for academic research based on the free ideas of the researchers themselves, over a wide range of fields and spanning from basic to applied research. Both teaching and research personnel actively apply for Kakenhi, and many are accepted.Awarded Kakenhi can also be distributed to researchers at other research institutions (co-investigators) based on collaboration in the research.
Similarly, many NII researchers are participating as co-investigators in projects funded by Kakenhi acquired by researchers at other institutions.

Applications accepted (FY2017)

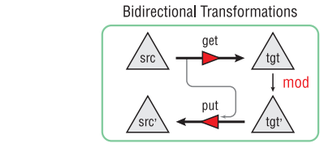
	No. of Applications Accepted	Amount (Thousands of yen)
Principal Investigator	78	404,896
Co-Investigator (Other institution > NII)	55	77,627

Grant-in-Aid for Scientific Research (S)

Software Foundations for Interoperability of Autonomic Distributed Data Based on Bidirectional Transformations

Principal Investigator: Zhenjiang Hu, Professor, Information Systems Architecture Science Research Division

Big data processing is now widely employed in all aspects of our lives. Usually, parts or copies of a huge amount of data are stored in separate locations, and it is infeasible to collect all the parts and copies of the data and process them in a centralized manner, as it would be exceedingly inefficient to transfer them over the network. We therefore need new software foundations based on which big data can be efficiently analyzed and shared in a distributed way. A highly relevant research area is bidirectional transformations, which provide a reliable mechanism for data synchronization. The study of bidirectional transformations originates from the longstanding problem of view updating in databases, and has led to a rich collection of bidirectional languages with new programming models tailored for data synchronization. Despite the potential in solving practical synchronization problems including data interoperability, bidirectional technologies are not widely employed yet, and most applications of bidirectional transformations remain only proof of concept. In this research, we aim to further develop bidirectional technologies to make them more reliable, scalable, and efficient, so as to establish solid foundations for integration, sharing, and interoperability of autonomic distributed big data. Research specifically has the following three objectives to achieve these goals.



Goal 1: To further develop bidirectional transformation technologies, to enable modular development, static analysis and automatic verification, strong debugging mechanism, and learning support for development of large-scale and reliable bidirectional transformations.

Goal 2: To build a new software foundation with bidirectional transformations, which will feature a novel view-passing model that can achieve efficient asynchronous parallel data processing and facilitate interoperability of autonomic distributed data.

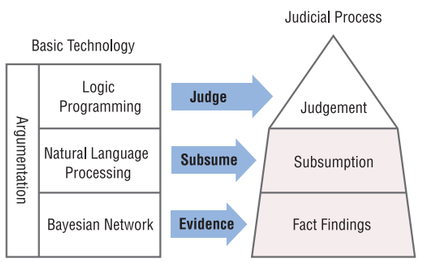
Goal 3: To construct practical applications of bidirectional transformations, solving real-world problems using the view-passing model.

Grant-in-Aid for Scientific Research (S)

Advanced Reasoning Support for Judicial Judgment by Artificial Intelligence

Principal Investigator: Ken Satoh, Professor, Principles of Informatics Research Division

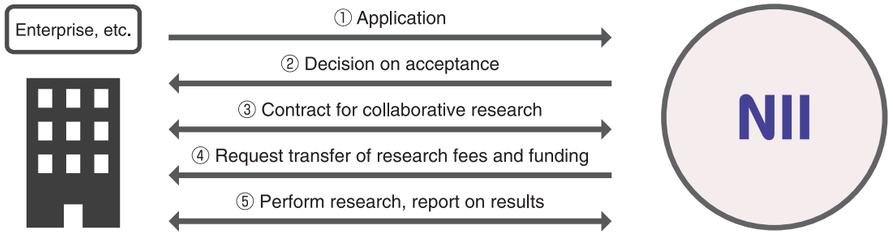
In the trial process, the intellectual tasks that the judges are carrying out are roughly divided into the fact finding process, the subsumption process, and the judgement process. The fact finding process is a process of recognizing facts actually occurred in the case from evidence, the subsumption process is a process of making the facts correspond to legal concepts, and the judgement process is a process of making a judgement according to the legal concepts corresponding the facts based on legal rules. Furthermore, in court cases, there are conflicting structures of plaintiffs and defendants, and prosecutors and an accused. Therefore, in the trial process, various complicated high-order inferences are executed, and more accurate and prompt high order inference should be realized by support by artificial intelligence. For this research, we aim to develop a system that supports advanced reasoning by using the following fundamental technologies and a system that analyzes argumentation in each process (Figure).



1. Fact finding process support system using evidence reasoning based on Bayesian network
2. Subsumption process support system by acquiring subsumption rules based on natural language processing
3. Judgement process support system by extending the existing civil code reasoning system PROLEG to handle criminal cases and administrative cases
4. Argumentation analysis system based on argumentation theory

Collaborative Research Promotion

NII is actively conducting research in collaboration with private facilities and utilizing external funding through means such as contracted research. Also, in order to produce real value for people and society as never before with new theories and methodologies, and expanded applications (future value), as is demanded of informatics, we are promoting informatics research by seeking and performing public collaborative research and cultivating research through collaboration with other academic fields.



[Various joint research performed with enterprises of different types]

Joint research with private facilities

https://www.nii.ac.jp/research/collaboration/

NII faculty performed the following joint research, receiving research staff and expenses from private and other external facilities. In principle, projects last one year, but there are also multiple-year contracts.

① **Receiving funding only**
We receive funding required for cooperative research from private institutions and other external bodies. Cooperative researchers then work from their respective locations.

② **Taking on researchers**
We take on researchers from private institutions and other external bodies to carry out cooperative research at NII while continuing with their regular job. Essential overheads are covered under our research costs up to a certain limit.

③ **Taking on researchers and receiving funding**
We take on researchers and receive funding to carry out cooperative research.

Projects performed (FY2017)

	No. of projects accepted	Funding received (thousands of yen)
FY2015	53	109,525
FY2016	55	176,239
FY2017	47	144,121

[Paving the way for wide-ranging collaboration with researchers and conducting research aimed at creating value]

NII open collaborative research

https://www.nii.ac.jp/research/collaboration/

We accept proposals for collaborative research, with NII staff acting in a liaison capacity. We accept proposals every year for the following three types of open collaborative research.

- **Strategic research proposals** based on strategic themes set out by NII.
- **Proposals for research planning meetings** aimed at paving the way for new collaboration or further existing research, through meetings at International Seminar House for Advanced Studies in Karuizawa.
- **Open subject proposals** in which the applicant is free to set their own research subject.

Researchers affiliated with a wide range of domestic institutions are eligible to apply for open collaborative research. This includes the option for staff members and graduate students to become collaborative research-ers, as well as staff from private companies, universities, and technical colleges (although the applicant may not be a graduate student). We are particularly interested in proposals for research planning meetings, so please collaborate with us in taking things to the next level.

Selection status (FY2017)

	No. of proposals accepted
Strategic research applications	16
Research planning meeting applications	11
Open subject applications	39
Total	66

Intellectual Property

NII creates, acquires, and manages intellectual property, and promotes the use of this intellectual property in industry-academia-government collaborations that contribute to society.

Number of Invention Reports, Applications for Patents, and Registrations (total number since FY2004)

(as of the end of March 2018)

Number of Reports		
240	Attribution: Organization Attribution	227
	Attribution: Individual Attribution	13

Number of Applications		
269	Domestic	222
	Foreign	47

Number of Registrations		
94	Domestic	78
	Foreign	16

List of Japanese patents owned

Title of invention	NII Inventors	Joint application	Registration
Image information apparatus, and method and program for retrieving and displaying image information	Tomoko Kajiyama		Patent No. 4441685
Quantum key delivering method and communication apparatus	Yodai Watanabe		Patent No. 4231926
Time-series data analysis device, and time-series data analysis program	Ryutaro Ichise		Patent No. 4734559
Information-Sharing System, Information-Sharing Server, Information-Sharing Method, and Information-Sharing Program	Shinichi Honiden	●	Patent No. 4799001
Sequential content delivery device, sequential content receiving device, and method therefor	Noboru Sonehara		Patent No. 4734563
Contents presentation apparatus, contents presenting method and contents presentation program	Noboru Sonehara		Patent No. 4403276
Text content presentation apparatus, text content presentation method and text content presentation program	Noboru Sonehara	●	Patent No. 4143628
Method and apparatus for evaluating communication traffic that uses fragmentary self-similarity process	Yusheng Ji		Patent No. 4081552
Imaging device and imaging method using out-of-focus structure	Kazuya Kodama		Patent No. 4437228
Information resource retrieval device, information resource retrieval method and information resource retrieval program	Noriko Kando		Patent No. 4324650
Active content distribution system, active content distribution program and active content distribution method	Shinichi Honiden		Patent No. 4392503
Device and method for generating traffic congestion prediction information, and route search system	Shinichi Honiden	●	Patent No. 4729411
Content selling device and method	Noboru Sonehara		Patent No. 4304278
Document indexing device, document retrieval device, document classifying device, and method and program thereof	Noboru Sonehara	●	Patent No. 4362492
Video provision device and method	Kenro Aihara		Patent No. 4359685
Projection image correction system and correction information generation program	Imari Sato		Patent No. 4982844
Digital content registration distribution apparatus, system and method	Noboru Sonehara		Patent No. 4956742
Airing structure of three dimensional integrated electrical circuit and layout method therefor	Michihiro Koibuchi		Patent No. 5024530
Quantum key distribution method, communication system, and communication service	Yodai Watanabe		Patent No. 4862159
Time reference point information transmitting system and receiver	Hiromichi Hashizume		Patent No. 4621924
Method and device for searching ambiguous frequent itemset	Takeaki Uno		Patent No. 5267847
Collection/delivery route selection system	Ichiro Satoh		Patent No. 4374457
Device and method for learning data management, and vehicle air-conditioning device and equipment control device	Tetsunari Inamura	●	Patent No. 5224280
Air conditioner for vehicle and its control method	Tetsunari Inamura	●	Patent No. 5177667
Route Switching method, server apparatus, boundary node apparatus, rout switching system, and switching program	Shigeo Urushidani	●	Patent No. 5062845
Direct path establishing method, server device, sender network node device, direct path establishment network, and program thereof	Shigeo Urushidani	●	Patent No. 4999112
Virtual stereoscopic image display device and method of displaying virtual stereoscopic image	Asao Fujiyama	●	Patent No. 5263960
Path management control method, path management control program, path management controller and path management control system	Shigeo Urushidani	●	Patent No. 4806466
Emission allowance trading system and emission allowance trading method	Ichiro Satoh		Patent No. 5207195
Quantum repeater, and system and method for generating extended entanglement	Kae Nemoto	●	Patent No. 5296924
Distance measuring method, distance measuring receiving station equipment, and position measurement system	Hiromichi Hashizume		Patent No. 5305324
Quantum computing device and method for Ising model	Yoshihisa Yamamoto		Patent No. 5354233
Video display device	Isao Echizen		Patent No. 5373662
Method and device for accelerating speed of successfully generating entanglement, and quantum repeater that uses the method and device	Kae Nemoto	●	Patent No. 5414006
Quantum repeater, and system and method for generating extended entanglement	Kae Nemoto	●	Patent No. 5414007
Spoken language estimating device, method, and program	Shuichi Itahashi	●	Patent No. 5544575
LSI arithmetic device and failure detection method for the same	Tomohiro Yoneda		Patent No. 5582472
Measurement device, measurement system, and measurement method	Hiromichi Hashizume		Patent No. 5593062
Information retrieval display device, method, and information retrieval display program	Noboru Sonehara		Patent No. 5599068
Information retrieval display device, method, and information retrieval display program	Noboru Sonehara		Patent No. 5608950
Information retrieval display device, method, and information search display program	Noboru Sonehara		Patent No. 5608951
Information providing device, method, and program	Noboru Sonehara	●	Patent No. 5614655
Control server, control method, and control program	Michihiro Aoki	●	Patent No. 5682932
Doppler radar system, Doppler radar transmission device, and method for optimizing transmission wave	Hiromichi Hashizume		Patent No. 5704695
Image collation device, image collation method and computer program	Shin'ichi Satoh		Patent No. 5713398
Speed/distance detection system, speed/distance detection device, and speed/distance detection method	Hiromichi Hashizume		Patent No. 5739822
Information processing device, schedule determining method, and computer program	Ken'ichi Kawarabayashi		Patent No. 5733722
Search tree drawing device and search tree drawing method and program	Yusheng Ji	●	Patent No. 5754676
Encoding device, method, program, and recording media	Nobutaka Ono	●	Patent No. 5789816
Word reordering device, translation device, translation model learning device, method, and program	Yusuke Miyao	●	Patent No. 5800206
Acoustic signal analysis device, method, and program	Nobutaka Ono	●	Patent No. 5807914
Data delivery system and data delivery device and method	Kensuke Fukuda	●	Patent No. 5818262
Distributed data management system and device, method, and program	Kensuke Fukuda	●	Patent No. 5818263
Acoustic signal analysis device, method, and program	Nobutaka Ono	●	Patent No. 5911101
Image search device, method, and program	Shin'ichi Satoh	●	Patent No. 5979444
Semiconductor chip, semiconductor chip connection system	Tomohiro Yoneda		Patent No. 6029010
Distance measuring method and radar device	Hiromichi Hashizume		Patent No. 6029287
Superconducting quantum bit state detection using light	Kae Nemoto	●	Patent No. 6029070
Optical parametric oscillator and random signal generating device, and ising model using the oscillator and ising model computation device	Yoshihisa Yamamoto	●	Patent No. 6029072
Word order sorting device, translation device, method, and program	Yusuke Miyao	●	Patent No. 6040946
Signal processing device, method, and program	Nobutaka Ono	●	Patent No. 6005443
Spoken language evaluation device, parameter estimation device, method, and program	Nobutaka Ono	●	Patent No. 6057170
Signal processing device, signal processing method, and computer program	Nobutaka Ono		Patent No. 6099032
Interactive information search device using eye gaze interface	Noriko Kando		Patent No. 6099342
Face detection prevention tool	Isao Echizen		Patent No. 6108562
Legal reasoning submission method as well as legal reasoning submission system and program	Ken Satoh		Patent No. 6112542
Ising model quantum computation device and ising model quantum computation method	Shoko Utsunomiya	●	Patent No. 6143325
Word reordering device, translation device, translation model learning device, method, and program	Yusuke Miyao	●	Patent No. 6083645
Doppler imaging signal transmission device, doppler imaging signal reception device, and doppler imaging system and method	Hiromichi Hashizume		Patent No. 6179940
Encoding device and decoding device for contrast image	Gene Cheung		Patent No. 6188005
Flip-flop circuit	Tomohiro Yoneda		Patent No. 6210505
Method for initialization of superconducting quantum bit	Kae Nemoto	●	Patent No. 6230123
Generation model creation device, estimation device, method therefor, and program	Nobutaka Ono	●	Patent No. 6241790
Ising model quantum computation device, ising model quantum parallel computation device, and ising model quantum computation method	Shoko Utsunomiya	●	Patent No. 6255087
Ising model quantum computation device	Yoshihisa Yamamoto	●	Patent No. 6260896
Adaptive positioning interval setting system, adaptive positioning interval setting method, action model calculation device, and action model calculation program	Atsuhiro Takasu	●	Patent No. 6253022
Quantum key distribution system and quantum key distribution method	Yoshihisa Yamamoto	●	Patent No. 6257042
Apparatus and method for voice signal processing	Nobutaka Ono	●	Patent No. 6278294
Calculation using networks of optical parametric oscillators	Shoko Utsunomiya	●	Patent No. 6300049

List of registered trademarks

(as of the end of March 2018)

Trademark mode	Registration number
NII	4811291
NII	4830960
Net Commons	4832775
icture＋SINET	4934163
NAREGI	4952143
トップエスイー	4943324
WebELS	4980388
Net Commons	5182361

Trademark mode	Registration number
n c net commons	5152641
Commons Partners	5208443
neXt commons	5191260
researchmap	5261160
RACE＋Picture	5275386
Picture (grace)	5261216
Picture（トップエスイー/NPO）	5279082

