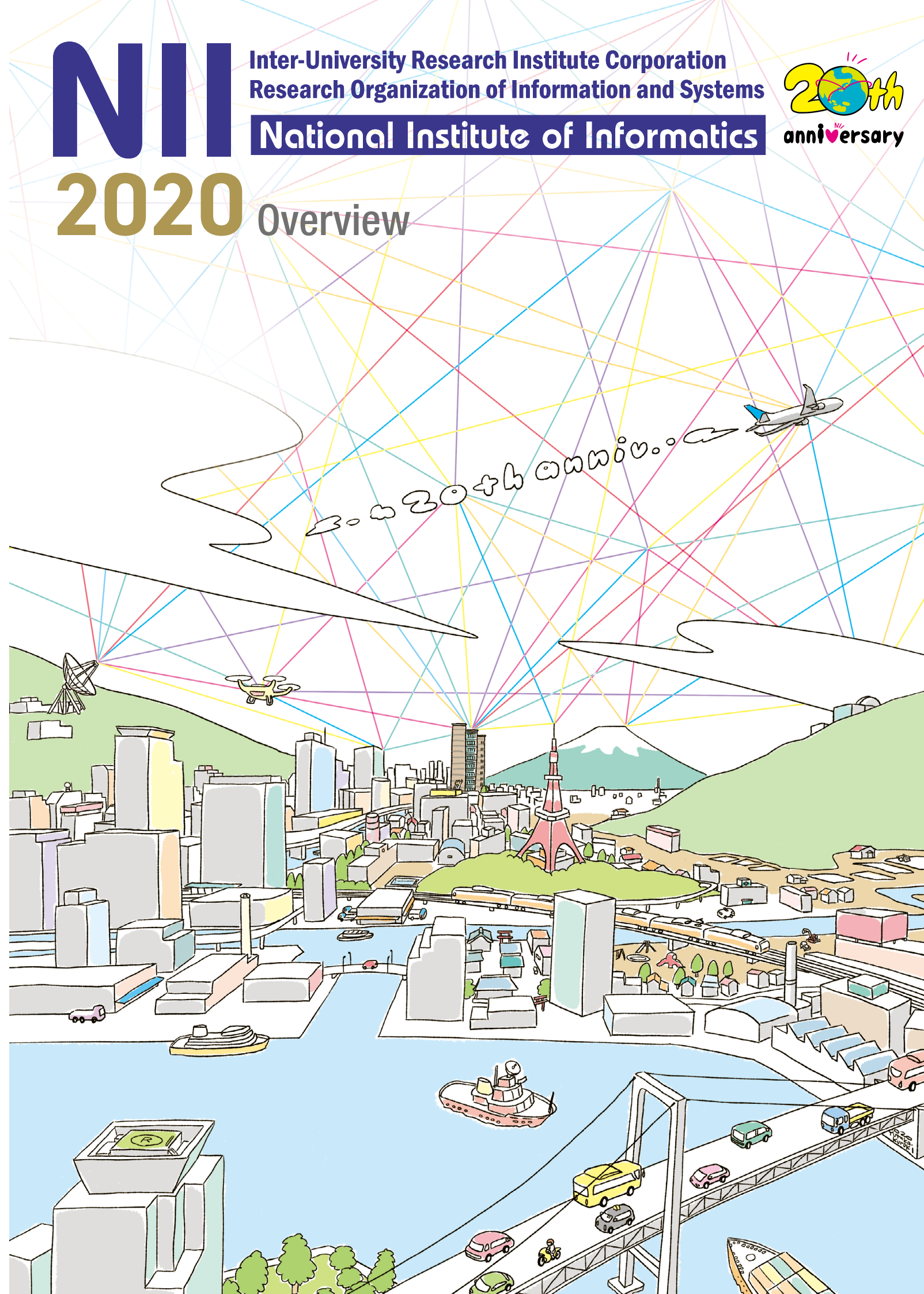


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Top Message



KITSUREGAWA Masaru

Director-General, National Institute of Informatics
Inter-University Research Institute Corporation
Research Organization of Information and Systems

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Humanity is in the midst of the unprecedented threat posed by the novel coronavirus disease (COVID-19). Lockdowns and other measures have been enforced in major cities in Europe and the United States to prevent the further spread of the virus. In Japan, a state of emergency was declared nationwide, placing considerable restrictions on social activities, especially on the movements of people. Access to facilities in universities and other educational and research institutions was limited. This had an enormous impact by forcing the suspension of education and research activities. Under these extraordinary circumstances, the use of information technology, or more specifically remote or online communication, is serving an important role. As the only comprehensive academic research institute in the field of informatics in Japan, and as the organization tasked with the mission to build and operate the Science Information NETwork (SINET), the National Institute of Informatics (NII) in particular has been intensively supporting both online academic conferences and online classes. The Japanese government's call to avoid the “Three Cs” (closed spaces, crowded places, and close-contact settings) in principle means that, in these times where people are unable to have face-to-face interaction with each other, conversations are moving into the cyberworld. In other words, we needed to shift the main core of our activities from the real world to the cyberworld. Starting on March 26th, NII has been hosting the Cyber-Symposium for Information Sharing on Remote Teaching Efforts at Universities since April, with the goal of making sure that higher education does not stop. We have been carrying out this symposium with the belief that distance education in Japan as a whole needs to be fast-tracked, so we called on the information technology centers of seven national universities to conduct large-scale experiments on large universities first, in order to learn from experiencing many failures and to bring to light the value of these experiences for other universities. All the leading universities in Europe, the United States, and China have quickly switched to remote classes, and I feel that Japan has also been able to achieve this without much delay. As a result, we have received the appreciation of many people who were helped by this symposium. At the beginning, the symposium was held every week and it was a really very busy time for us. For instance, 5,000 lectures at the University of Tokyo and 4,400 lectures at Tohoku University were turned into remote classes during that period. It is indeed a surprise that we were able to achieve such a major shift in around one to one and a half months. For the fall semester, many universities have decided on a policy of caring more for the feelings of incoming freshmen and partially introducing face-to-face classes. We are looking forward to working on the design for this system going forward. Looking back, the Idea Committee in the Intellectual Property Strategy Headquarters of the Cabinet Office raised the issue in mid-March, pointing out that the copyright restrictions for online classes and on-demand lessons during the COVID-19 epidemic should be eased. After going through several processes, the use of content for remote classes was made available free of charge by the Society for the Administration of Remuneration for Public Transmission for School Lessons (SARTRAS) at the end of April. This copyright problem was the most difficult issue facing the implementation of distance learning. Making the content free made it possible for educators to design new lessons without worrying about copyrights.

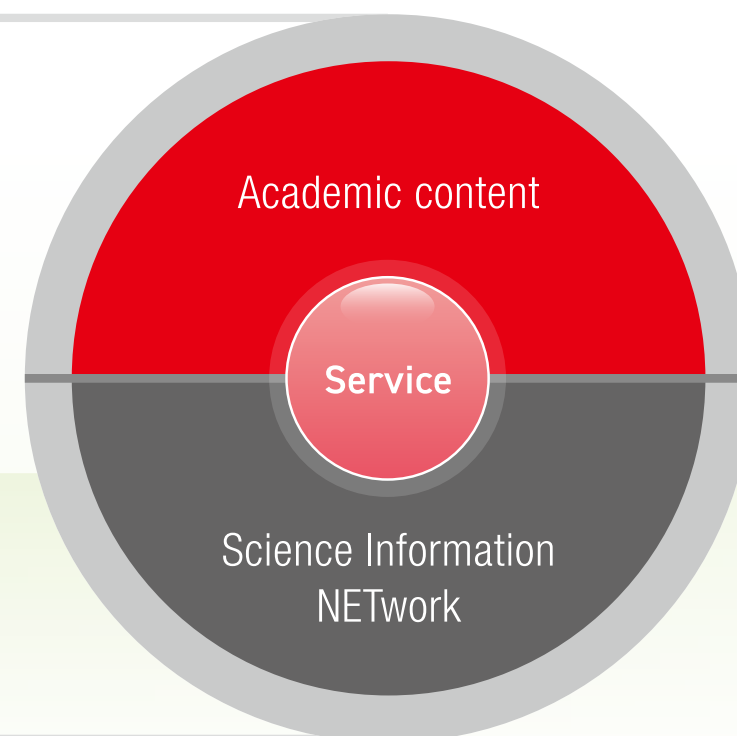
In addition, we provided guidelines for creating online classes that lessen the use of communication bandwidth, for what we called a data diet. These guidelines are currently adopted by many universities to prevent the amount of traffic from online lessons from exceeding the limit of communication lines. Initially, most lessons were reportedly videos taken as instructors gave lectures in front of blackboards. In principle however, screen sharing is the best way to reduce traffic because in this case the voice band, or in other words, the bitrate (amount of data that can be sent and received per second) for a telephone call, would be sufficient. Looking back further, I believe a major trigger for us was when we established the base for a remote symposium at NII from March 2 to 4 and successfully held the 12th Forum on Data Engineering and Information Management and 18th Annual Meeting of The Database Society of Japan (DEIM 2020) entirely online, which was a first in Japan for a large-scale conference, with about 600 participants. At the time, the rumors spread quickly and we had many visitors who came to see if it could really be possible. Later, when I asked members of the China Computer Federation (CCF), the largest computer society in China, they had never heard of such a thing being done even in China; surprisingly, it may have been a trailblazing effort at the global level. We were prepared to take the lead in showing that “We can do it!” but most of the academic conferences in March were canceled after that. Assessing the situation, we determined that it was essential not just to show but also to help, so we started the abovementioned Cyber-Symposium for Information Sharing on Remote Teaching Efforts at Universities Since April. Today, the symposium is still ongoing with well over 1,000 online participants. Time and again, we have stated that far from providing solutions, the symposium is merely a venue for sharing the outcome of the challenges we have undertaken. Shifting as many as 5,000 lectures to remote classes in a very short period of time is extraordinarily difficult. Thus, it was good that, to a certain extent, we felt that there will surely be some problems or some sort of failure along the way, and were mentally ready for it. Recently, we were among the first to develop an AI system to support the diagnosis of COVID-19 pneumonia, using numerous anonymized COVID-19 pneumonia images collected from the Japan Radiological Society on the medical imaging cloud built by NII's Research Center for Medical Bigdata. We believe that the concept of this data platform can be applied not only to medical imaging but also to a wide range of fields in the future. CT scans are not easy to collect on slow networks, and achieving this is a demonstration of the power of SINET5. NII has been undertaking research and development during the COVID-19 pandemic following the IT principles of *fail fast*, *fail cheap*, and *fail smart*. In August, we also provided backroom assistance to the International Online Conference to Address Water-related Disaster Risk Reduction under the COVID-19 Pandemic, held by the National Graduate Institute for Policy Studies and other institutions, in which Their Majesties the Emperor and Empress participated for the first time in a remote conference. Going forward, we will continue to give our utmost effort to carry out our many different initiatives. We look forward to your continued support.