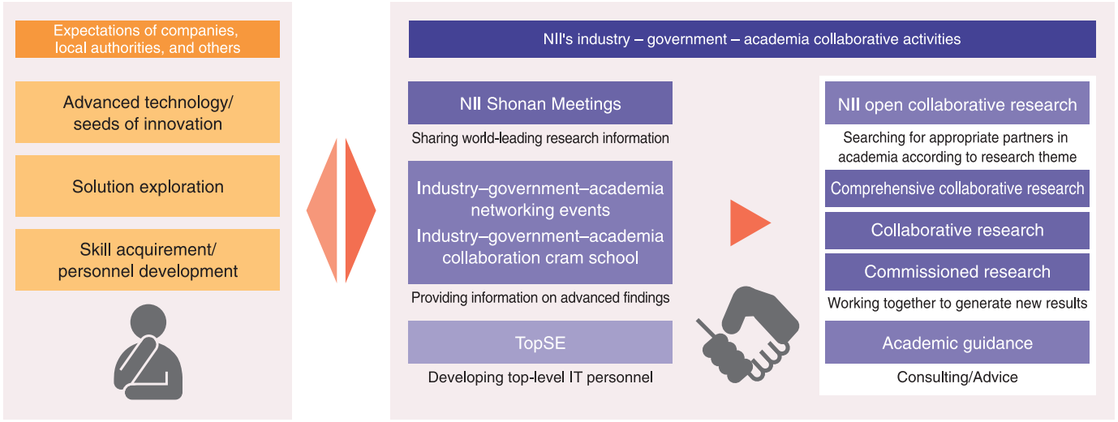
Trademark mode	Registration number
edubase	5296963
学認/GAKUNIN	5341899
NetCommons Ready	5369242
Picture(パレット)	5498318
Picture(学認/GakuNin)	5498319
情報犬	5538785
Picture(情報犬)	5538784

Trademark mode	Registration number
Picture(サイニィ/CiNii)	5580217
Picture(ミカエル)	5600802
meQuanics	5622078
Picture(GeoNLP)	5645544
SIGVerse ※	5649553
PrivacyVisor ※	5653596
WillingRing	5789533

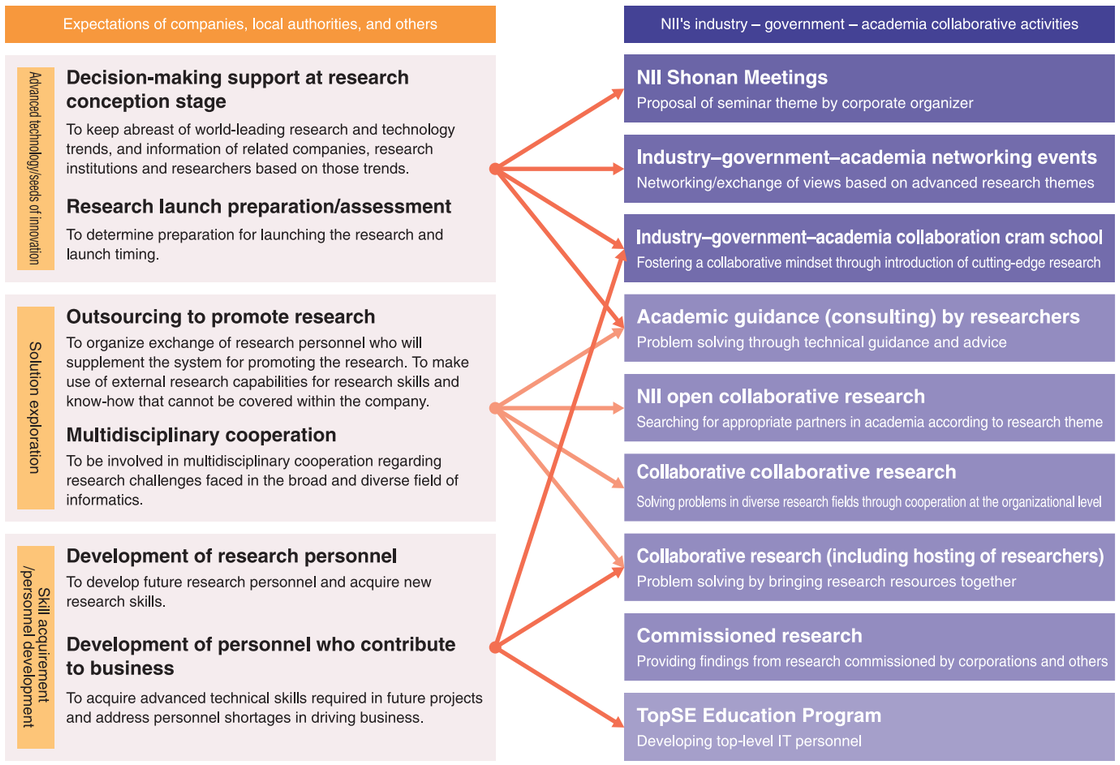
※SIGVerse (International Registration No. 1203063) and PrivacyVisor (International Registration No. 1208262) are also registered trademarks in Europe, the United States, and China.

Industry-Government-Academia Collaboration (Practical R&D and Industry-Government-Academia Collaborative Activities)

NII conducts research in the field of informatics and engages in information infrastructure projects with the aim of furthering practical R&D that will help solve various problems facing society. Collaborations between industry, government, and academia are vital in achieving these goals. In order to further strengthen such collaborations, NII promotes activities that help ensure that we meet the requirements of companies, local authorities, and others.



Action program for industry–government–academia collaboration



Expert Guidance (Consulting) by Researchers

NII offers a consulting service that aims to expand our industry–government–academia collaborative initiatives, explore possible collaborations with new partners, and contribute widely to society. Through communication between researchers and people involved in business, our consulting service supports startup companies by providing relevant policy advice from researchers on issues that are likely to lead to contributions to society or to the generation of innovation through industry–academia collaborations.

We want to know appropriate targets for the value of the data that we possess

We want to know what is technically possible regarding analysis

We want to determine policies quickly

NII Academic Guidance

Researchers' knowledge

- Limits of technical possibilities from the perspective of advanced research (advice on target setting)
- Insight, expertise, advice, and consultation on new developments
- Identifying the key personnel who tend to be overlooked are (advice on organization)
- Analyzing how to carry out initiatives effectively (advice on policies and plans)

Offerings from NII

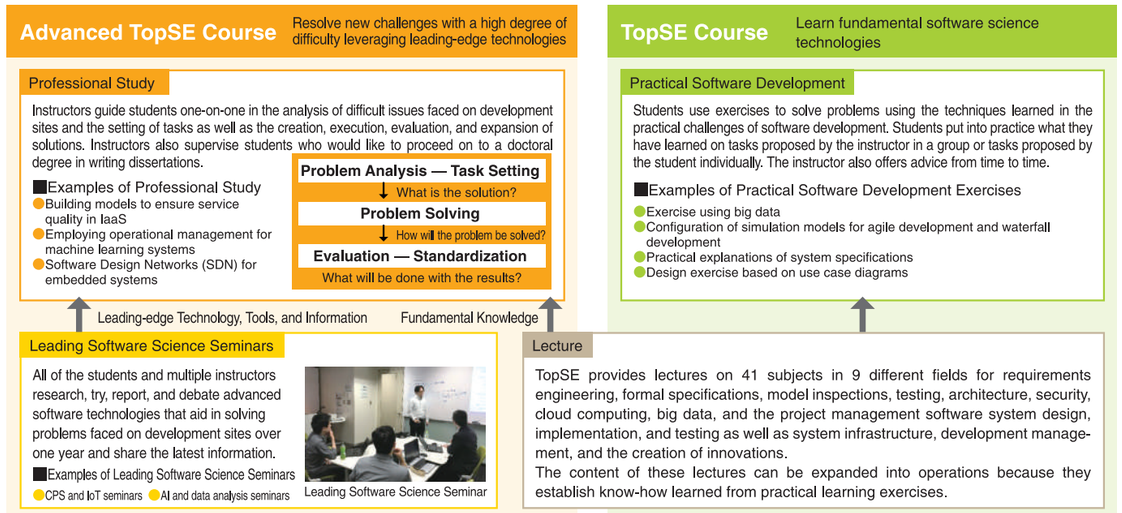
- Advice by way of lectures and group meetings
- Guidance on policymaking under short-term contracts
- Group guidance by multiple staff in different fields is also available

Education Services for Developing Top-Level IT Personnel

TopSE provides education programs in intelligent manufacturing for professionals found in science for mastering leading-edge software science as basic theoretical and practical learning at the Grace Center for the purpose of cultivating the world's highest standard of human resources in IT who have foresight of societal changes and are able to create innovations through IT.

The educational programs aim to:

1. Teach techniques to analyze and resolve on-site problems with a high degree of difficulty and standardize solutions by leveraging the leading-edge technologies in the advanced TopSE course.
2. Teach fundamental software science technologies to ensure future job security in the TopSE course.



Collaboration with Foreign Universities - UCL Training -

6 students from the University College London (UCL) and 29 engineers from sponsor companies participated in the seventh UCL training (February 12-16, 2018) held at the National Institute of Informatics. One student from UCL partnered with four or five engineers in a group for the agile development of an online Point of Sales (POS) application in training to experience agile development techniques first-hand, such as pair programming, mob programming and test-driven development.

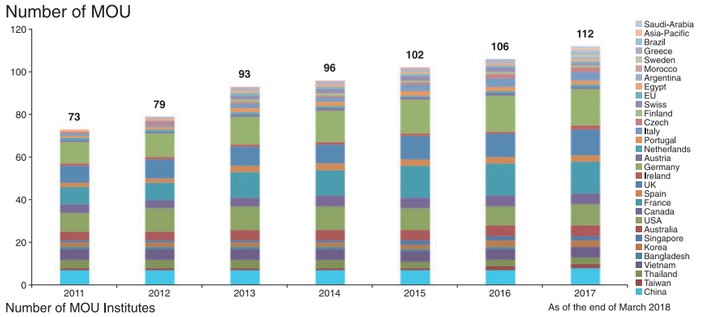
UCL Students in Training to Learn Hands-on Agile Development Techniques

Research

International Exchange

NII has set up Global Liaison Office (GLO) to promote international exchange by concluding memorandum of understanding (MOU) with a large number of major universities and research institutes worldwide. Associated with the MOUs, the GLO conducts the NII International Internship Program, MOU Grant/Non-MOU Grant as well as other programs to dispatch and invite researchers and students.

Number of MOU



Number of MOU Institutes

As of the end of March 2018

International Exchange Agreements (MOU)

MOUs for research cooperation in 29 countries and regions: 103 institutes

(as of the end of March 2018)

Country/Region	Name of Institution
China	School of Information Science and Technology, Department of Automation, Tsinghua University
	Institute of Computational Mathematics and Scientific/Engineering Computing, Academy of Mathematics and System Sciences, Chinese Academy of Sciences
	Tongji University
	School of Electronics Engineering and Computer Science, Peking University
	The Hong Kong University of Science and Technology (HKUST)
	The School of Electronic Information and Electrical Engineering of Shanghai Jiao Tong University
	University of Science and Technology of China (USTC)
	Institute of Computing Technology, Chinese Academy of Sciences (ICT-CAS)
Taiwan	College of Electrical Engineering and Computer Science, National Taiwan University
	National Tsing Hua University, College of Electrical Engineering and Computer Science (NTHU EECS)
Thailand	Department of Computer Engineering, Chulalongkorn University
	School of Engineering and Technology, Asian Institute of Technology
	Faculty of Science, Kasetsart University
Vietnam	International Research Institute, Multimedia Information, Communication, and Applications (MICA)
	Hanoi University of Science and Technology (HUST)
	Vietnam National University of Ho Chi Minh City (VNU-HCM)
	University of Science (Vietnam National University - Ho Chi Minh City)
	VNU University of Engineering and Technology
S. Korea	Department of Computer Science and Engineering, Seoul National University
	Korea Institute of Science and Technology Information (KISTI)
Singapore	School of Computing, National University of Singapore (NUS)
	INSTITUTE FOR INFOCOMM RESEARCH
Australia	CSIRO (Data 61)
	University of Queensland
	The Faculty of Engineering and Information Technologies, The University of Sydney
	Department of Computing & Information Systems, Melbourne School of Engineering, The University of Melbourne
	Royal Melbourne Institute of Technology
Saudi Arabia	King Abdullah University of Science and Technology
America	College of Engineering & Computer Science, University of Michigan–Dearborn
	College of Engineering, University of Washington, Seattle
	New Jersey Institute of Technology
	International Computer Science Institute
	University of Southern California
	School of Informatics, Computing, and Engineering, Indiana University
	University of Illinois at Urbana–Champaign
Canada	Faculty of Mathematics, University of Waterloo
	Faculty of Science, Department of Computing Science, the Alberta Machine Intelligence Institute, University of Alberta (Amii)
	School of Computer Science, McGill University
	Simon Fraser University
	Polytechnique Montréal
Brazil	Pontifical Catholic University of Campinas
Argentina	The Faculty of Exact and Natural Sciences of Buenos Aires University
Ireland	The Irish Software Research Centre (LERO; University of Limerick)
	Trinity College Dublin
France	University of Nantes (Atlanstic 2020)
	Institut National de Recherche en Informatique et en Automatique (INRIA)
	Institut National Polytechnique de Grenoble
	Université Grenoble Alpes (Joseph Fourier University)
	Sorbonne University (Pierre and Marie Curie University/University of Paris VI), Computer Science Laboratory of Paris 6 (LIP6)
	INP Toulouse ENSEEIHT
	National Center for Scientific Research (CNRS)
	Université Toulouse III - Paul Sabatier

Country/Region	Name of Institution
France	Claude Bernard University Lyon 1
	Université Paris Sud
	The Electronics and Information Technology Laboratory
	University of Nice Sophia Antipolis
	LIMOS Research Laboratory, University of Clermont Auvergne (formerly Blaise Pascal University, Clermont-Ferrand)
	The French National Audiovisual Institute (INA)
	Centre de Recherche en Informatique de Lens (CRIL)
United Kingdom	Department of Computer Science, Faculty of Engineering Science, University College London
	Faculty of Mathematics and Computing, The Open University
	Department of Computer Science, University of Bristol
	University of Bath
	Department of Computing at Imperial College London
	Department of Computer Science, University of Oxford
	School of Computer Science & Electronic Engineering, University of Essex
	School of Informatics, University of Edinburgh
	Newcastle University
	University of Kent, Faculty of Sciences, School of Computing
	Department of Theoretical and Applied Linguistics, University of Cambridge
	UCL Big Data Institute (UCL Big Data Center), University College London
Germany	Faculty of Applied Informatics, University of Augsburg
	Institute of Information Systems, German Research Center for Artificial Intelligence (DFKI)
	The Faculty of Applied Science of the University of Freiburg
	RWTH Aachen University (Faculty of Mathmatics, Computer Science and Natural Sciences)
	The German Academic Exchange Service (DAAD)
	Saarland University
	Ludwig-Maximilians-Universität München
	Berlin Institute of Technology (TUB, TU Berlin)
	Technische Universität Braunschweig (TU Braunschweig)
	Technische Universität München (TUM)
	Georg-August-Universität Göttingen
	Department of Computer and Information Science at the University of Konstanz(ISGUK)
	Bochum University of Applied Sciences, Department of Electrical Engineering and Computer Science
	The Faculty of Science at the University of Potsdam
Australia	Vienna University of Technology
Italy	Dipartimento di Informatica, Università degli Studi di Torino
	Politecnico di Milano, Dipartimento di Elettronica, Informazione e Bioingegneria
	UNIVERSTÀ DEGLI STUDI DI FERRARA (UNIFE)
	Dipartimento di Informatica - Scienza e Ingegneria (DISI), Università di Bologna
Switzerland	Institute of Electrical Engineering in Ecole Polytechnique Federale de Lausanne
Finland	Aalto University
Sweden	School of Computer Science and Communications (CSC), KTH Royal Institute of Technology
Czech Republic	Faculty of Electrical Engineering, Czech Technical University in Prague
	The Institute of Physiology of the Czech Academy of Sciences
Spain	Universitat Politècnica de València (UPV)
	Universidad Politécnica de Madrid (UPM)
	Facultat d'Informàtica de Barcelona, Universitat Politècnica de Catalunya (UPC)
Greece	Athena Research & Innovation Center
Netherlands	Department of electrical Engineering, Mathematics, & Computer Science, Delft University of Technology
Portugal	Instituto de Engenharia de Sistemas e Computadores, Investigação e Desenvolvimento em Lisboa (INESC-ID)
	INESC Technology and Science (INESCTEC)
Egypt	Egypt Japan University of Science and Technology (E-JUST)

Development and operational cooperation: 9 institutes

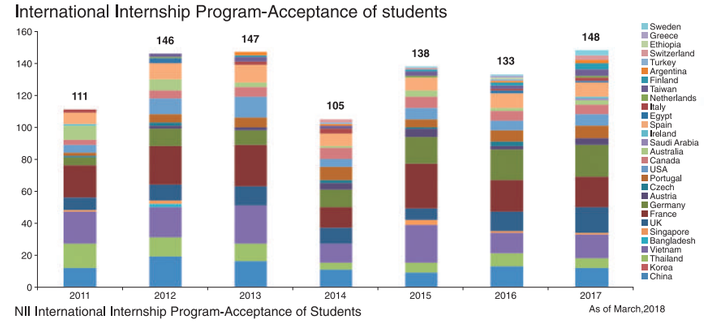
Country/Region	Name of Institution
Asia-Pacific	Asia-Pacific Ring (APR) Collaboration
America	Indiana University
	North American Coordinating Council on Japanese Library Resources (NCC)
	The New Venture Fund (NVF) on behalf of the Scholarly Publishing & Academic Resources Coalition (SPARC)
S. Korea	Korea Education & Research Information Service (KERIS)

Country/Region	Name of Institution
Germany	Hochschulbibliothekszentrum des Landes Nordrhein-Westfalen
	German National Library of Science and Technology (TIB)
	German National Library of Medicine (ZB MED)
European Union (EU)	GÉANT

NII International Internship Program

NII International Internship Program is organized for Master's and PhD students from institutions with which NII has concluded MOUs. During the internship period, they work on each research topic under the supervision of NII supervisors. This program has contributed significantly to NII's research activities such as presentations at international conferences and an increase in international papers by promoting exchange with our partners and by hosting and sponsoring interns since its inception in 2005.

International Internship Program-Acceptance of students



NII International Internship Program-Acceptance of Students

As of March,2018

Applicant	Graduate students from MOU institutes (master's and PhD students)
Research period	2 months to 6 months (180 days)
Paid expenses	Accommodation expenses: ¥5,700/day
Recruitment	The program recruits students working on research topics proposed by NII faculty. Students are recruited twice per year (March/September) and each MOU institution is notified by a recruitment notice sent to the person in charge as well as postings on the NII homepage.
Application	The person in charge of each institution selects a student and submits an application by the deadline designated on the application (applications can be submitted for the top three students as a general rule).
Selection	NII faculty and the GLO evaluate the applications submitted from each institution and determine the students to accept.

*A certificate of completion is issued to students when they complete the internship program.

Instructor provides guidance to an internship student

Research Seminar

MOU/Non-MOU Grant

MOU Grant was established in 2005 and Non-MOU Grant was established in 2006 as a system of financial support for the research exchange with our partner institutions and non-partner institutions. MOU Grants are provided when accepting researchers from abroad or when NII faculty members visit our partner institutions for the purpose of research exchange. Non-MOU Grant accepts foreign researchers to aim for research collaboration with institutes/universities without MOU.

For both, travel expenses are covered.
There are two calls per year, and applications are reviewed and selected by the GLO to pursue further research collaborations with foreign research institutes.

International Exchange Activities

Research Activities of Internship Students

Research

International Exchange

NII Shonan Meetings

http://www.nii.ac.jp/shonan/

In February 2011, NII launched the NII Shonan Meetings, the first Dagstuhl-style seminar* in Asia. The purpose of the NII Shonan Meetings is for leading researchers all over the world to get together and to tackle to solve difficult issues in informatics through the intensive discussions. The meeting is hosted by NII in collaboration with Kanagawa Prefecture based on a partnership agreement.
The meeting's venue, Shonan Village Center, is easy to access from Narita Airport, offering an environment full of nature where participants can focus on their research activities.
109 seminars have been held so far, and August 2014 saw the launch of the NII Shonan School, intended primarily for promising students and young researchers in the field of informatics.

*Dagstuhl Seminar: A renowned seminar series in the field of informatics, held about every week in Dagstuhl, Germany. It is famous for the style which lodges participants at the venue for one week to have intensive discussions on the topics of informatics.

Shonan Village Center, located in beautiful natural surroundings

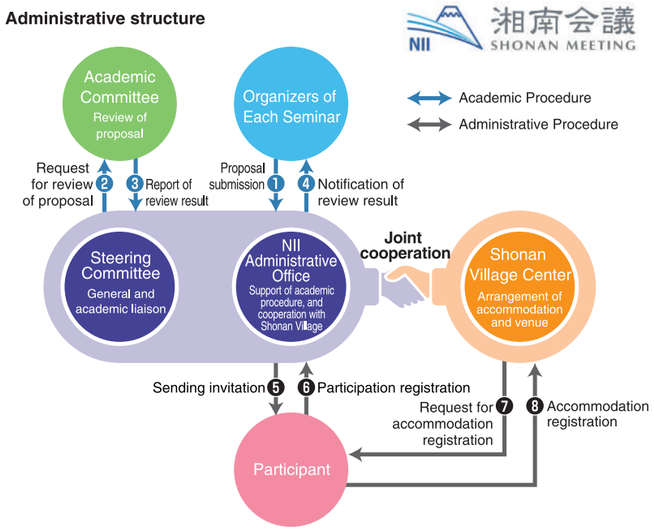
NII Shonan Meetings

Participants of the NII Shonan Meetings

Support by the office and venue

On behalf of organizers, the office of NII Shonan Meeting and Shonan Village Center support administrative arrangements such as coordinating seminar dates and booking venues, sending invitations, providing lodging information for participants and preparing the venue on the meeting day.
The program also includes events like a historical tour of Kamakura to cultivate personal exchanges among participants.

Administrative structure



NII Shonan Meeting Memorial Lectures

The NII Shonan Meeting Memorial Lectures are annually held and co-hosted by NII and Kanagawa Prefecture and researchers related to NII or the NII Shonan Meetings give lectures on the latest research topics of the informatics that are open to the public.

NII Shonan Meeting Memorial Lectures

Call for proposals

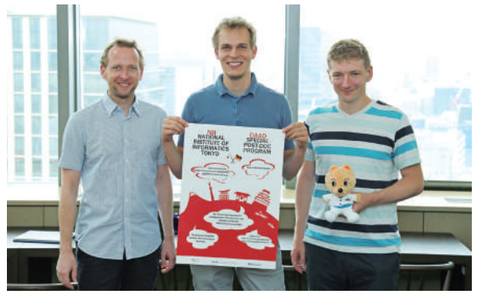
We welcome proposals of Shonan Meeting seminars throughout the year. There are deadlines for submission twice a year, June 15 and December 15. Following the reviewed proposals by the Academic Committee in NII, organizers will be notified as to whether or not their proposal has been accepted.

Contact: The Office of NII Shonan Meetings, **shonan@nii.ac.jp**

Agreement with German Academic Exchange Service (DAAD)

https://www.nii.ac.jp/en/glo-daad/

NII has a special agreement with the German Academic Exchange Service (DAAD) that allows German Postdoctoral researchers to stay at NII to conduct their research projects under the supervision of NII researchers.
In the frame of the agreement, researchers can stay at NII for minimum three months (six months is recommended) up to two years supported by DAAD. During that period, they implement their own projects in connection with NII supervisors. The post-docs have the possibility to recruit Master's/Ph.D. students or engineers to help their researches during their stays. Since NII is an inter-university organization, researchers can visit NII's partner universities and research institutions in Japan to strengthen their networks in Japan.



A special agreement has been reached with DAAD, and we are directing post-doc research

Japanese-French Laboratory for Informatics (JFLI)

https://jfli.cnrs.fr

Pierre and Marie Curie University (UPMC; University of Paris VI), The University of Tokyo (Graduate School of Information Science and Technology), Keio University, and NII joined the National Center for Scientific Research (CNRS) to establish the Japanese-French Laboratory for Informatics (JFLI) in 2008 as a base for informatics research exchange between France and Japan. The JFLI has been entrusted with invigorating research exchange since 2012 by promoting the International Joint Unit (UMI) international research organization of the CNRS.
The Japanese-French Laboratory for Informatics promotes collaborative research by emphasizing important and challenging fields in informatics with the primary research themes of (1) next-generation networks, (2) high-performance computing, (3) software programming models and formal methods, (4) virtual reality and multimedia and (5) quantum computing. Up until now, joint research has been promoted at each institution, including the acceptance of researchers and graduate students from French research institutes. Research presentations are also regularly held as workshops to enhance collaborative research as well as venues for graduate internship students to present their research. The JFLI Seminar is another regular activity. Many networks of researchers have formed recently around the JFLI thanks to the conduct of activities up until now. A JFLI-wide workshop was held at NII by inviting outside researchers involved with JFLI in March 2016.
In addition, JFLI is also planning joint workshops with universities and other outside institutions. JFLI also now plans to collaborate with UMIs that have similar research themes even at the UMI international research organizations of CNRS spread widely throughout Asia.
JFLI will promote informatics research by working together with each university in Japan while also putting its effort into collaborative research between two countries in the future.

Minister of Higher Education, Research and Innovation of France Frédérique Vidal and Director General Masaru Kitsuregawa

Active Research Exchanged Conducted by JFLI

Graduate Program

The Department of Informatics, SOKENDAI (The Graduate University for Advanced Studies)

Establishment of graduate school

The National Institute of Informatics joined SOKENDAI (The Graduate University for Advanced Studies) and opened the Department of Informatics (three-year doctoral program) in April 2002, seeing its first students graduate in March 2005. A five-year doctoral program was launched in 2006. The first graduate university in Japan, SOKENDAI was founded with the aim of promoting original, international research that goes beyond the boundaries of conventional academic disciplines, and opening up advanced scientific fields that create new streams of science.

Content and structure

The Department of Informatics aims to develop young IT researchers and engineers who will play key roles on an international level in the 21st century. Students are able to acquire a Ph.D. (Informatics) (or depending on the content, a Ph.D. (Science)). Education and research guidance is provided in the following six fields: (1) foundations of informatics, (2) information infrastructure science, (3) software science, (4) multimedia information science, (5) intelligent systems science, and (6) information environment science. The Department offers more than 70 subjects, including Department's Special Subjects and Common Specialized Basic Subjects.

Feature of the Dept

The Department of Informatics welcomes students from overseas and is a place of lively cross-cultural communication between students. There are also many working students; in fact, they account for around 20% of all the department's students.

Number of students in Department of Informatics (as of April 2018) *( ) indicates foreign students

Five-year program	Three-year program	Research students	Total
44 (30)	45 (23)	1 (0)	90 (53)

New Student Guidance (April 2018)

Lecture on Applied Linear Algebra.

[Greetings from the Dean of the School of Multidisciplinary Sciences]

Tomohiro Yoneda

(Professor, Information Systems Architecture Science Research Division, National Institute of Informatics)

The School of Multidisciplinary Science conducts research and education on complicated natural and social phenomena, as systems that govern the occurrences, functions, and interactions of these phenomena, from the comprehensive and transdisciplinary viewpoint. Through such research and educational activities, the school aims to nurture researchers and highly specialized professionals in the area of information and systems who will take the lead in academic research and address various important issues relating to changes in human society in the 21st Century. The School, consisting of the Department of Statistical Science, the Department of Polar Science, and the Department of Informatics, has been involved in multidisciplinary research fields from the beginning. In addition, the school further strives to enhance its research and education by promoting close collaboration between the Departments by, for example, setting common subjects in curricula. The school covers diverse research subjects but studies the principles of multidisciplinary science, research approaches, and methodologies as an essential part of the school's research and education activities. The Department of Statistical Science and the Department of Informatics seek to determine the common probability or complexity among various phenomena by statistical mathematics and data analysis. The Department of Polar Science studies the geophysical and the biological complex system in the polar regions of extremes on Earth and approaches its subject from the viewpoint of multidisciplinary science. By continuing to explore new research fields, including advanced and leading research fields, and systematizing them through such activities, the school strives for further development of the multidisciplinary sciences.

[Greetings from the Chair of the Department of Informatics]

Katsumi Inoue

(Professor, Principles of Informatics Research Division, National Institute of informatics)

The Department of Informatics consists of six fields: Foundations of Informatics, Information Infrastructure Science, Software Science, Information Media Science, Intelligent Systems Science, and Information Environment Science. These fields are based on the traditional domains of computer science and information engineering, and are also multi-disciplinary sciences, encompassing the humanities and social sciences. Moreover, our department covers research and education in all three phases: basic, applied and practical phases. We aim to develop not only researchers, but also highly-skilled professionals, who would become the next leaders in the field of informatics.
Instruction is tailored to individual student's ambitions, interests, and academic research plans through a system of personal guidance and a Ph.D. mentorship program by top-level researchers at the National Institute of Informatics. We employ a sub-advisor system whereby students can obtain advice from staff in different research fields, or with different areas of specialization within the same field of research, who can provide a variety of perspectives. Our department has Five-year Ph.D. Course and Three-year Ph.D. Course: the former for undergraduate university graduates, where students can take plenty of time to develop appropriate research subjects , and the latter for students coming from a master course, where students can concentrate on themes extending their research experiences. Informatics students are students of SOKENDAI (The Graduate University for Advanced Studies) as well as members of NII. They can learn in an internationally collaborative environment on a daily basis, participate in various research projects, and train to become international researchers through human resource exchange programs with foreign universities and institutes. Roughly half of our students from Japan are professionals affiliated with companies and other organizations who have joined the school to systematically review their work up until that point from a research perspective while also learning the latest technology. Our high percentage of exchange students is also an important feature of our department. Many of the lectures are available in English and quite a few laboratories have seminars in English. There is a great deal of cross-cultural communication between students, and this environment is valuable for students envisioning an international career. Collaborations with other departments in SOKENDAI and their founding institutes further extend the sphere of exchange, and students can participate in a valuable network of students, teachers, and researchers.

Message from a Current Student

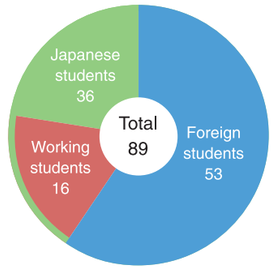
NGUYEN, Phi Le

2010 Graduated the Graduate School of Frontier Sciences Ph.D. Course, The University of Tokyo
2016 Entered the Department of Informatics Three-year Ph.D. Course, SOKENDAI (The Graduate University for Advanced Studies)
Main Supervisor Professor Yusheng Ji

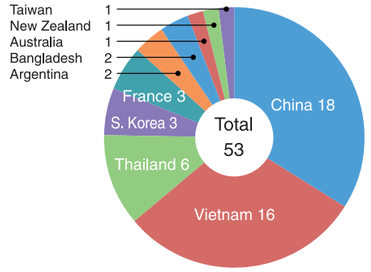
My research addresses the issue of packet forwarding in wireless sensor networks with the occurrence of obstacles. In order to bypass the obstacles, the traditional approach is to forward packets along the obstacle boundaries. However, this approach leads to two serious problems: traffic concentration around the obstacle boundaries and routing path enlargement.
In my research, we propose a novel approach which can balance the traffic over the network while ensuring the constant stretch property of routing paths. Our main idea is to let the forwarder node notices early enough about the occurrence of the obstacles in the direction to the destination and hence, can “bend” the packet around the obstacles in a smart and efficient manner.

Student data (as of April 2018)

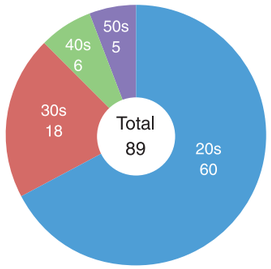
Number of Students



Numbers of foreign students by country



Age distribution of students



Career paths of students after completion of doctoral program

(Over the past 3 years) *( ) indicates number of foreign students

Year of completion	University/Research institution	Company	Undetermined	Total
FY2017	5 (4)	2 (1)	0 (0)	7 (5)
FY2016	9 (6)	6 (4)	3 (3)	18 (13)
FY2015	9 (6)	5 (3)	0 (0)	14 (9)

Degree Conferring Ceremony and Excellent Student Award (March 2018)

Curriculum

The Department of Informatics provides research instruction and guidance by top-level researchers within the advanced environment and international atmosphere of the National Institute of Informatics.

A broad range of academic fields are offered: from fundamental disciplines such as mathematics, to the basics of computer architecture and networks, and extending to software and media engineering, artificial intelligence, infosocionomics, and informatics for research. Ever since the Department was first established, lectures and research guidance have been given in small groups, meaning that the system of education is flexible to suit the individual students. Advanced research instruction and guidance are given on a daily basis to develop people capable of working at the forefront of informatics. The academic year consists of two semesters: the first semester runs from April to September and the second semester runs from October to March.
In order to complete the course, students are required to acquire a certain number of credits, to carry out research under appropriate guidance, and to pass the doctoral dissertation review of their research results. The minimum number of credits required is 10 for the three-year doctoral program and 40 for the five-year doctoral program. The duration of the program is flexible and may be shortened for students with excellent research results. If a student enrolled in the five-year doctoral program has to withdraw before graduation, they may also be awarded a master's degree as long as certain requirements are met.