September 2020

Weaving Information into Knowledge Informatics to Create Future Value on the Wheels of “Research” and “Service”

The National Institute of Informatics (NII) under the Inter-University Research Institute Corporation Research Organization of Information and theory of informatics to cutting-edge fields such as artificial intelligence, big data, internet of things, and information security, NII carries out In parallel, NII develops and operates services of the essential academic information infrastructures used by the entire academic research academic content and service platforms on the other hand. The bilateral feedback cycle between the findings gained from the service Through these activities, NII is committed to human resource development and social/international contribution, and conducts its operations Furthermore, NII is engaged in graduate education with the aim of fostering original world-class academic research and pioneering

Systems is the only academic research institute in Japan dedicated to creating future value in informatics, a new academic field. From the basic long-term basic research as well as practical studies that attempt to address current social issues. community in Japan for research and education; it builds and operates the Science Information NETwork (SINET5) on one hand, and provides operations and from the academic research generates cutting-edge technologies, which are utilized in the service. with an emphasis on collaboration and cooperation between universities, research institutes, and private sector businesses in Japan and globally. advanced fields of study.



Research

Comprehensive research from basic theory to cutting-edge technology

Merging computer science and information engineering with the humanities, social sciences, life sciences, and many other disciplines, informatics is a new domain of study that is involved in all aspects of society. Having established four Research Divisions and 15 Research Centers, NII is carrying out research comprehensively on everything from the basic theory of informatics to cutting-edge fields such as artificial intelligence, big data, internet of things, and information security. NII is also focusing its efforts into international exchange and collaboration with overseas universities and research institutes, as well as collaboration between industry, government, and academia, in order to help implement its research achievements in the real world.

Service

Supporting academic research and education

In collaboration with universities and research institutions, as well as research communities, NII builds and operates the Science Information NETwork (SINET). Leveraging SINET5's ultra-high speed, high reliability, robustness, and multifunctionality, NII contributes to academic research and education by developing and providing an authentication federation platform, cloud adoption and utilization supports, and an academic content platform, as well as by working to advance open science. In addition, NII Security Operation Collaboration Services help build the framework enabling national universities and other academic institutions to quickly respond to cybersecurity incidents and other issues.

Graduate Program

Fostering new leaders for an advanced information society

The graduate program at NII is carried out in three ways: (1) participating in SOKENDAI (the Graduate University for Advanced Studies), (2) collaborating with other graduate schools, and (3) accepting research students for special collaboration. SOKENDAI is the first graduate university in Japan established to foster original, world-class academic research that transcends traditional disciplines and to pioneer advanced fields of study that create new lines of scientific inquiry. NII has joined with SOKENDAI to establish the Department of Informatics in the School of Multidisciplinary Sciences in order to offer graduate programs with three-year and five-year Ph.D. courses. The Department of Informatics encompasses six research fields; at the Department, students can take lectures and obtain research advice according to their field of study.

Collaboration with Industry, Government, and Academia


NII carries out goal-oriented research and development to address real social issues and fosters collaboration between industry, government, and academia to help implement its research achievements in the real world. NII actively promotes collaborative work between industries, local governments, and universities by using a system that includes open calls for collaborative research, comprehensive partnerships, and joint research units that are set up to operate special research laboratories under corporate partnerships. To create new collaboration and licensing opportunities for its research accomplishments, NII holds seminars to present the seeds of its cutting-edge research and to discuss corporate and social needs. It is also engaged in academic consulting by researchers and human resource development for the IT sector.

International Exchange

To promote organization-wide international research exchange with overseas universities and research institutes, NII has set up the Global Liaison Office (GLO), which conducts various activities, including forming international exchange agreements through Memoranda of Understanding (MOUs) and managing the MOU Grant for research exchange assistance, and the NII International Internship Program. In addition, NII holds the NII Shonan Meeting, a series of seminars where top-class researchers from around the world come to Japan for intensive discussions on the field of informatics. NII is also actively accepting researchers through the German Academic Exchange Service (DAAD) and the Japanese-French Laboratory for Informatics (JFLI).

Research Divisions

NII established four Research Divisions—Principles of Informatics Research Division, Information Systems Architecture Science Research Division, Digital Content and Media Sciences Research Division, and Information and Society Research Division—in order to accommodate various types of research across the broad discipline of informatics. Each research division conducts specialized studies ranging from basic to applied research.




Principles of Informatics Research Division

Director: UNO Takeaki

Seeks new principles and theories of informatics using algorithms and computational complexity theory, as well as artificial intelligence, robotics, and quantum computing. Conducts research to develop new technologies that will sustain societies of the future and break new ground in the field of informatics.

Fields of Research

Algorithms, artificial intelligence, machine learning, deep learning, big data analysis, data mining, mathematical modeling, numerical analysis, computational science, web informatics, neuroscience, quantum information, and leading-edge research that creates possibilities for discovering new principles or theories and new applications at the frontiers of these fields




Information Systems Architecture Science Research Division

Director: JI Yusheng

Aiming at boosting the performance, quality, and functionality of computers and networks, the building blocks of information technology, conducts research ranging from creating groundbreaking technologies in software and hardware architectures to implementing their working systems.

Fields of Research

R&D on post-Internet, cybersecurity infrastructure, software and hardware architecture, distributed and cloud computing, programming languages, system performance and log analysis infrastructure, dependable systems, Internet of Things (IoT), and network and cloud visualization




Digital Content and Media Sciences Research Division

Director: TAKASU Atsuhiko

Carries out research on analyzing and generating content and media, including symbolic and patterned media; storing, retrieving, and organizing content with platform technologies; and analyzing social media and interactions among humans and knowledge.

Fields of Research

R&D on natural language processing, computer vision, image processing, acoustic information processing, computer graphics, databases, human interaction, web mining, social media, community analysis, media clone generation and recognition, machine learning and deep learning applications, among others



Information and Society Research Division

Director: NAKAJIMA Shin

Conducts cross-disciplinary research based on emerging information and system technologies such as big data analytics to achieve the required levels of trustworthiness in a cyber–physical society where the cyberspace and real-world phenomena are related more closely than before.

Fields of Research

R&D on protection and use of privacy information, next-generation anonymization, data governance, next-generation IR infrastructure theory, data policy theory, data use in human resource development theory, digital humanities, IT healthcare, data reliability evaluation, crowdsourcing, digital education, and open innovation platforms, as well as research in humanities and social sciences related to these topics

Research Centers

NII established 15 Research Centers in order to remove barriers between Research Divisions and respond quickly to critical social issues, creating a system where researchers with various areas of expertise can collaborate across disciplines to focus on exploring key research domains.

Services and Operations

Research and Development Center for Academic Networks

<https://www.nii.ac.jp/en/research/centers/network/>

Develops and provides new services and features to enhance the operations and efficiency of the Science Information NETwork (SINET), a crucial backbone network of more than 900 universities and research institutes in Japan.