Special Subjects of the Department of Informatics

Foundations of Informatics	Logic in Computer Science (TATSUTA Makoto) / Theory of Numerical Methods (HAYAMI Ken) / Basis of Information Processing in Life Systems / Algorithm (UNO Takeaki) /
	Mathematical Linguistics / Discrete Mathematics (KAWARABAYASHI Ken'ichi) / Mathematical Logic / Quantum information systems (NEMOTO Kae) /
	Quantum Computation (MATSUMOTO Keiji) / Modern Cryptography Control and Optimization (KISHIDA Masako) / Numerical Analysis (NAKTSUKASA Yuji) /
	Sublinear Algorithms (YOSHIDA Yuichi) / Graph Algorithms (IWATA Yoichi) / Computational Neuroscience (KOBAYASHI Ryota) / Algorithmic Market Design (YOKOI Yu)
Information Infrastructure Science	Computer System Design (YONEDA Tomohiro, GOSHIMA Masahiro) / Information and Communication Systems (JI Yusheng, ABE Shunji, KANEKO Megumi, FUKUDA Kensuke)
Software Science	Theory of Programming Structure (Hu Zhenjiang) / Distributed Systems (SATOH Ichiro) / Data Engineering (TAKASU Atsuhiro) /
	Software Engineering (NAKAJIMA Shin) / Signal processor (HASHIZUME Hiromichi) / Probabilistic Models in Informatics (KITAMOTO Asanobu) / Constraint Programming
	Software Development Modeling (ISHIKAWA Fuyuki) / Mathematical Structures for Formal Methods (HASUO Ichiro)
	XML Databases (KATO Hiroyuki) / Database Programming Languages / Software Development Process /
	Fundamentals of Web Application Development / Programming Languages and Theory (TSUSHIMA Kanae)
Multimedia Information Science	Digital media infrastructure (ECHIZEN Isao, KATAYAMA Norio, ANDO Ryoichi, TAKAYAMA Kenshi, AIZAWA Akiko) / Fundamentals of Media Processing (SATOH Shin'ichi, KODAMA Kazuya, IKEHATA Satoshi, MO Hiroshi) /
	Applications of Multimedia Processing (SUGIMOTO Akihiro, SATO Imari, GOTODA Hironobu, CHEUNG Gene, ZHENG Yinqiang) /
	Interactive Media (ARAI Noriko, AIHARA Kenro, YAMAGISHI Junichi, YU Yi)
Intelligent Systems Science	Logical Foundations for Artificial Intelligence (INOUE Katsumi) / Reasoning Science (SATOH Ken) / Knowledge Sharing System (TAKEDA Hideaki) / Human-Agent Interaction (YAMADA Seiji) /
	Cluster Analysis (HOULE Michael E) / Machine Learning (ICHISE Ryutaro) / Robotic Informatics (INAMURA Tetsunari) / Natural Language Processing / Psycholinguistics /
	Intelligent User Interfaces (PRENDINGER Helmut) / Intelligent Web Systems (OHMUKAI Ikki) / Communication Environments (BONO Mayumi) /
	Syntactic/semantic parsing (MIYAO Yusuke) / Econophysics (MIZUNO Takayuki) / Data mining (SUGIYAMA Mahito)
Information Environment Science	Digital Publications (OYAMA Keizo) / Information Retrieval (KANDO Noriko) / Governance among humans, technology and social system in the ICT society /
	Scholarly Information Databases / Academic Information Environments / Information Society / Methodology of Scientmetrics (NISHIZAWA Masaki) /
	ICT-enabled Business (OKADA Hitoshi) / Information Economics / Record Management / Introduction to Statistical Methods in Bibliometrics (SUN Yuan) / Terminology
Common Subjects (Faculty in Charge of the Department of Informatics)	Special Experimental Research in Informatics IA and IB to VA and VB/Special Informatics Exercises IA and IB to IIA and IIB
	Integrated Research of Informatics I A and I B to II A and II B

Common Specialized Subjects of the School of Multidisciplinary Sciences

Introduction to Mathematical Logic (TATSUTA Makoto) / Introduction to Algorithms (UNO Takeaki) / Quantum Information and Computing (NEMOTO Kae, MATSUMOTO Keiji) /
High-Performance Computing (AIDA Kento, KOIBUCHI Michihiro, TAKEFUSA Atsuko) / Information Sharing System Architecture (URUSHIDANI Shigeo, TAKAKURA Hiroki, KURIMOTO Takashi) /
Introduction to Software Science I (All professors in Software Science) / Introduction to Software Science II (All professors in Software Science) /
Introduction to Information Media Science (All professors in Multimedia Information Science) /
Introduction to Intelligent Systems Science I (INOUE Katsumi, YAMADA Seiji, INAMURA Tetsunari, ICHISE Ryutaro, MIYAO Yusuke, MURATA Shingo, HOULE Michael E) /
Introduction to Intelligent Systems Science II (SATOH Ken, TAKEDA Hideaki, PRENDINGER Helmut, OHMUKAI Ikki, MIZUNO Takayuki, BONO Mayumi, SUGIYAMA, Mahito) /
Introduction to Information Environment Science I (All professors in Information Environment Science) /
Introduction to Information Environment Science II (All professors in Information Environment Science) / Academic Communication /
Intellectual Property Rights / Research, Development and International Collaboration in a Changing World / Scientific Presentations (HAYAMI Ken, HOULE Michael, CHEUNG Gene, JONES Caryn) /
Scientific Writing (HAYAMI Ken, HOULE Michael, CHEUNG Gene, JONES Caryn) / Introduction to information security infrastructure (ECHIZEN Isao, OKADA Hitoshi, TAKAKURA Hiroki) /
Applied Linear Algebra (HAYAMI Ken, GOTODA Hironobu, CHEUNG Gene, NAKATSUKASA Yuji, SATOH Shin'Ichi) / Introduction to Big Data Science (Professors related to Big Data)

Cooperation with Graduate Schools

The National Institute of Informatics actively cooperates with graduate education at the University of Tokyo, Tokyo Institute of Technology, Waseda University, Japan Advanced Institute of Science and Technology (JAIST), Kyushu Institute of Technology, the University of Electro-Communications, and Tokyo University of Science. We conduct classes in partnership with these institutions and accept graduate students for research guidance.

Cooperation with Graduate Schools

Name of Institution	Name of School	Notes
The University of Tokyo	Graduate School of Information Science and Technology	Since FY2001
Tokyo Institute of Technology	Graduate School of Information Science and Engineering	Since FY2002
	Interdisciplinary Graduate School of Science and Engineering	Since FY2003
	Graduate School of Engineering	Since FY2016
	Graduate School of Information Science and Technology	
Waseda University	Graduate School of Fundamental Science and Engineering	Since FY2005
	Graduate School of Creative Science and Engineering	
	Graduate School of Advanced Science and Engineering	
Japan Advanced Institute of Science and Technology (JAIST)	Graduate School of Advanced Science and Technology	Since FY2008
Kyushu Institute of Technology	Graduate School of Computer Science and Systems Engineering	Since FY2010
	Faculty of Computer Science and Systems Engineering	
University of Electro-Communications	Graduate School of Information Systems	Since FY2012
Tokyo University of Science	Graduate School of Science	Since FY2015

Special Collaboration with Research Students

As an inter-university research institute, the National Institute of Informatics accepts graduate students from other universities in Japan and overseas as research students in special collaborative projects.
Special research with research students receives guidance from faculty of the National Institute of informatics according to the research subjects.

Universities to which research students for special collaboration belong (2017 results)

Kyushu Institute of Technology	Birla Institute of Technology and Science	Trinity College Dublin
Chiba University	Ecole des Ponts Paristech	Universite Paris-Est Marne-la-Vallee
University of Tsukuba	Ecole Normale Superieure	University of Innsbruck
The University of Tokyo	Ecole Polytechnique	University of Konstanz
Tokyo University of Agriculture and Technology	Ghent University	University of Namur
Keio University	Hanoi University of Science and Technology	University of Science and Technology of China
Tokyo University of Science	Hong Kong University of Science and Technology	University of Strathclyde
Ritsumeikan University	Imperial College London	VNU Hanoi University of Engineering and Technology
Waseda University	Shanghai Jiao Tong University	Yale University
Aalto University	Simon Fraser University	Zhejiang University
Beijing Jiaotong University	The University of Hannover	

Number of students accepted through both systems of collaboration with graduate schools and research students (FY2017)

Master's program	Doctoral program	Total
74	54	128

SINET5 (Science Information NETwork) : Providing Ultrahigh-Speed and Low Latency Throughout Japan

https://www.sinet.ad.jp/

100Gbps, full-mesh network opens up new possibilities

The Science Information NETwork (SINET5; Science Information NETwork 5) is an information communication network built and operated as academic information infrastructure for universities and research institutions throughout Japan. The network has nodes (network connection points) nationwide, and it is designed to promote research and education as well as the circulation of scientific information among universities, research institutions, and similar entities. In addition, SINET is also interconnected with many overseas research networks, such as Internet2 in the U.S. and GÉANT in Europe, to facilitate the circulation of research information across borders, which is necessary in advanced international research projects.

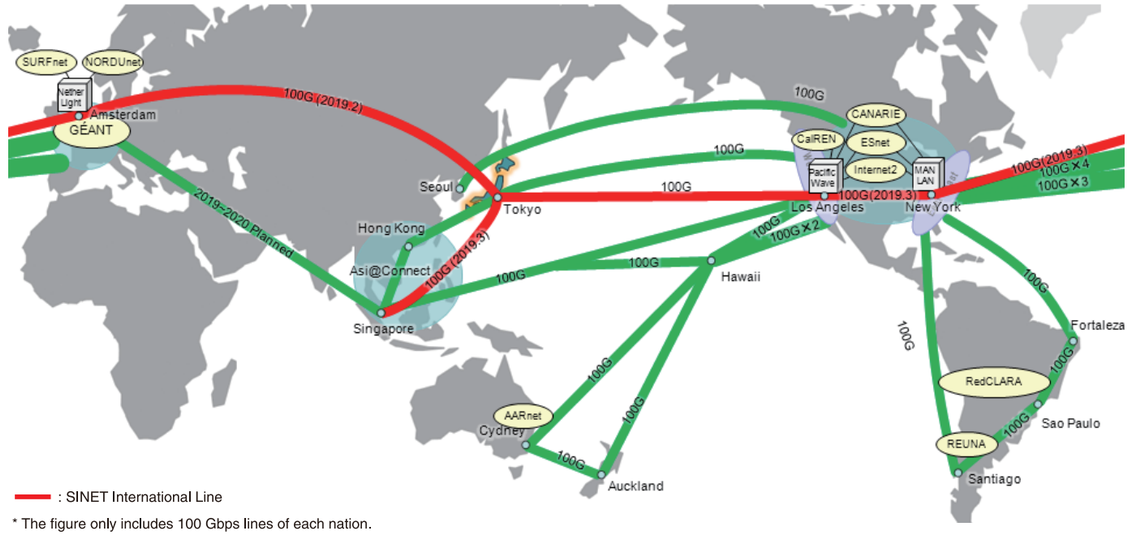
The previous SINET4 was upgraded to SINET5, and full-scale operation of the upgraded network began in April 2016. SINET5 provides cloud computing, security and high-level academic information infrastructures to more than 850 universities and other institutions to organically share academic contents via a 100 Gbps network throughout Japan.

In the second half of FY2018, we plan to upgrade the Japan-Europe line, Japan-New York Line (via Los Angeles), and Japan-Singapore Line to 100Gbps in order to further enhance the strength of international competitiveness and cooperation. We are also planning to put in place platform functionality that directly connects SINET and the mobile network for data collection analysis that utilizes the mobile network as a way to foster flexible use of university analysis resources as well as arbitrary cloud resources.

Number of institutions participating in SINET (as of March 31, 2018)

National universities	86
Municipal universities	80
Private universities	386
Junior colleges	77
Technical colleges	56
Inter-university research institutes	16
Others	188
Total	889

Interconnection with overseas research networks



: SINET International Line

* The figure only includes 100 Gbps lines of each nation.

SINET5 Services

SINET5 provides ultrahigh-speed interfaces, such as 100GE and 40GE. Along with expanding the network service features, more user-focused services such as university LAN virtualization and L2 on-demand are added to the service menu to allow secure, advanced research environments to be built in universities and research institutions.

Service menu		
L3 services	Internet connection (IP Dual)	
	Full Route Provision	
	IP multicast (+QoS)	
	QoS for each application	
	L3VPN (+QoS)	
L2 services	L2VPN/VPLS (+QoS)	
	University LAN Virtualization	Provision started
	L2 on-demand (Basic)	Provision started
	L2 on-demand (International collaboration: NSI)	Trial operation underway (currently accepting usage requests)
	L2 on-demand (Cloud system collaboration: REST)	Provision started
L1 service	Lambda Leased Line	
Redundancy of access lines	Multihoming	
	Link aggregation	
	Redundant trunk group service	Provision started
Stabilization of network operations	DDoS Mitigation function	Set according to applications from member institutions
Next-generation network functions	NFV service	In trial phase
Enhanced transfer performance	Performance measurement	Provision started
	High-speed file transfer supporting 100 Gbps	Provision of some functions underway

Concept and Characteristics of SINET5

https://www.sinet.ad.jp/

Five Major Concepts of SINET5

(1) Advanced Infrastructure

Adopting the Latest Technologies to Minimize Delays in Communication

SINET5 introduces a state-of-the-art optical network with optical transmission technologies, and adopts the latest technologies over the fully-meshed topology to minimize transmission delays between DCs in every prefecture.

(2) Ultra High Speed

Realize 100 Gbps High-speed Networks throughout Japan

SINET5 realizes an ultrahigh-speed network oriented for plane expansion via 100 Gbps line bandwidth that connects between DCs.

(3) High Reliability/Robustness

Realize a Highly Reliable and Robust Network without Interruptions or Stoppages

SINET5 realizes and provides a highly reliable and robust network by adopting and cooperating (combining) redundancy function/method in each network layer to avoid and bypass blockages in the latest stratified network architecture (optical network layer, MPLS-TP network layer, and IP/MPLS network layer).

(4) Internationality

Realize Faster Lines to the US and Asia, and Directly Connected to Europe

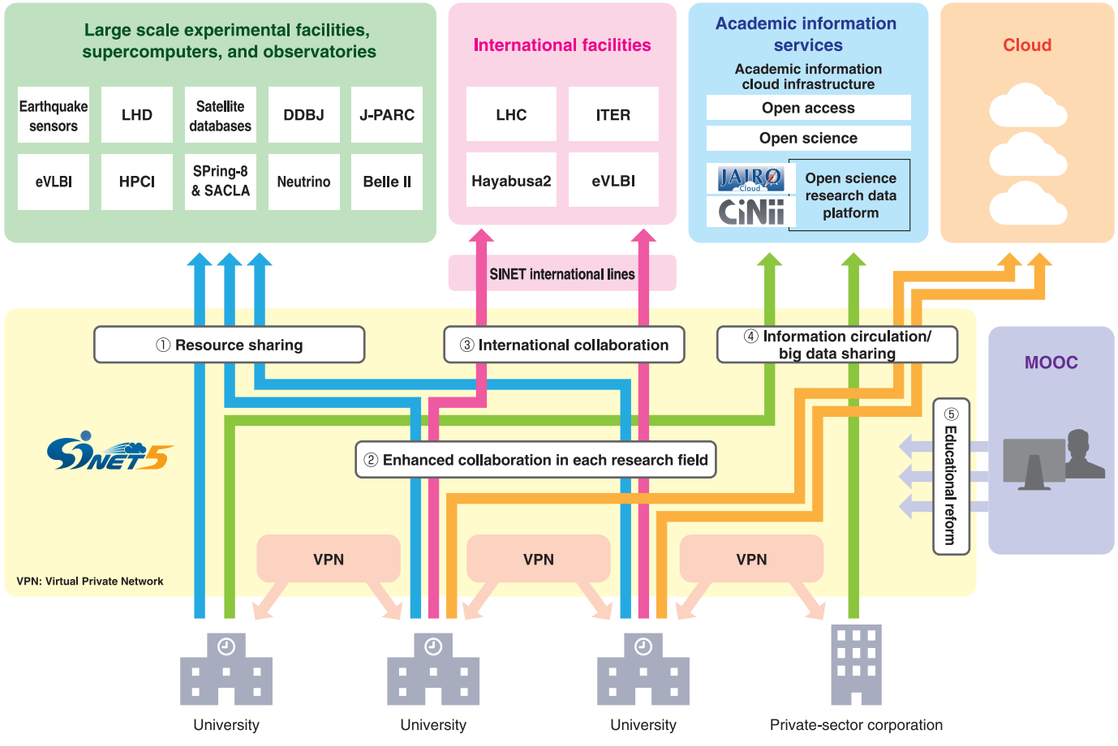
SINET5 achieves a lower delay network by adding a direct connection to Europe that do not travel through the United States. This network further enhances support for international joint projects by realizing global expansion of SINET for the United States, Europe and Asia.

(5) Multifunction/Flexibility

Promote Diverse Expansion of Academic Information (Infrastructures) such as Security, Support for Use of Cloud Systems, Academic Content

Characteristics of SINET5

SINET5 has been built and operated as a platform for benefits such as (1) collaborative use including large laboratories, (2) strengthening cooperative capabilities in each research field, (3) international collaboration between nations worldwide, (4) distribution of academic information and sharing of big data, and (5) higher quality education at universities.



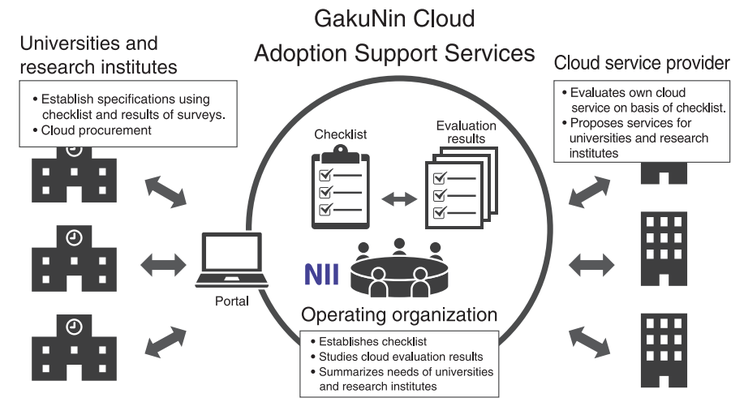
Support for Cloud Utilization by Universities and Research Institutes

With the aim of establishing an academic information infrastructure, NII supports cloud use for a variety of applications.
This support includes a service to support adoption and procurement of cloud services (GakuNin cloud adoption support), services to support cloud use (SINET cloud connection service, Cloud gateway service, and On-demand cloud configuration).

GakuNin Cloud Adoption Support

GakuNin Cloud https://cloud.gakunin.jp/

NII's GakuNin Cloud Adoption Support is a service for preparing, distributing, and sharing information about the required standards when a university or research institute adopts cloud services. It is supporting cloud service adoption by organizing a checklist of items that must be addressed when a university or research institute introduces the cloud, analyzing the results of the responses by cloud service providers to this checklist, and providing the results to universities and research institutes. Institutions can develop the specification for cloud service procurement as well as compare multiple could services using the same indicators so that they can adopt and use a cloud system appropriate for their needs. In addition, NII conducts individual consultations of cloud adoption, hosts seminars on cloud services for universities and research institutes, and provides cloud start-up guides as well as cloud usage examples.



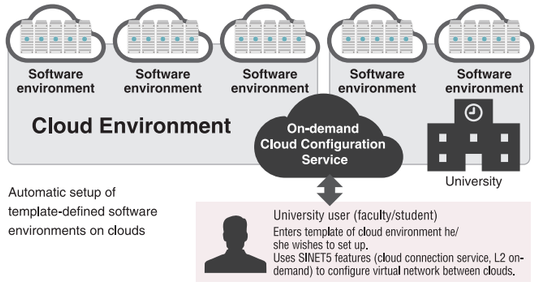
Cloud Gateway Service

https://cloud.gakunin.jp/cgw/

The Cloud Gateway Service provides portal functionality to access all of the online services from one place, such as the various cloud services necessary for research and educational activities as well as electronic journals.
Members of universities and research institutions can easily and quickly access the list of services they want to use such as the various services contracted by their institution, by accessing the cloud gateway service via authentication infrastructure operated by their institution.
Furthermore, administrators of universities and research institutions can count on a highly-convenient system for members of their institution, such as the ability to customize service lists to display for users.

On-demand Cloud Configuration Service (Release Planned for the Second Half of 2018)

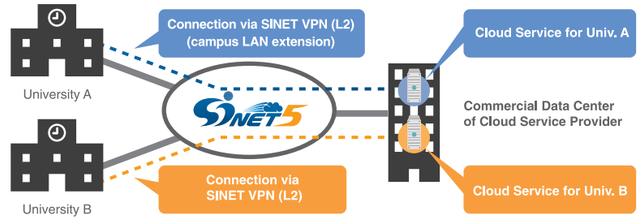
The on-demand cloud configuration service is a service to set up a cloud environment. Users at universities and research institutions can easily perform software installations and specify settings on the cloud system. In addition, this service supports the fast and secure network provided by SINET5. An intercloud environment consisting of multiple computers connected by SINET5, e.g. computers in clouds, universities and research institutions, can be built on-demand and used for research, education, and IT system operation. This service is scheduled to be released in the second half of 2018.



SINET Cloud Connection Service

https://www.sinet.ad.jp/connect_service/service/cloud_connection

The SINET cloud connection service allows cloud service providers to be connected directly to SINET to provide cloud services to academic institutions so that upper layer services (email, storage, etc.) can be used securely. SINET-member institutions can configure networks, such as secure private networks, more inexpensively by using this service.



Establishment of Authentication Infrastructure

Academic Access Management Federation in Japan "GakuNin"

https://www.gakunin.jp

The Academic Access Management Federation "GakuNin" is a structure that utilizes university's authentication infrastructures not only for internal services but also for university collaboration and commercial services including the cloud, thus facilitating the safe and secure use of academic services on the Internet by collaborative utilization of identity information. With Single Sign-On, users can seamlessly and automatically log into multiple internal and external services with a simple single logon procedure. For universities, building an authentication infrastructure with GakuNin raises the baseline of security measures and reduces the cost of ID management.

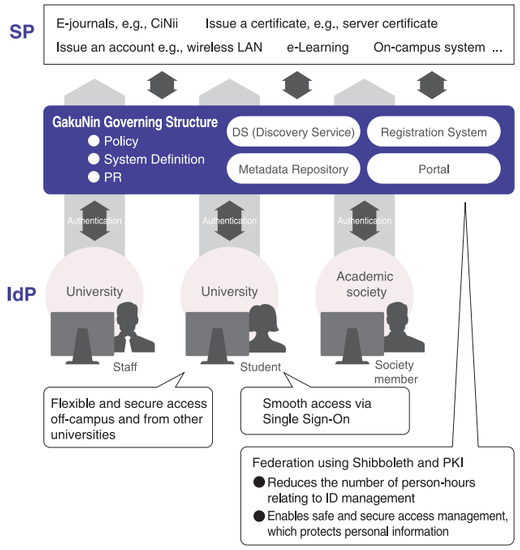
Participants (as of the end of March 2018)

Number of organizations (IdP: Identity Provider)	210
Number of services (SP: Service Provider)	162

[Features]

- Single Sign-On (SSO) by authenticate only once with one ID/password to use various services
- Accessible from anywhere in the world without VPN nor other complicated technologies (remote access)
- Only a web browser is required
- Ease to improve security level with client certificate authentication and/or multi-factor authentication

GakuNin strives to maintain reliability by annual assessment of the IdPs operated by universities and institutions. GakuNin also provides LoA1 (Level of Assurance 1) certification service specified in the trust framework of the Federal Identity, Credential, and Access Management (FICAM) in the United States.
Universities that have been certified for LoA1 are able to use the US government services, including the databases of the National Institutes of Health (NIH).



Digital certificates: UPKI Digital Certificate Issuance Service

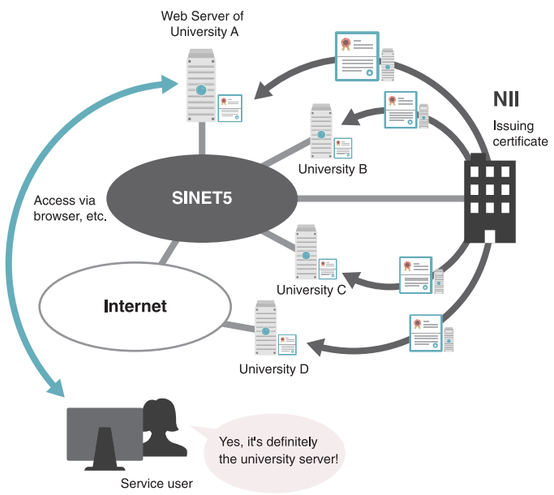
https://certs.nii.ac.jp/

NII started the UPKI Digital Certificate Issuance Service, a business issuing digital certificates aimed at universities and research institutions, in January 2015. In addition to the server certificates provided in advance, NII now also issues client certificates and code signing certificates. As before, the server certificates issued by NII are highly secure and conform to the unified international Web Trust for CA (WTCA) standard. The use of server certificates improves web security by proving that the provider of a web server (domain name and organization name) is legitimate and, for example, making them easy to distinguish from phishing websites. NII also issues client certificates to members of institutions for authentication, and these can be applied for security purposes such as multi-factor authentication and preventing identity theft.
Additionally, signing software with code signing certificates confirms the existence of a developer and guarantees that the software is not fake. This gives users peace of mind when using the software.
By providing these certificates, the UPKI Digital Certificate Issuance Service improves the security of universities and research institutions across the board.

Institutions using UPKI Digital Certificate Issuance Service

(as of the end of March 2018)

Number of target institutions for issuance	319
Number of target domains	427



eduroam: International Academic Wireless LAN Roaming Platform

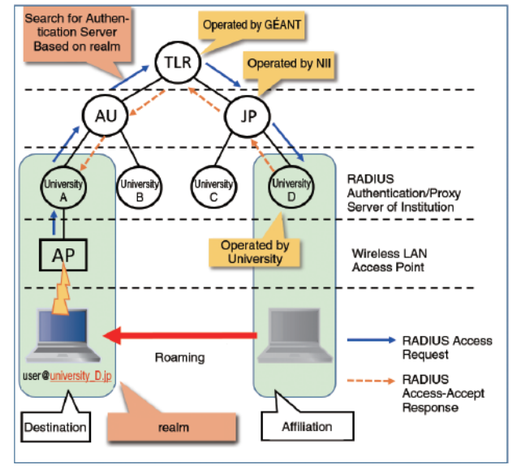
https://www.eduroam.jp/

eduroam is an academic wireless LAN roaming platform developed by GÉANT (formerly TERENA) in Europe. It realizes wireless LAN service that is mutually interoperable between campuses of universities and research institutes. In 2006, eduroam was introduced in Japan as part of NII's nationwide Common University Authentication Platform Construction Project. "eduroam JP" is being jointly operated, supported, and developed in Japan by NII and Tohoku University. Based on the IEEE802.1X industrial standard, eduroam provides a secure and highly convenient wireless LAN environment.

eduroam JP participants

(as of the end of March 2018)

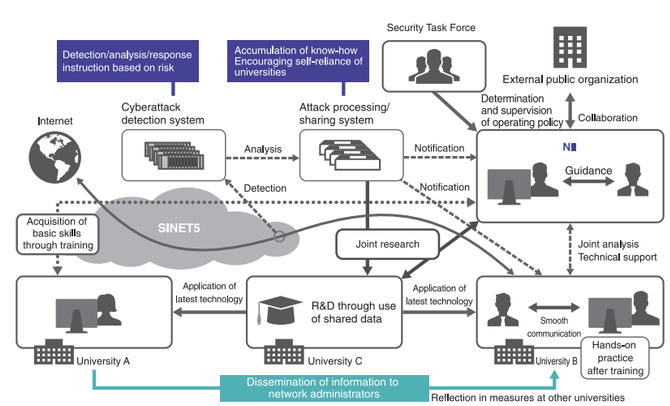
Number of organizations in Japan	211



Support of Inter-university Collaboration-based Information Security Framework

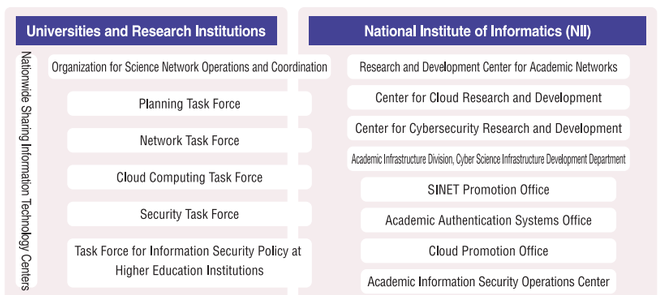
https://www.nii.ac.jp/service/nii-socs/

NII established the Center for Cybersecurity Research and Development in FY2016, to support system configuration which can rapidly respond to the incidents and accidents at national universities and other institutions under cyber attacks. The NII Security Operation Collaboration Services (NII-SOCS) began operation in FY2017.
By cultivating personnel based on inter-university collaboration while applying appropriately the research results of attack detection and defense capability, the quality of cyber security infrastructure of national universities and other institutions is improved. In addition, extensive research and development activities are committed to facilitating cybersecurity research and providing secure environments for the research and education in all scientific research fields.



Organization for Science Network Operations and Coordination

The science information network is operated by collaboration and cooperation with partners that include centers for informational infrastructure at universities and research institutions and three research and development centers of National Institute of Informatics (NII) under the supervision of the Organization for Science Network Operations and Coordination, which is a partner of the universities and research institutions as well as the National Institute of Informatics.



Publishing and Communicating Academic Information CiNii

NII accumulates and structures the education and research results produced at universities and research institutions, and provides access through a user-friendly interface.

CiNii https://ci.nii.ac.jp/en

This is a database service that can be exhaustively searched for academic information such as articles, books, journals, and doctoral dissertations.
NII is expanding the pool of data available and improving text hit rates by linking various database services.
In addition, NII is promoting intersystem links with university libraries and other facilities by providing search APIs (application program interfaces) such as OpenSearch.
The service also offers a dedicated smartphone display so that the database can be searched with ease using a smartphone.

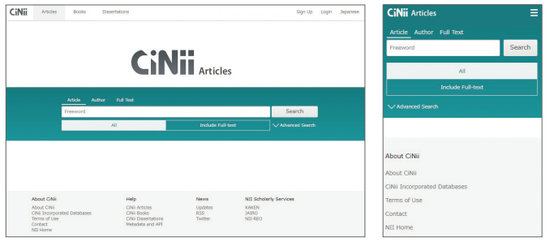
CiNii Articles: Searching for Japanese research papers

https://ci.nii.ac.jp/en

Contains more than 20 million information items on Japanese academic articles including academic society publications, research bulletins, and the Japanese Periodicals Index of the National Diet Library.

Collection status (as of the end of March 2018)

Number of article information items
20.63 million



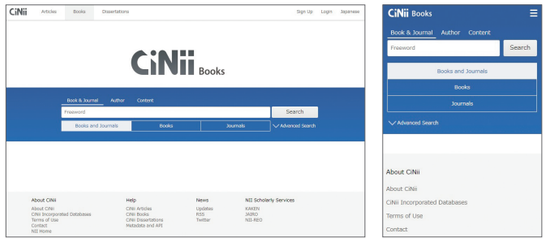
CiNii Books: Searching for books in university libraries

https://ci.nii.ac.jp/books/en

This service allows searching of information on books and journals held by university libraries in Japan.
Contains more than approximately 12 million bibliographic records of books and authors held by university libraries nationwide accumulated through the Catalog Information Service (NACSIS-CAT) operated by NII.

Collection status (as of the end of March 2018)

Number of bibliographic records	Number of holding records	Number of participating libraries
12.41 million	140 million	1,334



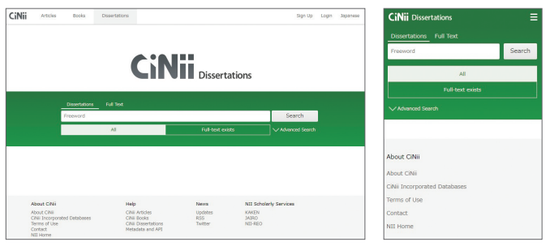
CiNii Dissertations: Searching for Japanese doctoral dissertations

https://ci.nii.ac.jp/d/en

Allows comprehensive, centralized searching of Japanese doctoral dissertations.
In addition to dissertation texts digitized by the National Diet Library, it is also possible to search and view dissertation texts published in the institutional repositories of universities and research institutes.

Collection status (as of the end of March 2018)

Total number of doctoral dissertations	Number of full texts
630 thousand	Approx. 240 thousand



Support for Construction and Linkage of Institutional Repositories (JAIRO Cloud) https://www.nii.ac.jp/irp/en/

To contribute to the establishment of next-generation academic content platforms, NII supports the construction and linkage of institutional repositories to communicate university education/research results and promotes open access. NII has so far supported content enrichment, system linkage, and community formation at academic institutions in Japan, and institutional repositories have been built and are in operation at more than 750 institutions.