Director: URUSHIDANI Shigeo (Vice Director-General, NII; Professor, Information Systems Architecture Science Research Division)

GRACE Center: Center for Global Research in Advanced Software Science and Engineering

<http://grace-center.jp/?lang=en>

Integrates research, practice, and education using collaborations between Japanese and overseas research institutions, as well as collaborations between industry and academia, with the goal of developing the software infrastructure of the twenty-first century, and also fosters the next generation of world-class researchers and engineers.

Director: HONIDEN Shinichi (Project Professor, NII)

Center for Cloud Research and Development

<https://www.nii.ac.jp/en/research/centers/ccrd/>

Promotes IT-based research and education by advancing joint R&D with researchers at universities and research institutes, in order to provide state-of-the-art scientific information infrastructures using cloud technologies on the Science Information NETwork (SINET).

Director: AIDA Kento (Professor, Information Systems Architecture Science Research Division)

Center for Cybersecurity Research and Development

<https://www.nii.ac.jp/en/research/centers/cybersecurity/>

Works to ensure the security and operational efficiency of university research environments in cyberspace, and to develop the human resources needed for this work in collaboration with universities, through R&D that leverages the knowledge gained from building and operating scientific information infrastructures.

Director: TAKAKURA Hiroki (Professor, Information Systems Architecture Science Research Division)

Research Center for Knowledge Media and Content Science

<https://www.nii.ac.jp/research/centers/kmcs/>

Promotes cutting-edge research on the analysis and extraction of knowledge from research papers and other academic content, and carries out empirical R&D to encourage the distribution of academic knowledge.

Director: AIZAWA Akiko (Vice Director-General, NII; Professor, Digital Content and Media Sciences Research Division)

Research Center for Community Knowledge

Collects and analyzes the process of forming shared knowledge between humans, as well as that between humans and machines, carries out activities to promote the use of the outcome of such research, and conducts empirical R&D to encourage the next generation of information sharing.

Director: ARAI Noriko (Professor, Information and Society Research Division)

Center for Dataset Sharing and Collaborative Research

<https://www.nii.ac.jp/en/research/centers/dsc/>

Collects datasets that are useful for informatics research and makes them available to researchers, conducts R&D on building datasets and a platform for their use, and promotes collaborative research in informatics using shared datasets.

Director: OYAMA Keizo (Vice Director-General, NII; Professor, Digital Content and Media Sciences Research Division)

Research Center for Open Science and Data Platform

<https://cos.nii.ac.jp/en/>

Conducts joint international R&D on platforms for managing, publishing, and searching research data, which will serve to promote a paradigm shift in the way research is carried out towards open science, and deploys these platforms jointly with universities and research institutes in Japan to encourage their use.

Director: YAMAJI Kazutsuna (Professor, Digital Content and Media Sciences Research Division)

Major Research Projects

Global Research Center for Quantum Information Science

<https://qis1.ex.nii.ac.jp/qi/>

An international hub for cutting-edge research on quantum information science and technology, advancing the science of quantum information and exploring the potential of quantum information technologies. Also cultivates the development of international human resources who will lead medium- to long-term research projects focused on specific goals.

Director: NEMOTO Kae (Professor, Principles of Informatics Research Division)

Global Research Center for Cyber-Physical Systems

Advances R&D on social cyber–physical systems (CPS) by tackling real-world challenges through industry–government–academia collaboration, with the goal of addressing social issues and creating new value by linking the real world and cyberspace.

Director: TAKASU Atsuhiko (Professor, Digital Content and Media Sciences Research Division)

Global Research Center for Big Data Mathematics

<https://bigdata.nii.ac.jp/wp/english/>

Research base for JST ERATO's Kawarabayashi Large Graph Project. A world-class hub for research on big data mathematics focused on developing high-speed algorithms, conducting advanced research and human resource development.

Director: KAWARABAYASHI Ken-ichi (Vice Director-General, NII; Professor, Principles of Informatics Research Division)

Global Research Center for Systems Design and Mathematics

<http://group-mmm.org/eratommssd/en/>

Research base for JST ERATO's HASUO Metamathematics for Systems Design Project. Aims to provide support to manufacturing, ranging from developing specifications for industrial products to their design, production, and maintenance, by incorporating the knowledge of formal methods from software engineering into manufacturing.

Director: HASUO Ichiro (Associate Professor, Information Systems Architecture Science Research Division)

Research Center for Medical Bigdata

<http://research.nii.ac.jp/rc4mb/>

Undertakes the construction of big data cloud platforms for medical imaging using the Science Information NETwork (SINET5) built and operated by NII, and develops artificial intelligence (AI) that analyzes large collections of medical images to assist doctors with diagnosis.

Director: SATOH Shin'ichi (Professor, Digital Content and Media Sciences Research Division)

Industry–Academia Collaboration

Research Center for Financial Smart Data

<https://rcfsd.github.io/en/>

Conducts statistical analysis of socioeconomic phenomena and creates models to enable more accurate future forecasts, develops technologies for financial information analysis using natural language processing, image processing, and machine learning, with the aim of transforming financial big data into "smart data."


Director: KITSUREGAWA Masaru (Director-General, NII)


Center for Robust Intelligence and Social Technology

<https://www.nii.ac.jp/en/research/centers/cris/>

Carries out basic R&D on information technologies to address social issues including disaster preparedness, education, and support for the disadvantaged, with a particular emphasis on robust intelligence and social technology in order to develop the intellectual capability and resilience to cope with the constantly changing and diverse real-world environment.

Director: KITSUREGAWA Masaru (Director-General, NII)

04  National Institute of Informatics

National Institute of Informatics  05

Research

Graduate Program

Service

Organization/Others

Principles of Informatics Research Division

<Mathematical Informatics>

Assistant Professor
IGARASHI Ayumi
Ph.D. (Computer Science)



Specialties: Algorithmic game theory; Fair division theory; Cooperative game theory
Research themes: Research on algorithmic game theory. Design of suitable algorithms that can satisfy many people with different objectives, such as assignment of customers to taxis and multi-task scheduling.

Professor
UNO Takeaki
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
KAWARABAYASHI Ken-ichi
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 society at large.

Associate Professor
KISHIDA Masako
Ph.D.



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

Professor
HAYAMI Ken
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: Development of the Cluster Gauss–Newton method to find multiple solutions to nonlinear least squares problems and its practical application in parameter estimations of pharmacokinetic models, and the development of the inner-iteration preconditioning for least squares problems and its application to the primal-dual interior point method for linear programming problems.

Assistant Professor
HIRAHARA Shuichi
Ph.D. (Information Science and Technology)



Specialties: Complexity theory; Minimum circuit size problems; Kolmogorov complexity; Average-case complexity
Research themes: Research on complexity theory, the theory underlying cryptographic security. Aiming to solve open problems that ask the limits of computation including the P vs NP problem with minimum circuit size problems serving as the axis of research.

Assistant Professor
FUJII Kaito
Ph.D. (Information Science and Technology)



Specialties: Combinatorial optimization; Machine learning; Approximation algorithm; Online algorithm
Research themes: Efficient algorithms for solving combinatorial optimization problems. In particular, designing algorithms with theoretical approximation guarantee and their applications to machine learning.

Assistant Professor
YOKOI Yu
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. Design of efficient algorithms for avoiding improper participation and producing fair matching.

Associate Professor
YOSHIDA Yuichi
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
TATSUTA Makoto
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
NEMOTO Kae
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
MATSUMOTO Keiji
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
ICHISE Ryutaro
Ph.D. (Engineering)



Specialties: Machine learning; Knowledge systems; Data mining
Research themes: Combining diverse information, generating useful knowledge from that, and then conducting research on artificial intelligence using that. Development of revolutionary technology to integrate differing types of data, and that for data mining and knowledge discovery.

Associate Professor
INAMURA Tetsunari
Ph.D. (Engineering)



Specialties: Human–robot interaction; Synthetic study of robot intelligence based on stochastic information processing; Neurorehabilitation using 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
INOUE Katsumi
Ph.D. (Engineering)



Specialties: Artificial intelligence platform; 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 the advancement of science and understanding in society.

Professor
SATO Ken
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
SUGIYAMA Mahito
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
TAKEDA Hideaki
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.

Information Systems Architecture Science Research Division

<Network Architecture>

Associate Professor
ABE Shunji
Ph.D. (Engineering)



Specialties: Performance analysis and quality control methods through communication traffic measurement; IP network communication performance improvement; Network architecture
Research themes: Development of methods for controlling communication volume to realize efficient and secure communication networks 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
FUKUDA Kensuke
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.

<Information Network>

Professor
URUSHIDANI Shigeo
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. Development of original NII functionality in collaboration with system vendors. Development of various services such as the world's first L1 on-demand service.

Associate Professor
KANEKO Megumi
Ph.D. (Engineering)
HDR (Habilitation à Diriger des Recherches)



Specialties: Wireless communication engineering; Wireless resource allocation; Protocol design for mobile communication systems
Research themes: Data volume is expected to increase explosively and 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
KURIMOTO Takashi
Ph.D. (Engineering)



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

Professor
JI Yusheng
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
TAKAKURA Hiroki
Ph.D. (Engineering)



Specialties: Cybersecurity; High-reliability networks; Anomaly detection
Research themes: Security measures to protect confidential information from cyberattacks, 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
AIDA Kento
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
KOIBUCHI Michihiro
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 the loss of data. Liquid submersion cooling technologies for computers. One dream is to design the world's first supercomputer network.