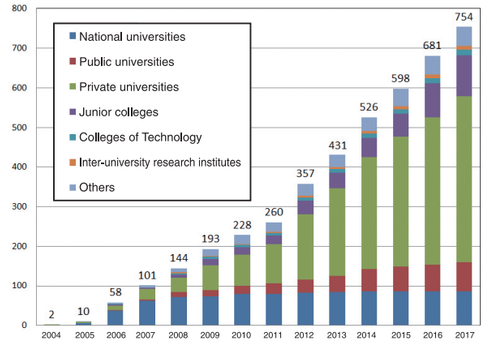
JAIRO Cloud (shared repository service) https://community.repo.nii.ac.jp/

For institutions that find it difficult to independently build and operate their own repositories, NII provides a shared repository system environment in the form of a cloud service based on our institutional repository software WEKO (http://weko.at.nii.ac.jp/).

Collection status (as of the end of March 2018)

Number of institutions using the service
498

■Numbers of institutional repositories in Japan



Crossover Searches of Academic Information Accumulated in Institutional Repositories in Japan

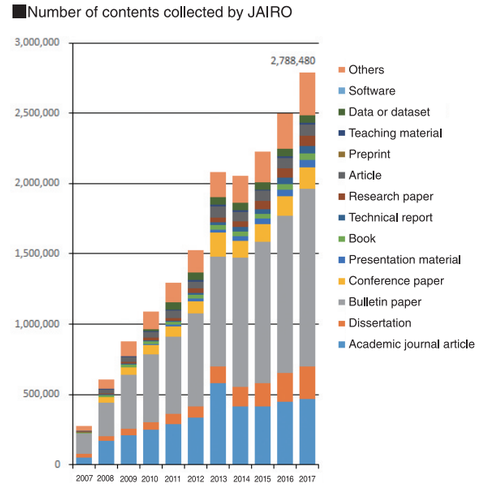
JAIRO (Institutional Repositories Portal) http://jairo.nii.ac.jp/en

This portal enables crossover searches of education/research results of university and research institution (journal articles, dissertations, research bulletins, research papers, teaching materials, etc.) accumulated in institutional repositories in Japan. Users are able to access full texts available in each institutional repository, as well as linking to CiNii.

Collection status (as of the end of March 2018)

Number of institutional repositories	Number of contents
676	2.79 million

■Number of contents collected by JAIRO



Japan Consortium for Open Access Repository https://jpcoar.repo.nii.ac.jp/

JPCOAR: Japan Consortium for Open Access Repository

JPCOAR is a repository community of institutions where universities and other research institutes engage as a way to more effectively promote their efforts for the purpose of spreading the dissemination of research results and enhancing the benefits of building and operating institutional repositories.
The consortium also works in efforts that include improvements to the distribution of open science and other academic information as well as the joint operation of system infrastructure for an institutional repository (JAIRO Could).
NII supports these activities as well as JPCOAR by providing assistance such as physical support for collaboration with university libraries.

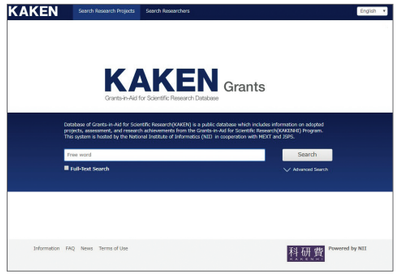
JPCOAR General Assembly (March 14, 2018)

Database of Grants-in-Aid for Scientific Research KAKEN 科学研究費助成事業データベース

KAKEN (Database of Grants-in-Aid for Scientific Research)

https://kaken.nii.ac.jp/en/

This database allows users to browse adopted projects and research results (reports, summaries, etc.) funded by Grants-in-Aid for Scientific Research from the Ministry of Education, Culture, Sports, Science and Technology and the Japan Society for the Promotion of Science. It provides access to the latest research information in Japan in a wide variety of fields. The system developed by KAKEN is also used in the JST Project Database (https://projectdb.jst.go.jp/), which contains research projects funded by the Japan Science and Technology Agency (JST).



Collection status (as of the end of March 2018)

Number of adopted projects
850,000

Catalog Information Service

NACSIS-CAT NACSIS-ILL https://www.nii.ac.jp/CAT-ILL/en/

The Catalog Information Service consists of the Cataloging System (NACSIS-CAT) and the Interlibrary Loan System (NACSIS-ILL).

Cataloging System (NACSIS-CAT)

NACSIS-CAT is a system for building comprehensive catalog databases designed to provide at-a-glance information on academic literature (books/-journals) archived at university libraries and other such institutions throughout Japan. To improve efficiency, the system provides the capability to refer to standard cataloging data (MARC), and university libraries and other institutions nationwide share the work of inputting records online.

Collection and usage status (As of end of March 2018, * indicates FY2017 (one year)'s value)

Number of NACSIS-CAT participating institutions	Cumulative no. of registered records	Number of NACSIS-ILL participating institutions	Number of NACSIS-ILL copies*	Number of NACSIS-ILL loans*
1,334	135,330,000	1,103	500,000	86,000

Interlibrary Loan System (NACSIS-ILL)

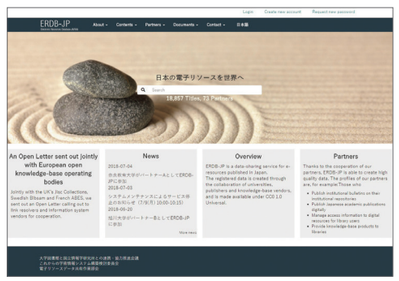
NACSIS-ILL makes use of the comprehensive catalog databases constructed using NACSIS-CAT to support the exchange of books and journal articles between libraries and so facilitate the provision of academic literature to researchers at universities and other institutions. As well as supporting interlibrary loan services with university libraries overseas by linking to systems such as KERIS in South Korea, NACSIS-ILL promotes the efficiency of library work through an offsetting service for ILL document copying and other charges.

Electronic Resources Data Sharing Service

ERDB-JP (Electronic Resources Database-JAPAN)

https://erdb-jp.nii.ac.jp/en

ERDB-JP is a service that develops and shares knowledge databases of electronic resources, such as e-journals and e-books, published in Japan. It is operated by NII and the "Electronic Resources Data Sharing Task Force," made up of staff responsible for managing e-resources at each university. Content metadata are collected and updated by partners consisting of universities, publishers, and knowledgebase vendors.
The accumulated metadata of contents are provided under the CC0 license. They can be exported and used for creating lists of e-resource titles, for OPAC provided by universities, and for discovery services.



Partner participation (as of end of March 2018)

	Universities (national)	Universities (municipal)	Universities (private)	Inter-university research institutes	Publishing companies	Others	Total
Partner A	27	3	8	4	3	6	51
Partner B	6	0	9	1	0	3	19
Total	33	3	17	5	3	9	70

Data registrations (as of end of March 2018)

Number registered	Number of new registrations (FY2017)	Number of updates (FY2017)	
18,448	7,258	Automatic Update 97,241	Manual Update 12,227

Electronic Archives

NII-REO https://reo.nii.ac.jp/index_en.html

NII carries out the following activities to store and provide electronic academic information on a permanent basis.

NII-REO (NII Electronic Resource Archives)

Back issues of international electronic journals (approx. 3.34 million records) and an electronic collection of humanities and social science materials (approx. 620,000 items) are saved on NII servers and provided to universities in Japan. Electronic resources archived in NII-REO are maintained in collaboration with the Japan Alliance of University Library Consortia for E-Resources (JUSTICE).

Archived contents (as of the end of March 2018)

OJA e-journal archive	Archived Years	Number of items
Springer Online Journal Archive	1832-1999	Titles: Approx. 1,100 Number of records: Approx. 2 million
Springer Lecture Note in Computer Science	1973-1999	Titles:1,501
Oxford Journal Archive Collection	1849-2003	Titles: 311 Number of records: Approx. 640,000
Kluwer Online	1997-2005	Titles: Approx. 800 Number of records: Approx. 350,000
IEEE Computer Society Digital Library (CSDL)	1988-2011	Titles: 30 Number of records: Approx. 350,000
HSS Humanities and Social Sciences e-collection	**Archived Years**	**Number of items**
Nineteenth / Twentieth Century House of Commons Parliamentary Papers (19C HCPP & 20c HCPP)	1801-2004	Number of records: Approx. 186,000
Eighteenth Century House of Commons Parliamentary Papers (18c HCPP)	1660-1834	Number of records: Approx. 58,000
The Making of the Modern World: Goldsmiths'-Kress Library of Economic Literature (MOMW)	1450-1850	Number of records: 61,000 books, 445 journals
The Making of the Modern World, Part II (MOMW II)	1851-1914	Number of records: Approx. 5,000
Eighteenth Century Collections Online	1701-1800	Number of records: Approx. 180,000
Early English Books Online	1475-1700	Number of records: Approx. 130,000

International Scholarly Communication Initiative

https://www.nii.ac.jp/sparc/en/

SPARC Japan

The Scholarly Communication Initiative started working with SPARC (USA) and SPARC Europe in FY2003 and has conducted services with the collaboration of academic societies and university libraries for the propose of promoting greater dissemination of results from scientific and academic information research in Japan, while promoting digitalization and internationalization of academic magazines published by organizations, such as academic societies in Japan, and promoting improvements to international standards for the distribution of academic information.
In particular, the SPARC Japan Seminar covers the latest challenges of distributing academic information as a place for exchange between academic information stakeholders.
The basic policy in phase 5 (FY2016–2018) is to "implement open access under a framework of international collaboration, to promote the distribution of academic information, and to strengthen the ability to disseminate information." In addition to promoting collaboration with university libraries and researchers, the project aims to understand the issues around open access and to study the measures that universities should adopt.

SPARC Japan

Education and Training Service

https://www.nii.ac.jp/hrd/

We offer education and training services such as those below to develop human resources, such as university staff who support academic information infrastructures in Japan.

- Training course (NACSIS-CAT/ILL self-learning)
- Specialized training course (bibliography creation training for catalog systems/information processing technology seminars)
- Comprehensive training (training held by the National Institute of Informatics/comprehensive academic information systems workshops), etc.

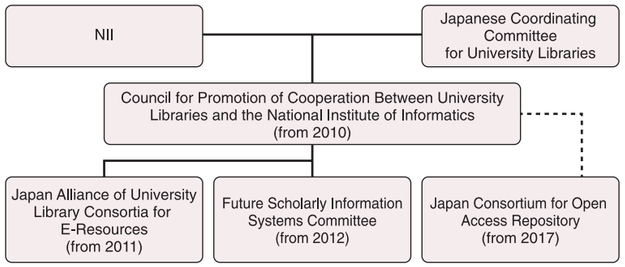
国立情報学研究所 教育研修事業

Collaboration with University Libraries

https://www.nii.ac.jp/content/cpc/

Council for Promotion of Cooperation Between University Libraries and the National Institute of Informatics

NII entered into an agreement with the Japanese Coordinating Committee for University Libraries in order to promote projects in cooperation with university libraries. Based on this agreement, NII established the Council for Promotion of Cooperation Between University Libraries and the National Institute of Informatics. This Council and the committees established beneath it (including the Japan Alliance of University Library Consortia for E-Resources and Future Scholarly Information Systems Committee) promote collaborative projects concerning electronic materials and the distribution of academic information.
NII has also partnered with the Japan Consortium for Open Access Repository for services related to institutional repositories.



Japan Alliance of University Library Consortia for E-Resources

https://www.nii.ac.jp/content/justice_en/

JUSTICE: Japan Alliance of University Library Consortia for E-Resources

Aiming to implement a range of activities to provide stable and continuous access to academic information, including e-journals, JUSTICE is one of the world's largest consortia with over 500 participating national, public, and private university libraries.
To support the activities of JUSTICE, NII has established the Library Liaison Cooperation Office, which functions as the JUSTICE secretariat and is staffed from university libraries.

Future Scholarly Information Systems Committee

https://www.nii.ac.jp/content/korekara/

Future Scholarly Information Systems Committee

The Future Scholarly Information Systems Committee was established for the purpose of further promoting activities related to the construction, management, sharing and provision of infrastructures for academic information resources. This committee is made up of university librarians recommended by each national, public, and private university library association and council, experts as well as NII faculty.
In addition to organizing the challenges in reaching the ideal form of future academic information systems, the committee examines the ideal form of the community for examination and operation in the future and measures to realize that ideal form.
NII participates as a member and supports activities such as the role entrusted to the secretariat.

Working Group for e-Resource Data Sharing

This working group strives to (1) build management infrastructure and workflows for electronic resources, (2) systematically prepare electronic books and other metadata, (3) establish a maintenance management system for the Electronic Resources Database-JAPAN (ERDB-JP), and (4) forge international partnerships for shaping sustainable electronic resource management and the provision infrastructure for the purpose of creating electronic resource management and provision infrastructure able to realize a comprehensive discovery environments. The working group is made up of members such as university librarians in charge of the contract, management and provision of electronic resources.

Working Group for the Examination of NACSIS-CAT/ILL

This working group examines the ideal form in the future for the Catalog Information Service (NACSIS-CAT/ILL) operated by NII for the purpose of minimizing and rationalizing operation and management. The members composed of university librarians in charge of cataloging operations work to create measures that include guidelines for new cataloging operations in addition to formulating policies for various changes.

Open Science

https://rcos.nii.ac.jp/en/

Open Science, which promotes open access and open research-data over the Internet, is gaining traction as a new way of conducting research. The three platforms deployed along the research workflow allow researchers to manage, publish and search various types of research outputs in the respective workflow. NII Research Data Cloud—deployed and enhanced by the collaboration of NII, Japanese universities, and research centers—contributes to accelerating Open Science in Japan*.

Research Data Management Platform (GakuNin RDM)

GakuNin RDM is a platform which allows individual researchers or research groups to manage their research data and relevant digital materials in the active research process. Universities can connect a variety of cloud storages in addition to the institutional storage. Major research tools can also be used on GakuNin RDM. Basic functions, such as file viewer, access, and version control, enhance collaborative work between researchers. For ensuring research integrity and for protecting researchers, modifications of files are recorded by applying time-stamping technology.

Publication Platform (WEKO3)

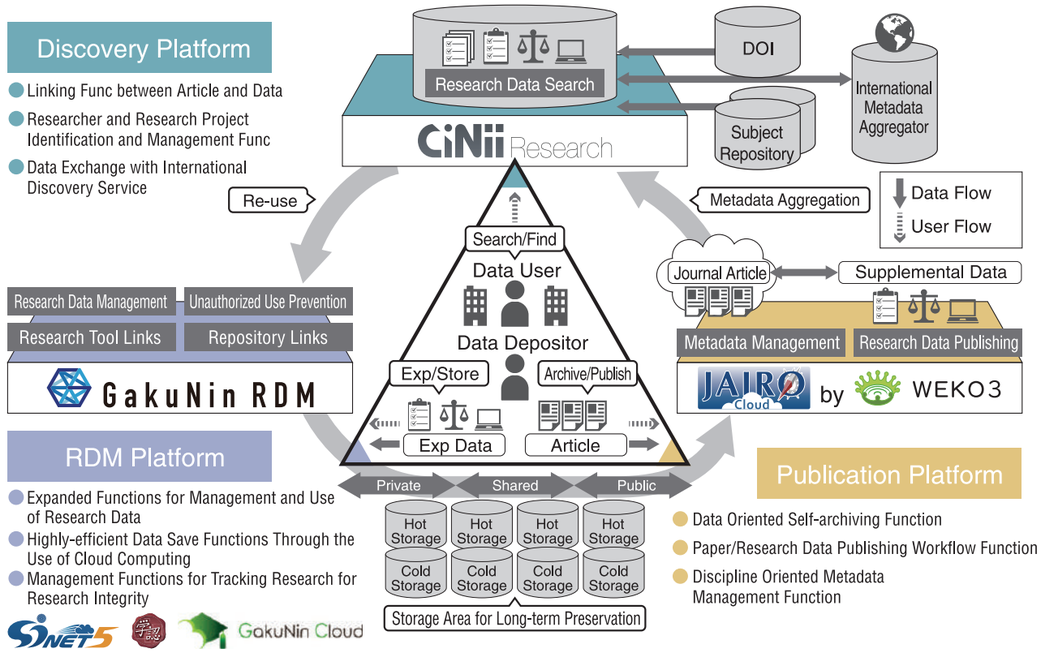
WEKO3 is a platform where research data and other resources, which researchers have decided to make openly accessible, are stored and published. WEKO3 is connected to GakuNin RDM, allowing researchers to publish research outputs through a simple action. The new publication platform is provided through JAIRO Cloud, which is a cloud service for hosting institutional repositories. Digital object identifiers (DOI) are assigned and linking information between contents—such as between a journal article and its evidence data—is provided, making the published research outputs more reusable. This next-generation repository system offers enough flexibility and expandability, allowing WEKO3 to be used not only as institutional repositories but also as subject-based repositories.

Discovery Platform (CiNii Research)

CiNii Research is a discovery platform for finding research outputs published through institutional repositories and other domain-specific databases. This next-generation search engine can shed new lights in the research discovery process. Large-scale academic knowledge graph is core to providing such a new experience. After aggregating metadata from various databases, the knowledge graph is generated by analyzing relationships between different types of scholarly contents, researchers, research projects, and institutions, enabling users to gain great panorama of research activities.

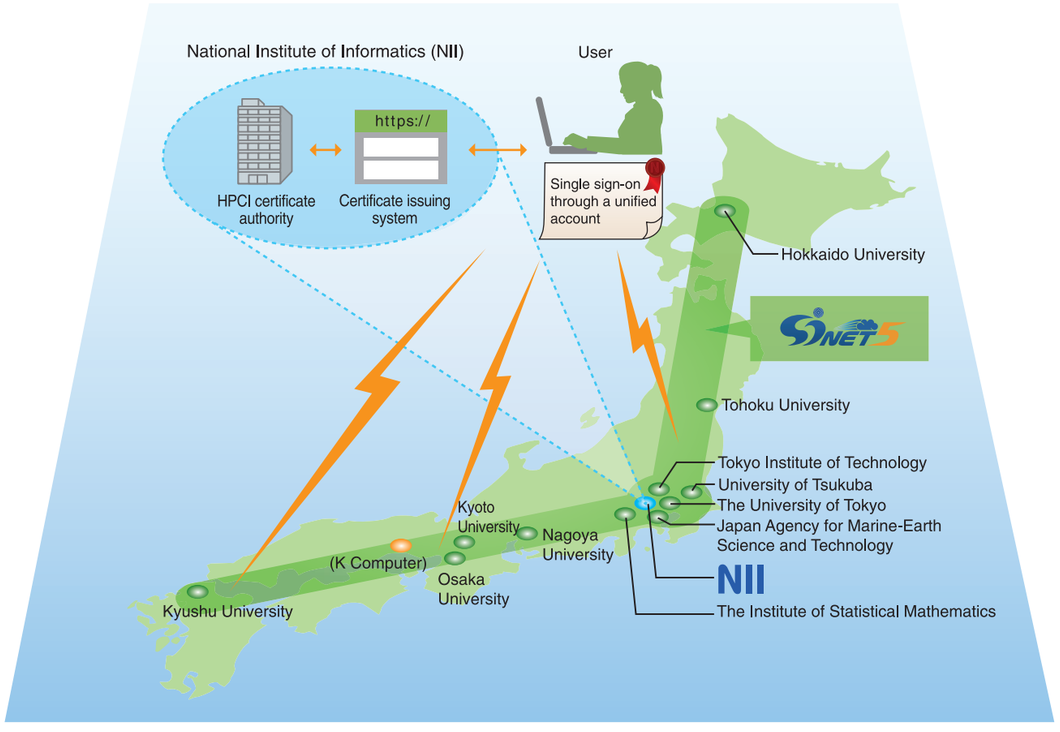
*Production level operation of this service is set to start in FY2020.

NII Research Data Cloud	
Purpose	For facilitating Open Science, a common infrastructure which consists of research data management, publication, and discovery platforms is developed by the collaborations of academic communities.



Operation and Maintenance of Authentication Infrastructure for High Performance Computing Infrastructure (HPCI)

HPCI implements a revolutionary computing environment that meets the needs of various users, including the industrial sector, by linking the K computer in Kobe and other supercomputers and storage installed at universities and research institutes in Japan. It began service in the second-stage project of FY2017. HPCI has a single sign-on authentication mechanism that allows users to gain access to any computing resource by using a common login account to improve usability. As the first-stage project, NII is continuing to operate and maintain the authentication system, including the certificate authority and a certificate issuing system, which are the core of this single sign-on authentication mechanism, in collaboration with the K computer and universities. The authentication system takes advantage of a highly secure framework that uses certificates for HPCI users to ensure security in communication and data. It also provides a single sign-on environment that enables users to seamlessly use the HPCI super computer and storage resources.
In addition, the Science Information NETwork (SINET5) has been given the role of a high-speed network infrastructure for linking to super computers remotely and sharing large-scale test data as well as calculation results.



NII Library (Contributing to Informatics Research and Education)

The NII Library holds online journals, books, and periodicals on informatics as part of its role as an informatics research/education center.
The library collaborates with the nearby Meiji University Library to provide access to academic materials for students of SOKENDAI.

Number of books / journal titles

(as of the end of March 2018)

Document type	Book	Bound journal	Journal (title)
Japanese	17,234	10,123	182
Foreign	13,994	8,313	9
Total	31,228	18,436	191

Facilities and equipment

Service	Reading room	Stack room
Area	140㎡	271㎡
Seats	8	3
Other equipment	Automatic lending and returning machine	
	Microreader printer	
	Copier	

Major online journals and databases

Service	Publisher
ACM Digital Library	Association for Computing Machinery
APS Online	American Physical Society
IEL	IEEE, IEE
MathSciNet	American Mathematical Society
SpringerLink	Springer Nature
ScienceDirect	Elsevier B.V.
Wiley Online Library	John Wiley & Sons.
IEICE	The Institute of Electronics, Information and Communication Engineers
IPSJ Digital Library	Information Processing Society of Japan


Reading room


Reading room

Dissemination of Research Results

Delivering NII's Research and Services to the Wider Society

NII holds public lectures and publishes information with the aim of sharing its latest research findings on informatics widely with the general public and society at large and deepening understanding of its services.
NII also delivers timely information via digital media such as the NII website, NII email newsletter, and social media (Twitter, Facebook).

NII Open House

NII holds an annual Open House to present its various research projects and results to a broad audience including the general public, researchers, and Ph.D. candidates. Besides "NII Research 100," a program where ten NII researchers each introduce ten research studies for a total 100 presentations, and demonstrations and poster exhibits, workshops for elementary and junior high school students were also held.

Workshop for Children to Try Programming a Stuffed Teddy Bear

Ten researchers introduce a total of 100 research presentations at "NII Research 100." (Both June 2017)

Public Lectures

The National Institute of Informatics holds free public lectures from time to time.

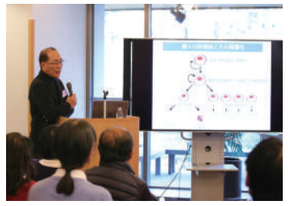
National Institute of Informatics Public Lectures: "The Forefront of Informatics" https://www.nii.ac.jp/event/shimin/

In these free lectures, researchers at the National Institute of Informatics explain various subjects at the forefront of Informatics-related fields to the general public. There are generally six lectures per year held at the National Center of Sciences (Hitotsubashi, Chiyoda Ward, Tokyo). Images, materials, and Q&As from past lectures are available on the Institute's website.

Associate Professor Masako Kishida at Fourth Lecture in 2017 (October 2017)

Karuizawa Saturday Salon https://www.nii.ac.jp/event/karuizawa/

Several lecture meetings a year about informatics and various other fields are held at the International Seminar House for Advanced Studies (Karuizawa, Nagano Prefecture) for people living in the surrounding area. A portion of the contents of past lectures have been published in Karuizawa Doyo-Konwakai Koenshu: Chi to Bi no Harmony (Collection of Lectures from the Karuizawa Saturday Salon: Harmony of Intelligence and Art) (Volumes 1–6).



Visiting Professor Hiromitsu Nakauchi from The Institute of Medical Science, The University Of Tokyo Discussing Induced Pluripotent in the Third Lecture of 2017 (November 2017)

Exhibitions

NII participates in various exhibitions to introduce its research findings, operations, and services. In FY2017, NII had exhibitions at various venues, including the CEATEC JAPAN 2017, 19th Library Fair, and the Inter-University Research Institute Symposium 2017.

Exhibition themed Possibilities of Monitoring to Protect Infrastructure with Internet of Things (IoT) and Sensing Data Management Infrastructure at CEATEC JAPAN 2017 (October 2017; Makuhari Messe)

Explanation and Presentation of Open Science Research Data Platforms at the Library Fair (November 2017; Pacifico Yokohama)

Publications

NII Series

A new commercially available publication (Maruzen Library) that introduces and explains the contents of NII's research to the general public in an easy-to-understand way using familiar topics. The newest edition, Everything You Want to Know About Big Data and AI, was released in July 2018.

The public information magazine NII Today is published four times a year.

Public Information Magazines

- NII Today (Japanese/English)
- Catalogue of National Institute of Informatics (Japanese/English)
- Outline of National Institute of Informatics (Japanese/English)
- Annual Report of National Institute of Informatics
- NII SEEDs
- Getting to Know NII (Info Dog "Bit-kun")

Digital Media

NII website: https://www.nii.ac.jp/en/
Visit the NII website for details about events and publications.

NII YouTube Channel https://www.youtube.com/user/jyouhougaku
Watch videos of NII lectures and research presentations.

Email newsletter https://www.nii.ac.jp/mail/

Twitter
Official NII account (@jouhouken) https://twitter.com/jouhouken
Tsubuyaku Bit-kun (@NII_Bit) https://twitter.com/NII_Bit

Facebook https://www.facebook.com/jouhouken

News Release List

(FY2017)

Date issued	Title
April 3, 2017	NII establishes new Research Center for Open Science and Data Platform/Contributions to open science expansion for building and operating ICT platforms
April 6	Developing technology to measure the traffic of online content/Improving integration and accuracy of action rhythms and the effects of external social media
April 11	NII Associate Professor Yuichi Yoshida presented The Young Scientists' Prize/FY2017 Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology
April 11	NII Deputy Director General Jun Adachi and SINET5 development staff presented Science and Technology Prize/FY2017 Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology
May 10	Applying optimization of all one-on-one encounters for efficient meetings through distinct movements of each party
May 23	Start of provision of sample business card data as data sets for research free of charge
June 01	The National Institute of Informatics concludes a partnership memorandum with the National Institute for Materials Science/Research and development of data platform
June 02	Successful data transfer at a speed of 131 Gbps between Japan and Europe
June 02	Open letter sent together with associations operating open knowledge bases in Europe/Future Scholarly Information Systems Committee
June 05	Conclusion of an agreements for collaboration with Sabae City, Fukui/Contributing to regional revitalization in informatics research
June 05	Researcher search function added/Batch display now available for research results and other information/KAKEN: Grants-in-Aid for Scientific Research Database
June 08	Developing the latest AI able to search for archived images from sketches and images/The National Institute of Informatics conducts collaborative research with the National Institute of Japanese Literature
June 08	Cognitive and Open Science Keynote Lecture/Open House 2017 held June 9th and 10th
June 12	Ideathon held for the use of SINET5/Winners decided for SINET Award and SINET Student Award
June 22	Long-term storage of PDF data for papers through cooperation with the National Diet Library/Easily use papers from search results for CiNii articles
June 28	Collaborative functions added for Virtual International Authority Files (VIAF) in CiNii Books/Agreement concluded for OCLC and VIAF participation
July 03	Portal able to list services available for use by faculty and students/Full operation of the Cloud Gateway Service starts July 3rd
Aug. 01	NII exhibits again this year at CEATEC JAPAN 2017/Research results for the SIP challenge of infrastructure maintenance, renovation and management
Aug. 09	KAKEN grant database launches ORCID support/Researchers can connect their national researcher identifiers to international identifiers
Aug. 18	The Research Data Management in an Open Science Generation online course starts via the gacco platform certified by JMOOC
Sept. 12	Toward big-data clustering on a personal computer: New algorithm achieves high processing speeds with small memory
Sept. 28	Protecting Infrastructure with the Internet of Things (IoT)/Joint Expansion of CEATEC JAPAN 2017/Research results related to challenges in the research and development of SIP
Oct. 26	NII SHONAN MEETING Reaches 100th Milestone/Intensive Discussions by World's Top Researchers
Oct. 27	New functionality added to CiNii Books/Cooperation with Database of Pre-Modern Japanese Works/Directly access public pages of text and images of pre-modern Japanese works
Nov. 06	Exhibition held to introduce Japanese Animated Film Classics/Website jointly developed with The National Museum of Modern Art, Tokyo National Film Center
Nov. 07	Next-generation repository development underway for an open science generation/National Institute of Informatics collaborates with European Organization for Nuclear Research/Collaboration with National Institute for Materials Science as well
Nov. 20	Quantum Neural Network on Cloud
Nov. 22	Commemoration of applicant who discovered a superior graph/The Graph Golf order/degree problem competition to help in the design of efficient super computers
Nov. 27	Joint research between the National Institute of Informatics and the LINE Corporation/Conclusion of memorandum and negotiations with joint research departments, etc.
Dec. 14	MMCFTP file-transfer protocol Achieves Transmission Speeds of 231 Gbps/A New World Record for Long-Distance Data Transmission
Dec. 25	NII launches new Research Center for Medical Big Data/Objectives include designing cloud platforms to collect medical imaging data and developing AI techniques for image analysis
Dec. 25	NII Launches Global Research Center for Systems Design and Mathematics/Formal methods revolutionized in manufacturing for high-quality, high-efficiency product development
Dec. 26	NII dramatically expands data sets for pre-modern Japanese works/Wide release of cook books, The Tales of Ise, Book of Heraldry, and picture books for readers to enjoy Japanese culture
Jan. 1, 2018	NII Signs 100th International Exchange Memorandums /MOUs with Universities and Research Institutes in 29 Countries and Regions
Jan. 23	SIGVerse to be used as simulator at World Robot Summit sponsored by METI/NEDO/Tool developed by the research group of NII's Associate Professor Inamura Educational texts published with interactive learning tools that expand around quizzes
Mar. 01	Hikari & Tsubasa's Information Security Class <FY2018 Version>/Educational materials to teach information security at higher education institutions/ Educational texts published with interactive learning tools that expand around quizzes
Mar. 16	Using Mobile Sensing for Smart City Applications research project/Using Could Sensing for Validation of Bus Location Services
Mar. 23	NII announces the latest trends in open science in Japan and the rest of the world/Japan Open Science Summit 2018 held June 18th and 19th/ First conference held jointly with multiple Japanese institutes

Organization

- Director General
  - Advisors to the Director General
  - Administrative Council
  - Advisory Board
  - Global Liaison Office
  - Deputy Director General
  - Research Strategy Office (incl. URA)
  - Gender Equality Promotion Office
  - Silicon Valley Office (JETRO Joint Project)
  - Research Divisions
    - Principles of Informatics Research Division
    - Information Systems Architecture Science Research Division
    - Digital Content and Media Science Research Division
    - Information an Society Research Division
  - Research Centers
    - Services and Operations
      - Research and Development Center for Academic Networks
      - Research Center for Knowledge Media and Content Science
      - Center for Global Research in Advanced Software Science and Engineering
      - Research Center for Community Knowledge
      - Center for Cloud Research and Development
      - Center for Dataset Sharing and Collaborative Research
      - Center for Cybersecurity Research and Development
      - Research Center for Open Science and Data Platform
    - Major Research Projects
      - Global Research Center for Quantum Information Science
      - Global Research Center for Cyber-Physical Systems
      - Global Research Center for Big Data Mathematics
      - Global Research Center for Systems Design and Mathematics (est. Nov. 2017)
      - Research Center for Medical Bigdata (est. Nov. 2017)
    - Collaboration With Industry, Government and Academia
      - Research Center for Financial Smart Data
      - Cognitive Innovation Center
      - Center for Robust Intelligence and Social Technology (est. Apr. 2018)
  - Organization for Management and Outside Collaboration on R&D
    - Organization for Science Network Operations and Coordination
    - Organization for Scientific Resources Operations and Coordination
  - Cyber Science Infrastructure Development Department
    - Academic Infrastructure Division — Coordination, Infrastructure and Liaison Team/SINET Team/ Cloud Promotion Team/NII-SOC Team/LAN-CSIRT Team SINET Promotion Office/Academic Authentication Systems Office/ Cloud Promotion Office/Academic Information Security Operations Center
    - Scholarly and Academic Information Division — Library Support Team/Academic Content Team/ Research Products Team/Content system, Development Office
    - Library Liaison Cooperation Office
    - Advanced IT Center
  - General Affairs Department
    - Planning Division — Planning Team/International Affairs and Education Support Team/Publicity Team
    - Office for Social Collaboration — Collaboration Support Team/Big Project and Intellectual Property Team
    - General Affairs Division — General Affairs Team/Personnel Affairs Team
    - Budget and Accounts Division — Finance and Accounting Team/Procurement Team
  - NII Library

* Silicon Valley Office (JETRO Joint Project)

NII and the Japan External Trade Organization (JETRO) established an office in Silicon Valley in May 2017. This new base is expected to further efforts to expand NII research results overseas by understanding and investigating international needs to help with NII research results activities and commercialization in the United States, especially on the west coast, based on the information that is collected. The Silicon Valley Office is also involved in activities that include the execution of joint research contracts with foreign companies, universities, research groups and other organizations in addition to providing administrative support to neighboring international societies and exhibitions.