Professor
GOSHIMA Masahiro
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 over the past ten years, when clock speeds remained relatively stable, effective speeds have increased by a factor of ten. Ongoing research to extend this trend for another ten or twenty years.

Associate Professor
TAKEFUSA Atsuko
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
HASHIZUME Hiromichi
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.

Professor
YONEDA Tomohiro
Ph.D. (Engineering)



Specialties: Asynchronous circuit technology and dependable VLSI platform technologies
Research themes: Asynchronous circuit technology, which addresses 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.

Assistant Professor
TSUSHIMA Kanae
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
YOSHIOKA Nobukazu
Ph.D. (Information Science)



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

<Software Infrastructure>

Assistant Professor
KATO Hiroyuki
Ph.D. (Engineering)



Specialties: Optimization for casual queries to database; Fundamental issues for 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 effectively. Advancing research on the query language XQuery to improve usability.

Assistant Professor
SEKIYAMA Taro
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.

<Software Engineering>

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



Specialties: Software engineering; Formal methods; Testing; Autonomous and smart systems; Cyber-physical systems; Machine learning engineering
Research themes: The catch phrase for research is "smart systems and smart dependability assurance." In anticipation of leading-edge application systems, research into 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
KATAYAMA Norio
Ph.D. (Engineering)



Specialties: Data management technology for video corpus analysis
Research themes: Efficient high-speed 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
KOMIYAMA Yusuke
Ph.D. (Agriculture)



Specialties: Open science; Research data management; Semantic Web; Linked data; Bioinformatics
Research themes: Consolidation of the open science platform for management and sharing of research data from universities and research facilities, as an urgent issue in the academic infrastructure field. Provision of a research data management service with a high degree of safety and versatility by utilizing SINET, GakuNin, UPKI, the Cloud, and academic content.

Professor
TAKASU Atsuhiko
Ph.D. (Engineering)



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

Professor
TAKANO Akihiko
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
YAMAJI Kazutsuna
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.

Professor
AIZAWA Akiko
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 by 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
OYAMA Keizo
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
KANAZAWA Teruhito
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.

Assistant Professor
SUGAWARA Saku
Ph.D. (Information Science and Technology)



Specialties: Natural language processing; Computational linguistics; Natural language understanding; Task design
Research themes: Designing highly descriptive evaluation tasks such as reading comprehension, recognizing textual entailment, and commonsense reasoning, while at the same time working on building a system that guarantees practical reliability and interpretability, with the goal of exploring human language understanding through computational modeling.

Professor
YAMAGISHI Junichi
Ph.D. (Engineering)



Specialties: Speech information processing; Speech synthesis; Speaker verification; Media forensics; Machine learning
Research themes: Reproducing the traits and characteristics of individuals as defined by voice, face, and writing by machine learning (digital cloning) and looking for new applications such as personal avatars, while at the same time considering a framework that achieves both security and privacy such as by biometric authentication using biometric sensor technologies.

<Pattern Media>

Assistant Professor
ANDO Ryoichi
Ph.D. (Design Engineering)



Specialties: Computer graphics; Physical simulations; Computational fluid dynamics
Research themes: Development of new computation methods for numerical fluid dynamos 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
IKEHATA Satoshi
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.

Professor
KITAMOTO Asanobu
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 the 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
KODAMA Kazuya
Ph.D. (Engineering)



Specialties: 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
SATO Imari
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
SATO Shin'ichi
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, and establishing search technologies for objects and events portrayed in video. Participating in overseas R&D projects and refining technologies.

Professor
SUGIMOTO Akihiro
Ph.D. (Engineering)



Specialties: Sensing and understanding human activities in daily life; Real-time 3D environment recovery using RGB-D 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.” Especially, reexamining problems in computer vision from a mathematical and engineering perspective to build a visual mathematics.

Assistant Professor
TAKAYAMA Kenshi
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
ZHENG Yinqiang
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
MO Hiroshi
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
AIHARA Kenro
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
ANDRES Frederic
Ph.D., HDR



Specialties: Mulsemmedia; Database; Collective intelligence; Data science; Big data
Research themes: Distributed collective intelligence (CI)-based applications, intelligent food and cooking recipes, CI-based semantics and social media ecosystems, community behavior detection, and early stress detection and monitoring.

Professor
PRENDINGER Helmut
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; Multimodal 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.

Professor
YAMADA Seiji
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
YU Yi
Ph.D. (Information Science)



Specialties: Multimodal content analysis using artificial intelligence and deep learning
Research themes: Converting data with different modalities into a common semantic space and using deep learning and cross-modality correlation analysis, in order to establish embedding algorithms that straddle modalities and use data with multiple modalities together.

Information and

< Information Use >

Professor
ARAI Noriko
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.

Associate Professor
GOTODA Hironobu
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
SUN Yuan
M.A. (Education)



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

< Information Public Policy >

Associate Professor
OKADA Hitoshi
Ph.D. (International Public Policy)



Specialties: Critical growth factors of e-commerce and e-money; University Information Security Policy Portal (UISPP)
Research themes: Blockchain 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.

Society Research Division

Assistant Professor
UEKI Kouichirou
M.Sc.



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.

Professor
NAKAJIMA Shin
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
NISHIZAWA Masaki
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.

Professor
SATO Ichiro
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.

Professor
ECHIZEN Isao
Ph.D. (Engineering)



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

Associate Professor
BONO Mayumi
Ph.D.



Specialties: Understanding multimodal interaction; Understanding conversational structures in multi-party interaction
Research themes: Creating a dataset 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.

Associate Professor
FUNAMORI Miho
M.Sc.



Specialties: Higher education policy; Scholarly communication policy; Open science; Research evaluation; Higher education in the digital age
Research themes: Analyzing the impact of digitization on higher education from the perspective of university management, research, and education. Investigating the relationship between massification and digitization of higher education, the process of digitization, the relationship between scholarly communication and research evaluation, and the outlook for higher education in the age of Society 5.0.

Professor
KANDO Noriko
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
MIZUNO Takayuki
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
FURUKAWA Masako
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.

Major Project Involvement

Japan Agency for Medical Research and Development (AMED)
ICT Infrastructure Establishment and Implementation of Artificial Intelligence for Clinical and Medical Research

New Support for Medical Care through IT

Principal Investigator, NII: SATOH Shin'ichi (Professor, Digital Content and Media Sciences Research Division; Director, Research Center for Medical Bigdata)

In collaboration with the medical academic societies supported by AMED, NII is undertaking the construction of big data cloud platforms for medical imaging using the Science Information NETwork (SINET5) built and operated by NII, as well as developing artificial intelligence (AI) that analyzes large collections of medical images to assist doctors with diagnosis.

Construction of a Big Data Cloud Platform for Medical Imaging

The medical societies collect, anonymize, and send data from hospitals and other healthcare facilities to their respective servers. The data are then sent from each association's server to the big data cloud platform for medical imaging. To transmit confidential medical imaging information over a secure network environment, the big data cloud platform leverages the features of SINET5, which connects all the prefectures in Japan with 100 Gbps ultra-high-speed lines, as well as the enhanced virtual private network (VPN) provided by SINET5 (Figure). The cloud makes it possible for researchers in the medical field nationwide to safely and easily use big data for medical imaging and conduct research utilizing large volumes of data, which were previously unavailable.

Development of AI in Medical Imaging Analysis Technology

NII is carrying out a large-scale project that collects, through the medical societies, medical images of over 100,000 clinical cases across Japan, and develops medical imaging analysis technology using the core AI technologies of deep learning and image recognition. To

accomplish this, NII established an R&D system in joint collaboration with other researchers in the field of informatics, and set up research themes to take on the challenge of addressing each issue.

One purpose of medical image analysis is to find subtle differences between areas with suspected lesions and normal areas within the images. Our goal is to be able to contribute to preventing oversights in the field and improving work efficiency by providing support to doctors in the fields of diagnostic imaging and medical examination.

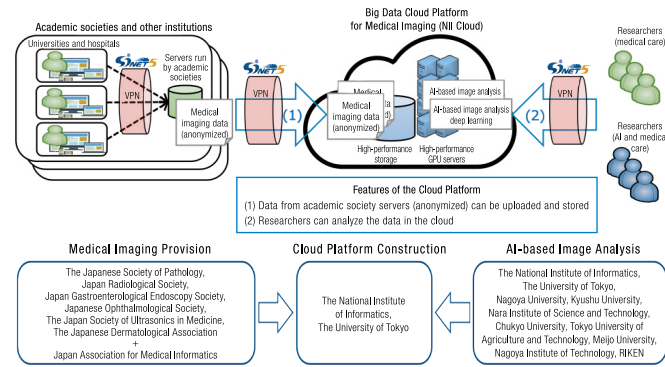


Figure: Overview of cloud platform, Medical institutions, universities, and other organizations can use the cloud platform via a high-performance virtual private network (VPN) provided by the Science Information NETWORK (SINET5).

Japan Science and Technology Agency (JST) Strategic Basic Research Programs

ERATO: Outstanding Research Leaders Strive to Generate the Seeds of Breakthrough New Technologies

HASUO Metamathematics for Systems Design Project

Research Director: HASUO Ichiro (Associate Professor, Information Systems Architecture Science Research Division; Director, Global Research Center for Systems Design and Mathematics)

In the manufacturing industry today, efforts are underway to fundamentally transform the manufacturing process—from design to production—through automation and software support using advanced information processing technologies. In light of these changes, the HASUO Metamathematics for Systems Design Project aims to introduce the findings from the field of software science into traditional manufacturing technologies and build software tools that support the different aspects of industrial product development, from developing specifications to design, implementation, and maintenance.

Leveraging Formal Methods in Manufacturing

In particular, the project explores methodologies for software support, which are responsible for quality assurance and efficiency in industrial products such as vehicles, and other “physical information systems,” by bringing in the techniques of systems design in software science based on mathematics, called “formal methods.” Formal methods have so far been used with “discrete elements,” assuming calculations by computer, but in order to apply them to physical information systems, formal methods must be extended to encompass “continuous elements” of physical systems such as continuous dynamics, probability, and time (Figure). Our unique approach to this theoretically difficult problem is to mathematically analyze the process itself of extending formal methods and construct a higher-order (metalevel) theory in order to obtain universal knowledge, which may allow the various techniques of formal methods to be extended together.

This metalevel approach is very theoretical and makes full use of a variety of abstract mathematical techniques, such as logic and category theory. However, another distinctive

feature of this project is its orientation towards application, with an ultimate goal of applying the outcome of these theoretical studies to the real problems faced by the industrial sector.

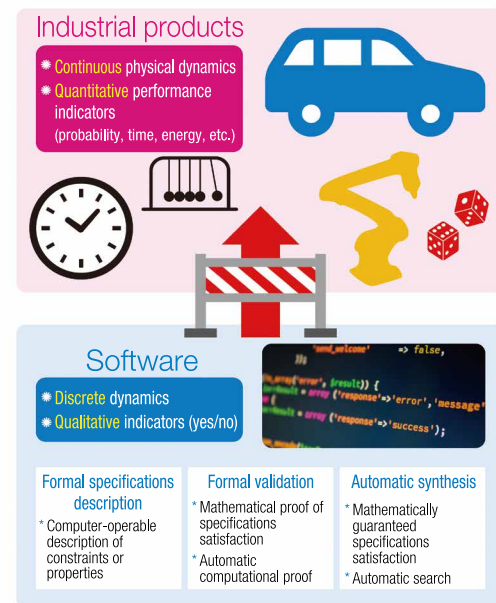


Figure: Extending formal methods from software to physical information systems

CREST: Network-Based (Team-Based) Research Giving Rise to Outstanding Results That Lead to Innovation in Science and Technology

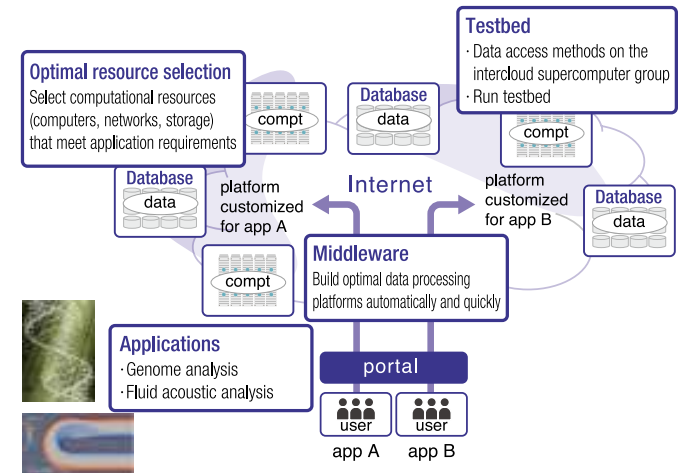
[Big Data] Advanced Core Technologies for Big Data Integration

Research Supervisor: KITSUREGAWA Masaru (Director-General, NII)

[Research Projects] Application-Centric Overlay Cloud Using Inter-Cloud

Research Director: AIDA Kento (Professor, Information Systems Architecture Science Research Division)

With the increasing performance of supercomputers, clouds, and the networks that connect them, the possibility of building interclouds that link multiple clouds through high-performance networks and utilizing them for large-scale data processing is becoming real. However, with current technology, users have to set up computers and networks individually to build a computing platform for processing data. This poses significant technical and time barriers. The objective of this research is to develop the core technologies for quickly and automatically building large-scale data processing platforms optimized for applications on multiple clouds connected to a network. The outcome of this research will enable easy high-performance processing of large-scale data using clouds. We also aim to develop applications for genome analysis and fluid acoustic analysis in collaboration with researchers in these fields, as well as to build and operate infrastructures together with researchers at information infrastructure centers of universities and other institutions. This research is being conducted in collaboration with research groups at Hokkaido University, National Institute of Genetics, Tokyo Institute of Technology, and Kyushu University.

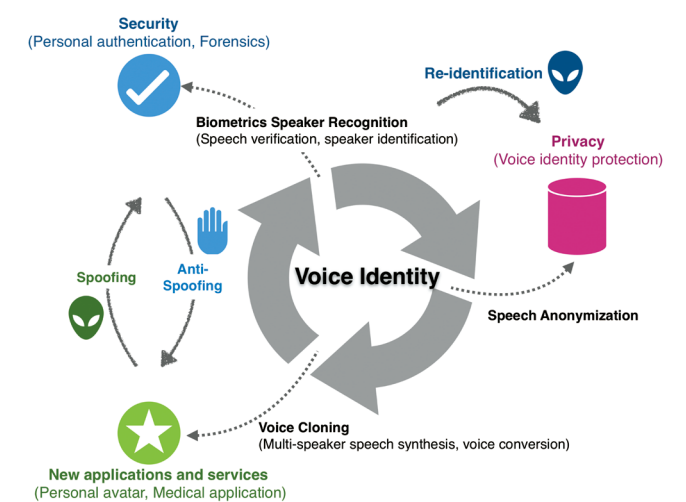
Application-centric overlay cloud technology
using intercloud

[Symbiotic Interaction] Creation and Development of Core Technologies Interfacing Human and Information Environments

[Research Projects] VoicePersonae: Speaker Identity Cloning and Protection

Research Director: YAMAGISHI Junichi (Professor, Digital Content and Media Sciences Research Division)

Voice is a simple, natural, and intuitive modality. At the same time, voice is also a part of our identity and is considered as an important factor in a variety of fields such as biometrics, speech synthesis, voice quality conversion, and privacy. However, research in these fields is currently being conducted separately toward conflicting goals. This project removes the barriers between fields related to voice identity in order to (a) refine the speaker identity modelling technology; (b) enhance the security and robustness of authentication with voice biometrics, i.e., speaker recognition; and (c) provide new technologies for voice privacy protection. Detailed modeling of speaker identity is essential for avatars that reproduce personal characteristics of individuals and other applications. Conventionally, speech synthesis, voice quality conversion, speech enhancement, and other fields were studied separately. In this project, we aim to create a new model that integrates these fields as various tasks of speech generation for multiple speakers. Aside from speech generation, we are also studying integration with speaker recognition technologies. Moreover, we will conduct research on voice biometric sensors, which are technologies for automatic detection of voice spoofing, in order to improve the safety of speaker recognition. Furthermore, we will hold the world's first challenge that will compete on voice anonymization and re-identification to accelerate research on voice privacy.



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

[Research Projects] UNDERPIN: Understanding Psychiatric Illness through Natural Language Processing and Media Analysis

Research Director: SATOH Shin'ichi (Professor, Digital Content and Media Sciences Research Division)

Psychiatric disorders such as depression, schizophrenia, and dementia are diagnosed and treated through “words.” Understanding the patient’s words thoroughly and bringing out the characteristic symptoms are essential to making the correct diagnosis and treatment, but objectively evaluating and quantifying them are difficult. This research aims to quantify the

symptoms of psychiatric disorders using natural language processing and media analysis technologies, in order to deepen our understanding of these illnesses and eventually lead to better prevention, early detection, and other technological developments.