Executives

Director General — Masaru Kitsuregawa

Acting Director General/ Deputy Director General — Akiko Aizawa
Deputy Director General — Ichiro Satoh
Deputy Director General — Shigeo Urushidani
Deputy Director General — Isao Echizen
Deputy Director General — Jun Adachi
Advisor to the Director General — Zhenjiang Hu
Advisor to the Director General — Ken-ichi Kawarabayashi

Cyber Science Infrastructure Development Department

Director — Shigeo Urushidani
Deputy Director — Kazuko Egawa
Senior Coordinator — Toyomi Takekawa

◇Academic Infrastructure Division — Director — Hideki Higuchi
◇ Scholarly and Academic Information Division — Director — Wataru Ono
◇Library Liaison Cooperation Office — Director — Yoshiro Hirata
◇Advanced CT Center — Director — Shunji Abe

General Affairs Department

Director — Hirokazu Mizoguchi

◇Planning Division — Director — Masako Suzuki
◇General Affairs Division — Director — Yukio Yanagihashi
◇Budget an Accounts Division — Director — Niro Kanomata

NII Library

Head — Ikki Ohmukai

Staff Numbers

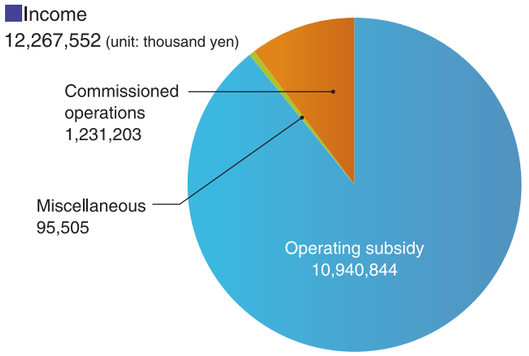
(as of April 2018)

Category	Director	Deputy Director	Advisor to the Director General	Professor	Associate Professor	Lecturer	Assistant Professor	Subtotal	Administrative Staff	Total
Full-time employees	1	4	2	25	31		16	79	58	137
Adjunct professors, etc.		1		14	14			45		45
Special term/fixed-term/short-term staff										219

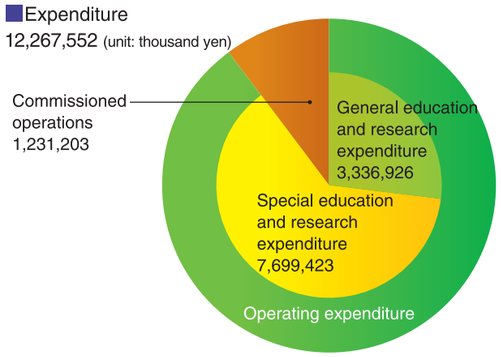
Budget

(FY2018)

Income
12,267,552 (unit: thousand yen)



Expenditure
12,267,552 (unit: thousand yen)



Administrative Council

Discusses important matters concerning the management and operation of NII. These matters include the selection of candidates for the post of Director General, as well as academic personnel, joint research plans, and matters concerning NII in the mid-term targets and plans of the Research Organization of Information and Systems (ROIS).

Advisory Board

Consists of Japanese and overseas experts who are external to NII and have extensive, advanced knowledge of academic information. The Board responds to inquiries from the Director General regarding issues involving informatics research, the development and establishment of infrastructure for distributing academic information, and so on.

Professors Emeriti

National Center for Science Information Systems (NACSIS)

Name	Award date
Atsunobu Ichikawa	25 June 1992
Hitoshi Inoue	25 June 1999

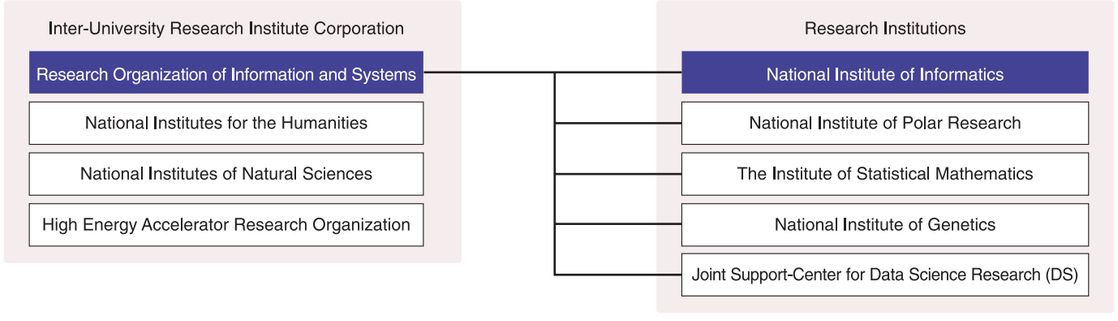
National Institute of Informatics (NII)

Name	Award date
Takamitsu Sawa	1 April 2002
Eisuke Nito	2 July 2002
Mitsutoshi Hatori	19 November 2004
Kinji Ono	19 November 2004
Takeo Yamamoto	1 April 2005
Yasuharu Suematsu	1 April 2005
Haruki Ueno	1 April 2007
Katsumi Maruyama	1 April 2010
Masamitsu Negishi	1 April 2010
Kenichi Miura	1 April 2011

Name	Award date
Masao Sakauchi	1 April 2013
Shoichiro Asano	1 April 2013
Teruo Koyama	1 April 2015
Akira Miyazawa	1 April 2015
Shigeki Yamada	1 April 2015
Yoshihisa Yamamoto	1 April 2015
Noboru Sonehara	1 April 2017
Jun Adachi	1 April 2018
Shinichi Honiden	1 April 2018

Inter-University Research Institute Corporations

The National Institute of Informatics is one institute operating under the auspices of the Research Organization of Information and Systems (ROIS), which itself is one of four Inter-University Research Institute Corporations.
It is these “corporations” that make it possible for Japan’s universities to share the utilization of facilities for every field of study, including larger types of leading-edge equipment that individual institutions would have a hard time installing and maintaining on their own. While promoting original, collaborative research that exceeds the purview of individual universities, the corporations provide, as a service to researchers nationwide, volumes of scientific data, access to valuable materials, plus recommended analytical methods.
The aim of ROIS is to carry out integrative studies beyond the boundaries of traditional disciplines by framing complex phenomena concerning life, Earth, the natural environment, and human society in the 21st century from the information and systems perspective.



History

Time	Event
October 1973	Ministry of Education, Science, Sports and Culture proposes an "Improved Circulation System for Academic Information" in the Third Report (Basic Policies for the Promotion of Scholarship) of the Science Council.
May 1976	Research Center for Library and Information Science (RCLIS) is established at the University of Tokyo.
November 1978	"A New Plan for Academic Information Systems" is presented to the Science Council by the Minister of Education, Science, and Culture. The Science Council issues a response in January 1980.
April 1983	The Center for Bibliographic Information is established at the University of Tokyo, with the reorganization of the Research Center for Information and Library Science.
December 1984	The NACSIS-CAT catalog information service is launched.
April 1986	The National Center for Science Information Systems (NACSIS) is established, with the reorganization of the Center for Bibliographic Information, University of Tokyo.
April 1987	The Science Information NETwork (SINET) is launched.
April	The NACSIS-IR information search service is launched.
April 1988	Email service is launched.
January 1989	International connection between SINET and US (National Science Foundation: NSF)
January 1990	International connection between SINET and the UK (British Library: BL)
April 1992	The Inter-Library Loan (ILL) System is launched.
April	The Internet backbone (SINET) is launched.
November 1993	Start of mutual access to databases through gateways with the Japan Information Center of Science and Technology (JICST)
April 1994	Start of ILL service with the British Library Document Supply Centre (BLDSC)
November	Chiba Annex (Inage-ward, Chiba City) is built.
October 1995	International connection between SINET and Thailand
April 1996	Start of ILL service with the National Diet Library
March 1997	International Seminar House for Advanced Studies, Inose Lodge (Karuizawa, Nagano Prefecture) is established.
April	Electronic Library Service is launched.
December	An Advisory Panel on a Core Institution for Scientific Research in the Information Field is established by the Ministry of Education, Science, and Culture.
January 1998	A proposal entitled "Promoting Computer Science Research" is published by the Science Council of Japan, calling for the establishment of a core institution for inter-university research in informatics.
March	Advisory Panel on a Core Institution for Scientific Research in the Information Field issues its report.
April	Coordination Office is established for the Core Institution for Scientific Research in the Information Field; committee is formed in May.
March 1999	Coordinating Committee of the Core Institution for Scientific Research in the Information Field issues its report.
April	Preparatory Office is established for the Core Institution for Scientific Research in the Information Field; committee is formed in May.
July	Preparatory Committee of the Core Institution for Scientific Research in the Information Field issues its interim report.
February 2000	Operations move to the National Center of Sciences (Hitotsubashi, Chiyoda-ward, Tokyo).
March	Preparatory Committee of the Core Institution for Scientific Research in the Information Field issues its final report.
April	National Institute of Informatics (NII) is established, with the reorganization of NACSIS and assumption of its functions.
January 2002	SuperSINET is launched.
April	Ph.D. Program in Informatics is established in the Department of Informatics, Graduate University for Advanced Studies.
April	GeNii (NII Academic Contents Portal) is released.
April	Japan–U.S. document delivery service is launched.
June	Intersystem linkage of catalogs with RLG in the U.S. is launched.
September	Research Planning and Promotion Strategy Office is founded.
October	International Course is established within Ph.D. Program in Informatics.
October	Start of joint construction of meta-databases
January 2003	Global Liaison Office is formed.
April	Initiation of Project to Improve Infrastructure for International Circulation of Scholarly Information
April 2004	NII begins a new chapter as a member of the new Inter-University Research Institute Corporation/Research Organization of Information and Systems.
April 2005	Official service of CiNii (the NII Scholarly and Academic Information Navigator) is launched.
June 2007	Science Information NETwork3 (SINET3) is launched.
April 2009	NII Scholarly and Academic Information Navigator (CiNii) and the KAKEN database of Grants-in-Aid for Scientific Research are revamped. Japanese Institutional Repositories Online (JAIRO) is officially launched.
February 2011	First NII Shonan Meeting takes place.
April 2011	Science Information NETwork4 (SINET4) is launched.
April	Library Liaison Office is established.
November	CiNii Books is launched.
April 2012	Japanese Institutional Repositories Online Cloud (JAIRO-Cloud) is launched.
October 2015	CiNii Dissertations is launched.
April 2016	Science Information NETwork5 (SINET5) is launched.

Facilities / Locations

National Center of Sciences (Chiyoda Ward, Tokyo)

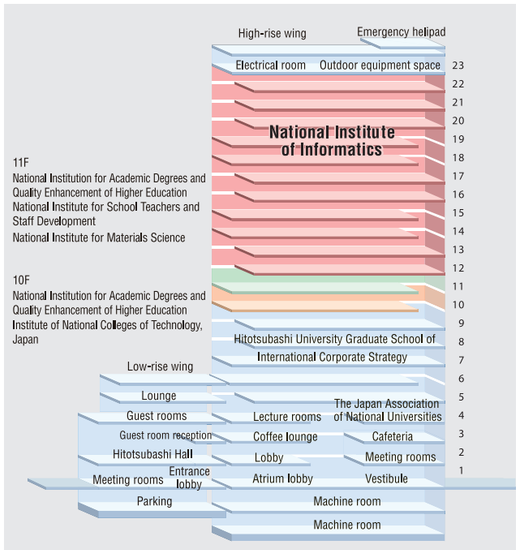
https://www.nii.ac.jp/en/

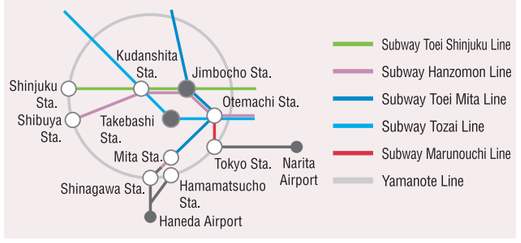
The National Center of Sciences was established as a center for research in fields such as informatics, academic exchange, dissemination of scientific information, and social collaboration, with the aim of improving and strengthening Japan's academic research infrastructure. Construction was completed in December 1999. The high-rise wing consists primarily of three organizations: NII, Hitotsubashi University Graduate School of International Corporate Strategy, and part of the National Institution for Academic Degrees and Quality Enhancement of Higher Education. The Center aims to provide an advanced base for intellectual creativity through comprehensive application of the academic functions of each institute. Conference facilities such as Hitotsubashi Hall are located in the low-rise wing, and these accommodate activities such as international conferences, lectures, and academic meetings organized by national university corporations and other institutions.

National Institute of Informatics

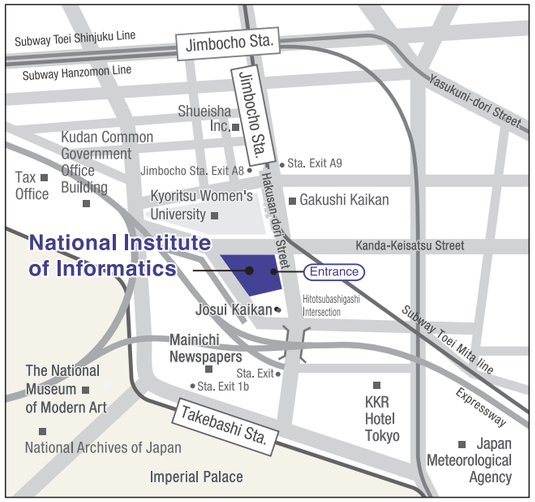
National Center of Sciences Bldg.
2-1-2 Hitotsubashi, Chiyoda-ward, Tokyo 101-8430
Tel: +81-3-4212-2000 (exchange)

■Site area : 6,842㎡ (occupied by NII: 3,036㎡)
■Floor space : 40,585㎡ (occupied by NII: 18,145㎡)





National Center of Sciences



Chiba Annex (Inage-ward, Chiba City)

Chiba Annex is a building that houses the computer systems and networking equipment used to operate academic information systems and provide academic information services. It was built in November 1994.

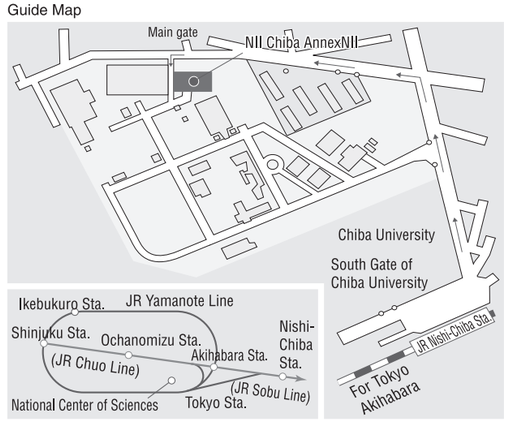
Exterior of Chiba Annex

Chiba Annex

1-8 Yayoi-cho, Inage-ward, Chiba-shi, Chiba 263-0022
Tel: +81-43-285-4911 (exchange)

■Site area (rented): 3,212㎡ ■Floor space: 3,943㎡

Guide Map



International Seminar House for Advanced Studies (Karuizawa, Nagano Prefecture)

https://www.nii.ac.jp/en/about/access/karuizawa/

Inose Lodge

The International Seminar House for Advanced Studies (Inose Lodge) was built on land donated by Dr. Hiroshi Inose, the first director general of NII. His idea was to create an ideal place for interdisciplinary and international discussions.

Uses

1) Domestic and international academic conferences, seminars, etc.
2) Public lectures, social gatherings, etc.
3) Research and training of NII researchers and staff.

Exterior of Seminar House

Exterior of Seminar House

International Seminar House for Advanced Studies Inose Lodge

1052-471 Okan Minamihara Nagakura,
Karuizawa, Karuizawa-cho, Kita Saku-gun, Nagano 389-0111
Tel. +81-267-41-1083 Fax. +81-267-41-1075

■Site area: 3,339㎡ ■Floor space: 667㎡

Guide Map