Major Project Involvement

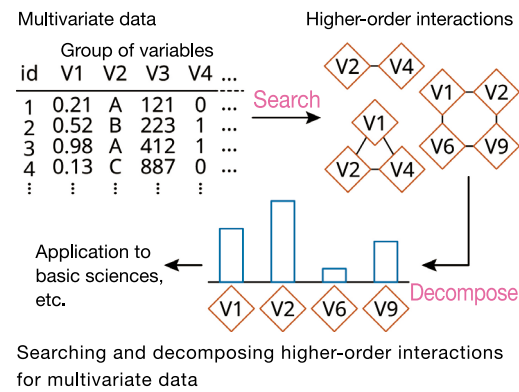
PRESTO: Network-Based (Individual) Research Giving Rise to Wellsprings of Innovation in Science and Technology

[Social Design] Fundamental Information Technologies towards Innovative Social System Design

Search and Decomposition of Higher-Order Interactions between Variables

Researcher: SUGIYAMA Mahito (Associate Professor, Principles of Informatics Research Division)

Discovering and analyzing interactions between variables is a fundamental and essential challenge in analyzing multivariate data consisting of many variables. Sensors, IoT, and other information technologies have been rapidly developing in recent years. This has resulted in the acquisition and collection of multivariate data on various variables over a wide range of fields, from basic sciences such as genetics, neuroscience, and social sciences to applied sciences such as medicine. Analyzing the interaction between variables in such multivariate data is one of the most basic analytical procedures in descriptive data analysis for identifying the underlying phenomena behind the data, and is a crucial procedure in data science. To date, variable (feature) selection based on predictive analysis using linear models, such as Lasso, had been developed for machine learning, although it is not suitable for descriptive data analysis. Therefore, this research project will develop a methodology for searching and decomposing higher-order interactions between variables, as well as develop the basic theories and practical algorithms. Building discrete algorithms will enable efficient searches for higher-order interactions hidden in multivariate data consisting of many variables, as well as decomposition of these higher-order interactions using the theory of information geometry. This project's outcome will provide more sophisticated data analytics and can be applied to a wide range of fields that form the foundation of our social systems.



Cabinet Office Cross-Ministerial Strategic Innovation Promotion Program (SIP) Phase 2

Big-Data and AI-Enabled Cyberspace Technologies

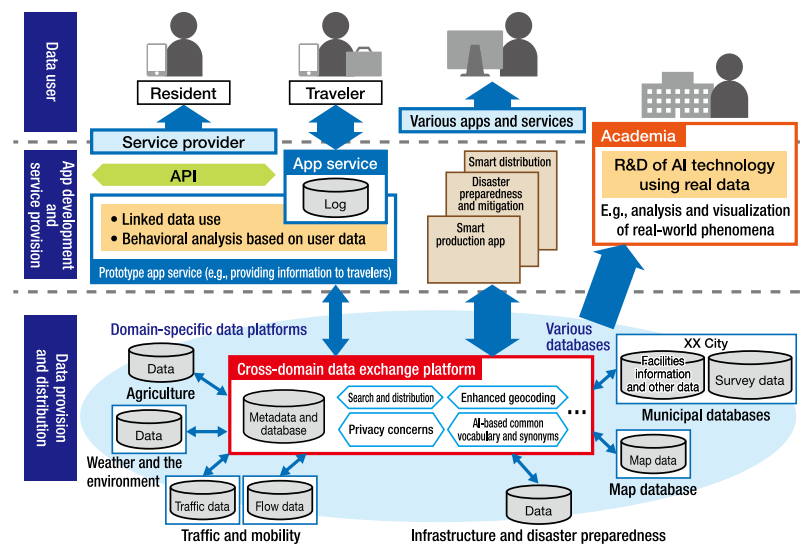
This project aims to establish the cyberspace platform technologies that will form the foundation of Society 5.0 in cyber-physical systems (CPS), in particular, (1) a highly sophisticated human interaction platform technology which will facilitate collaboration between humans and AI, (2) a cross-domain data exchange platform, and (3) inter-AI collaboration technology, with the goal of implementing CPS in the real world using big data and AI.

R&D Component

R&D of a Cross-Domain Data Exchange Platform based on Metadata Structuring by AI Technology and its Evaluation through Applications for Spatio-temporal Big Data

Head of R&D: TAKASU Atsuhiko (Professor, Digital Content and Media Sciences Research Division)

Overview of the cross-domain data exchange platform and the R&D undertaken by NII



Development of a data exchange platform that can exchange and enhance municipal open data and data from various domains, and prototyping through applications

Kakenhi

Grants-in-Aid for Scientific Research (Kakenhi)

Venturing into a wide range of basic to applied research

Kakenhi are funds that provide broad support for scientific research based on the free ideas of the researchers themselves, and covers a wide range of academic studies spanning from basic to applied research. Both faculty members and researchers actively apply to Kakenhi for grants, and many are approved. The grants obtained from Kakenhi are also distributed to researchers in other institutions (co-investigators) for collaborative research work. Similarly, many NII faculty members also participate as co-investigators in the Kakenhi-funded projects of researchers at other institutions.

Applications Accepted

(FY2019)

	No. of applications accepted	Amount (in thousands of yen)
Principal Investigator	69	375,050
Co-investigator (Other institutions → NII)	69	88,113

[Model Cases of Research Funded by Kakenhi]

Grant-in-Aid for Scientific Research (S)

Large Graphs: Theory and Algorithms

Principal Investigator: KAWARABAYASHI Ken-ichi
(Vice Director-General, NII; Professor, Principles of Informatics Research Division)

Collecting huge volumes of various types of data through sensors, images, audio, and other means, analyzing them, and applying information processing technologies hold great potential for solving many of the problems facing modern information society. However, many of these problems cannot be solved easily even with the use of supercomputers, because of the massive amounts of data involved. Overcoming such issues requires new innovations in algorithms. The most significant and urgent need on a common scientific foundation is for building and codifying innovative algorithm design techniques that are based on computational models and mathematical exploration. This research aims to strengthen the theoretical field of algorithms (mainly graph algorithms) by making full use of mathematical theory, and to speed up and make algorithms scalable using theoretical tools. Our three core research topics are as follows.

1. Submodular functions and their applications

We will work on solving real-world optimization problems such as robust optimization by incorporating combinatorial optimization techniques, such as approximation algorithm design methods and algebraic methods.

2. Exploration of basic mathematical theories: Directed graph minor theory

We aim to extend graph minor theory to digraphs.

3. Graph coloring problem

We aim to make essential contributions to central issues in discrete mathematics, the four color theorem and the graph coloring problem for graphs embedded in curved surfaces.

Reference: <https://bigdata.nii.ac.jp/kibans/english/>

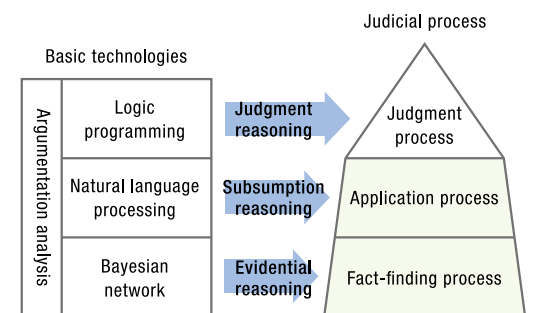
Grant-in-Aid for Scientific Research (S)

Advanced Reasoning Support for Judicial Judgment by Artificial Intelligence

Principal Investigator: SATOH Ken (Professor, Principles of Informatics Research Division)

In the trial process, the intellectual work performed by judges can be broadly divided into three parts: the fact-finding process, the application process, and the judgment process. The fact-finding process is the process of finding the facts of what actually occurred in the case based on evidence. The application process is the process of making the facts correspond to legal concepts. The judgment process is the process of making a judgment according to the legal concepts corresponding to the facts, based on the text of the law or judicial precedent. Furthermore, judges determine the issues, make decisions, and resolve disputes through interactions with parties to the proceedings, since conflicts may arise between plaintiff and defendant or between prosecutor and the accused, and trial by lay judges involves the participation of the lay judges. Various complex and advanced human reasoning tasks are performed in the trial process. Such higher-order reasoning may be carried out faster and better with the support of artificial intelligence. This research aims to develop support systems that perform advanced reasoning for the three processes above, using the respective platform technologies given below, as well as a system that analyzes the issues in each process using argumentation theory (Figure).

1. Fact-finding process support system using evidential reasoning based on Bayesian network
2. Application process support system that obtains applicable rules based on natural language processing
3. Judgment process support system that extends the already developed civil code reasoning system PROLEG to handle criminal and administrative cases.
4. Argumentation analysis support system using argumentation theory for issues in each process



Kakenhi

Grant-in-Aid for Scientific Research (A)

Data-Driven Reconstruction and Integrated Analysis of the Past World Using the Infrastructure for Historical Big Data

Principal Investigator: KITAMOTO Asanobu
(Professor, Digital Content and Media Sciences Research Division)

This study extends the data-driven approach underlying modern big data research to the world of the past by reconstructing and analyzing the world based on large-scale data collection and integration. We are developing a workflow for structuring data and building a digital research platform to assist with this work, starting from classical documents and ancient writings written in the Japanese cursive style, up to quantitative analysis of the past world through simulation. Furthermore, we are conducting data-driven reconstruction of nature (climate, disasters, etc.) and society (organizations, tourism, etc.) during the Edo period through open transdisciplinary research collaboration that transcends the barriers between informatics, humanities, science, and engineering, with the aim of gaining new knowledge on past history.

Grant-in-Aid for Scientific Research on Innovative Areas (Research in a Proposed Research Area)

Visualization of Complex Social Responsibilities in the Global Age through Network Science

Principal Investigator: MIZUNO Takayuki
(Associate Professor, Information and Society Research Division)

In a previous study, we have mathematically shown the economic connection between us and conflict regions, using data science (big data and complex network science). In this study, we will use these findings to lay the foundation for visualizing complex social responsibilities for conflict in a form that can be applied to policy making, in collaboration with international political scientists. Specifically, we will conduct research on the following four areas.

- (1) Measuring and indexing the impact of our purchases of goods through globalization on conflict damage
- (2) Measuring and indexing profits gained from connecting with conflict actors in the global economic network
- (3) Measuring and indexing ethnic conflict risks due to global capital inflows
- (4) Scientific backing for policies on conflict and conflict deterrence

Grant-in-Aid for Early-Career Scientists

Design and Implementation of Data-Driven Filters for Snapshot Hyperspectral Imaging

Principal Investigator: ZHENG Yinqiang
(Associate Professor, Digital Content and Media Sciences Research Division)

Multi-channel devices such as general RGB cameras are not always the best choice for hyperspectral reconstruction. The objective of this study is to optimize filter response for reconstruction from multispectral to hyperspectral images using deep neural networks (Figure).

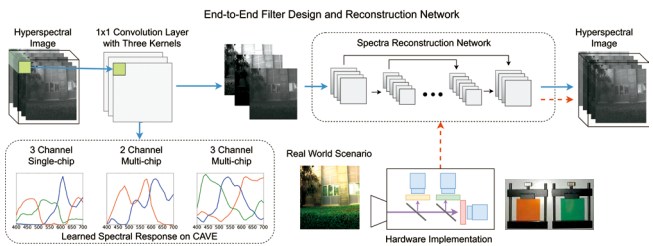


Figure: From optimization design of data-driven filter response to optical filter implementation

Grant-in-Aid for Scientific Research (A)

Error Tolerance and Uncertainty Tolerance Computing Using High-Bandwidth Optical Communication

Principal Investigator: KOIBUCHI Michihiro
(Associate Professor, Information Systems Architecture Science Research Division)

Big data computing and other computing methods where overall results are significant, as well as approximate computing that addresses problems with potential inaccuracies, will become more essential in the future. These parallel computations require enormous amounts of processing time for communicating between computing nodes, thereby making communications within the data center the key to improving performance. However, since improvements in scale integration of semiconductors will end by the second half of the 2020s, significant performance improvement of computer systems will be difficult with conventional designs that use up a large margin for operational accuracy. This research aims to establish a computer system design technology using optical communication that achieves high bandwidth and low latency by cutting margins and allowing reasonable bit error. We will also develop parallel computing technology that tolerates the uncertainty caused by bit error.

Grant-in-Aid for Challenging Research (Exploratory)

Theory Formation of “Massification of Research” in the Age of Higher Education Massification

Principal Investigator: FUNAMORI Miho
(Associate Professor, Information and Society Research Division)

In today's age of higher education massification, this research aims to shed light on how research activities are conducted at higher education institutions and the research programs that support them are transforming, as well as to theoretically formulate the mechanism under which the phenomenon of “massification of research” occurs. Today, the impact of massification has also reached the research functions of higher education institutions. Rampant unprofessionalism, such as excessive reliance on quantitative indicators and research misconduct, is widespread at the same time that societal demands are increasing. Through the theoretical formulation of the “massification of research” that is becoming common throughout the academic world, this study will offer a perspective on the ideal research function of modern higher education and issue a warning about its future.

Grant-in-Aid for Early-Career Scientists

Metatheory of Gradual Typing that Integrates Dynamic and Static Types

Principal Investigator: SEKIYAMA Taro
(Assistant Professor, Information Systems Architecture Science Research Division)

The type system is a widely used method for verifying software. Type systems can be broadly divided into static type, which verifies before running, and dynamic type, which verifies at runtime. Each of these has complementary strengths and weaknesses. In this research, we will study a software verification method called gradual typing, which combines these two different types and is able to take advantage of their respective strengths. In particular, we will study the correct design approach for gradually typed languages, as well as the metatheory of gradual typing that gives its theoretical limit, with the goal of boosting research on gradual typing theory in the right direction and achieving highly productive and highly reliable software development.

Human Resource Development

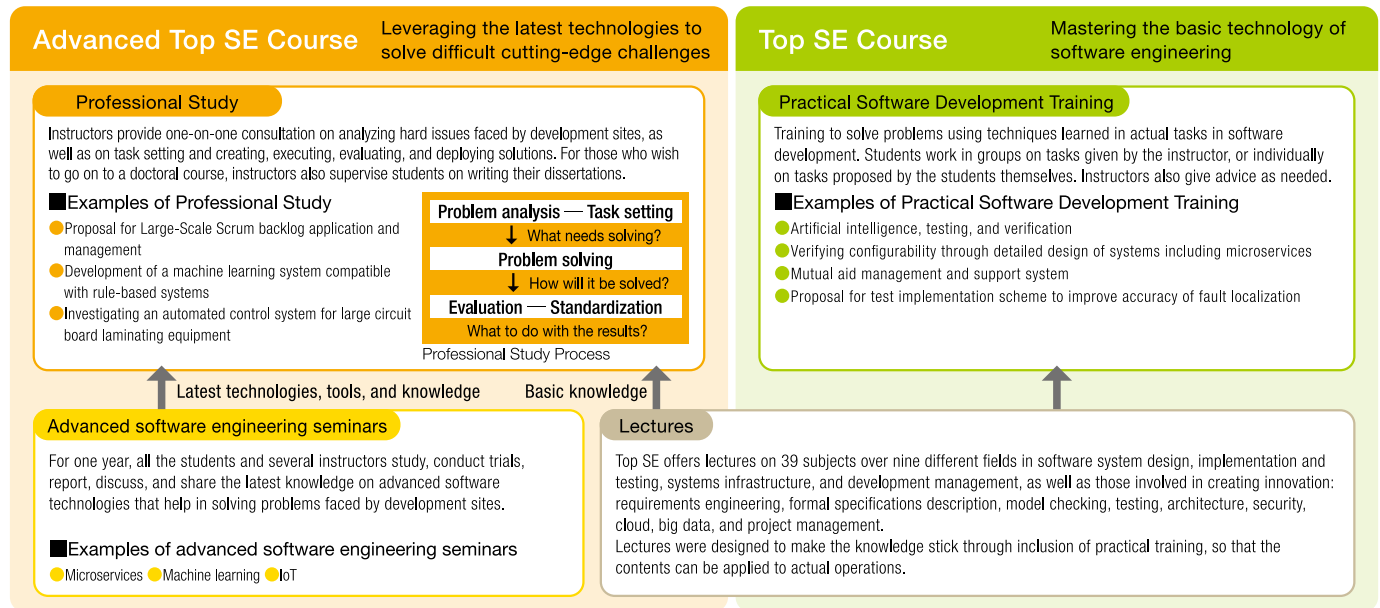
Top SE

■ Educational Services for Developing a Top-Level IT Workforce

GRACE Center provides a scientific educational program on intelligent manufacturing for professionals, so that they can master cutting-edge software engineering through learning basic theory and practical training. The program aims to cultivate world-class human resources in the IT field who have the foresight capable of creating IT innovations that meet the changes in the future.

The educational program offers:

1. Advanced Top SE Course for leveraging the latest technologies and mastering the techniques to analyze and solve highly difficult on-site problems and standardize the solutions
2. Top SE Course for mastering the basics of software engineering that are essential to staying ahead in the future



■ Collaboration with Overseas Universities: UCL Training

The ninth session is scheduled to be held at NII on February 15, 2021. The eighth session (October 29 to November 2, 2018) was held at University College London (UCL) with nine engineers from partner companies. The engineers each joined a group of five or six UCL students for a hackathon-style team training project to design and develop AR requirements collected from doctors and surgeons.

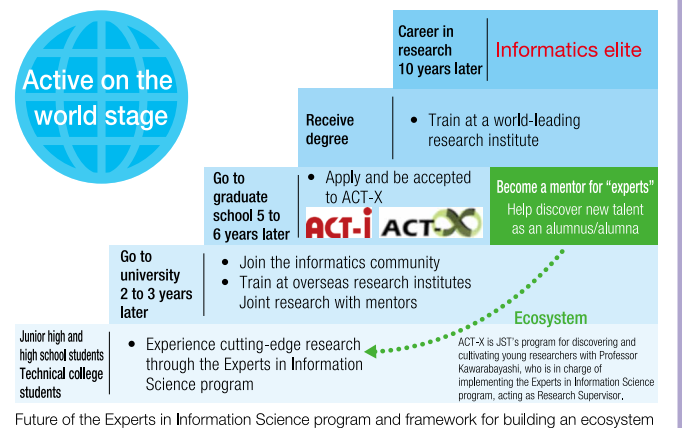


UCL students, partner company engineers, and faculty

Experts in Information Science: Public-Private Collaborative Training Program

Discovering and Nurturing Young Talent in the Field of Informatics

In April 2020, NII launched the Experts in Information Science program under the Global Science Campus (GSC) sponsored by the Japan Science and Technology Agency (JST), in collaboration with the Information Processing Society of Japan (IPSJ) and the Japanese Olympiad in Informatics (JOI). The goal of the program is to provide high school and technical college students showing talent in informatics the opportunity to experience cutting-edge informatics research, in order to cultivate knowledge and research skills in the field of informatics. Over 30 junior high, high school, and technical college students nationwide, selected from general public invitation through NII and IPSJ and from recommendations by JOI, will be assigned to university laboratories in various regions depending on where they live, in cooperation with IPSJ's local branches. In the first stage of the training process, students will broadly learn about information science at Japanese university laboratories. In the second stage, they will actually participate in research run by the laboratories and conduct joint research with top-class researchers. If desired, mentors can continue to follow up students even after they enter university. We are also considering providing opportunities to study abroad for those who have shown outstanding achievement, such as published papers.



Collaborative Research Promotion

NII actively conducts collaborative research with the private sector through external funds for commissioned research and other means. In addition, through calls for applications for open collaborative research, we are further promoting informatics studies and breaking new ground in research in collaboration with other academic fields, with the aim of generating new theories, methodologies, and applications (future value) from informatics that will bring incalculable real value to people and society.



[Various Collaborative Research with Different Corporations]

Collaborative Research with the Private Sector

<https://www.nii.ac.jp/research/collaboration/minkan>

NII receives researchers and research funds from outside institutions in the private sector to conduct joint research with NII faculty members. In principle, projects last one year, although multi-year contracts are also possible.

(1) Receiving researchers only

We accept researchers dispatched by outside institutions in the private sector to conduct collaborative research at NII while holding their regular jobs. Essential overhead expenses are covered by research fees up to a set limit.

(2) Receiving research funds only

We receive the research funds required for collaborative research from the private sector. Collaborating researchers conduct their research at their respective locations.

(3) Receiving researchers and research funds

We receive research funds and research fees to conduct collaborative research.

[Research to Build Broad Collaboration with Researchers and Create Value]

NII Open Collaborative Research

<https://www.nii.ac.jp/research/collaboration/koubo>

NII conducts open calls for applications for collaborative research, with NII faculty members acting as liaison officers. The following three types of open collaborative research proposals are accepted in the second half of each fiscal year.

- **Strategic research proposals** based on strategic subjects set by NII
- **Proposals for research project meetings** with the aim of paving the way for new collaboration or advancing research subjects, through meetings at the International Seminar House for Advanced Studies in Karuizawa
- **Open subject proposals** where applicants are free to set their own research subjects

Researchers affiliated with institutions in Japan are eligible to apply for the open collaborative research, although a wide range of researcher affiliations can become collaborating researchers, including faculty members of universities, technical colleges, and private corporations, as well as graduate students. We encourage everyone to take advantage of this open collaborative research program and move in a new direction.

Intellectual Property

Through the creation, acquisition, and management of intellectual property, NII encourages contributions to society by means of industry–government–academia collaborations.

Number of Invention Reports, Patent Applications, and Registrations (total number since FY2004) (as of the end of March 2019)

■ No. of Reports			■ No. of Applications			■ No. of Registrations		
269	Ownership: Organization	254	308	Japan	254	122	Japan	95
	Ownership: Individual	15		Outside Japan	54		Outside Japan	27

List of Japanese Patents Owned

Title of invention	NII inventor	Sole application	Registration No.
Apparatus, method, and program for retrieving and displaying image information	KAJIYAMA Tomoko	●	4441685
Quantum key delivering method and communication apparatus	WATANABE Yodai	●	4231926
Time-series data analysis device and time-series data analysis program	ICHISE Ryutaro	●	4734559
Information-sharing system, information-sharing server, information-sharing method, and information-sharing program	HONIDEN Shinichi	●	4799001
Sequential content delivery device, sequential content receiving device, and method thereof	SONEHARA Noboru	●	4734563
Contents presentation apparatus, contents presenting method, and contents presentation program	SONEHARA Noboru	●	4403276
Text content presentation apparatus, text content presentation method, and text content presentation program	SONEHARA Noboru	●	4143628
Method and apparatus for evaluating communication traffic that uses fragmentary self-similarity process	JI Yusheng	●	4081552
Imaging device and imaging method using out-of-focus structure	KODAMA Kazuya	●	4437228
Information resource retrieval device, information resource retrieval method, and information resource retrieval program	KANDO Noriko	●	4324650
Active content distribution system, active content distribution program, and active content distribution method	HONIDEN Shinichi	●	4392503
Device and method for generating traffic congestion prediction information, and route search system	HONIDEN Shinichi	●	4729411
Content selling device and method	SONEHARA Noboru	●	4304278
Document indexing device, document retrieval device, document classifying device, and method and program thereof	SONEHARA Noboru	●	4362492
Video provision device and method	AIHARA Kenro	●	4359685
Projection image correction system and correction information generation program	SATO Imari	●	4982844
Digital content registration distribution apparatus, system, and method	SONEHARA Noboru	●	4956742
Airing structure of three-dimensional integrated electrical circuit and layout method thereof	KOBUCHI Michihiro	●	5024530
Quantum key distribution method, communication system, and communication device	WATANABE Yodai	●	4862159
Time reference point information transmitting system and receiver	HASHIZUME Hiromichi	●	4621924
Collection/delivery route selection system	SATOH Ichiro	●	4374457
Device and method for learning data management, and vehicle air-conditioning device, and equipment control device	INAMURA Tetsunari	●	5224280
Air conditioner for vehicle and its control method	INAMURA Tetsunari	●	5177667
Route switching method, server apparatus, boundary node apparatus, rout switching system, and switching program	URUSHIDANI Shigeo	●	5062845
Direct path establishing method, server device, sender network node device, direct path establishment network, and program thereof	URUSHIDANI Shigeo	●	4999112
Path management control method, path management control program, path management controller, and path management control system	URUSHIDANI Shigeo	●	4806466
Emission allowance trading system and emission allowance trading method	SATOH Ichiro	●	5207195
Quantum computing device and method for Ising model	YAMAMOTO Yoshihisa	●	5354233
Measuring device, measuring system, and measuring method	HASHIZUME Hiromichi	●	5593062
Information search/display apparatus, method, and information search/display program	SONEHARA Noboru	●	5599068
Information search/display apparatus, method, and information search/display program	SONEHARA Noboru	●	5608950
Information search/display apparatus, method, and information search/display program	SONEHARA Noboru	●	5608951
Information providing apparatus, method, and program	SONEHARA Noboru	●	5614655
Control server, control method, and control program	AOKI Michihiro	●	5682932
Doppler radar system, Doppler radar transmitter, and transmission wave optimization method	HASHIZUME Hiromichi	●	5704695
Speed/distance detection system, speed/distance detection device, and speed/distance detection method	HASHIZUME Hiromichi	●	5739822
Information processing apparatus, schedule determination method, and computer program	KAWARABASHI Ken-ichi	●	5733722
Search tree drawing apparatus, search tree drawing method, and program	JI Yusheng	●	5754676
Encoding apparatus, method, program, and recording medium	ONO Nobutaka	●	5789816
Word-order rearrangement device, translation device, translation model learning device, method, and program	MIYAO Yusuke	●	5800206
Acoustic signal analyzing apparatus, method, and program	ONO Nobutaka	●	5807914
Data delivery system, data delivery apparatus, and method	FUKUDA Kensuke	●	5818262
Data distributed management system, apparatus, method, and program	FUKUDA Kensuke	●	5818263
Acoustic signal analyzing apparatus, method, and program	ONO Nobutaka	●	5911101
Image search apparatus, method, and program	SATOH Shin'ichi	●	5979444
Semiconductor chip and semiconductor chip connection system	YONEDA Tomohiro	●	6029010
Distance measuring method and radar device	HASHIZUME Hiromichi	●	6029287
State detection of superconducting qubits using light	NEMOTO Kae	●	6029070

List of Registered Trademarks

Trademark Mode	Registration No.	Trademark Mode	Registration No.	Trademark Mode	Registration No.	Trademark Mode	Registration No.	Trademark Mode	Registration No.
NII	4811291	Net Commons	5182361	NetCommons Ready	5369242	Picture (Michael)	5600802	Eduoram	6029580
NII	4830960	n c net commons	5152641	Picture (Palette)	5498318	meQuanics	5622078	(Picture) Eduoram	6029579
Net Commons	4832775	neXt commons	5191260	Picture (GakuNin)	5498319	Picture (GeoNLP)	5645544	(Picture) School cap and cloud	6062452
Picture + SINET	4934163	researchmap	5261160	Info dog	5538785	SIGVerse *	5649553	QNNcloud *	6072214
NAREGI	4952143	GRACE+ Picture	5275386	Picture (Info dog)	5538784	PrivacyVisor *	5653596		
Top SE	4943324	GAKUNIN	5341899	Picture (CINii)	5580217	WillingRing	5789533		
WebELS	4980388								

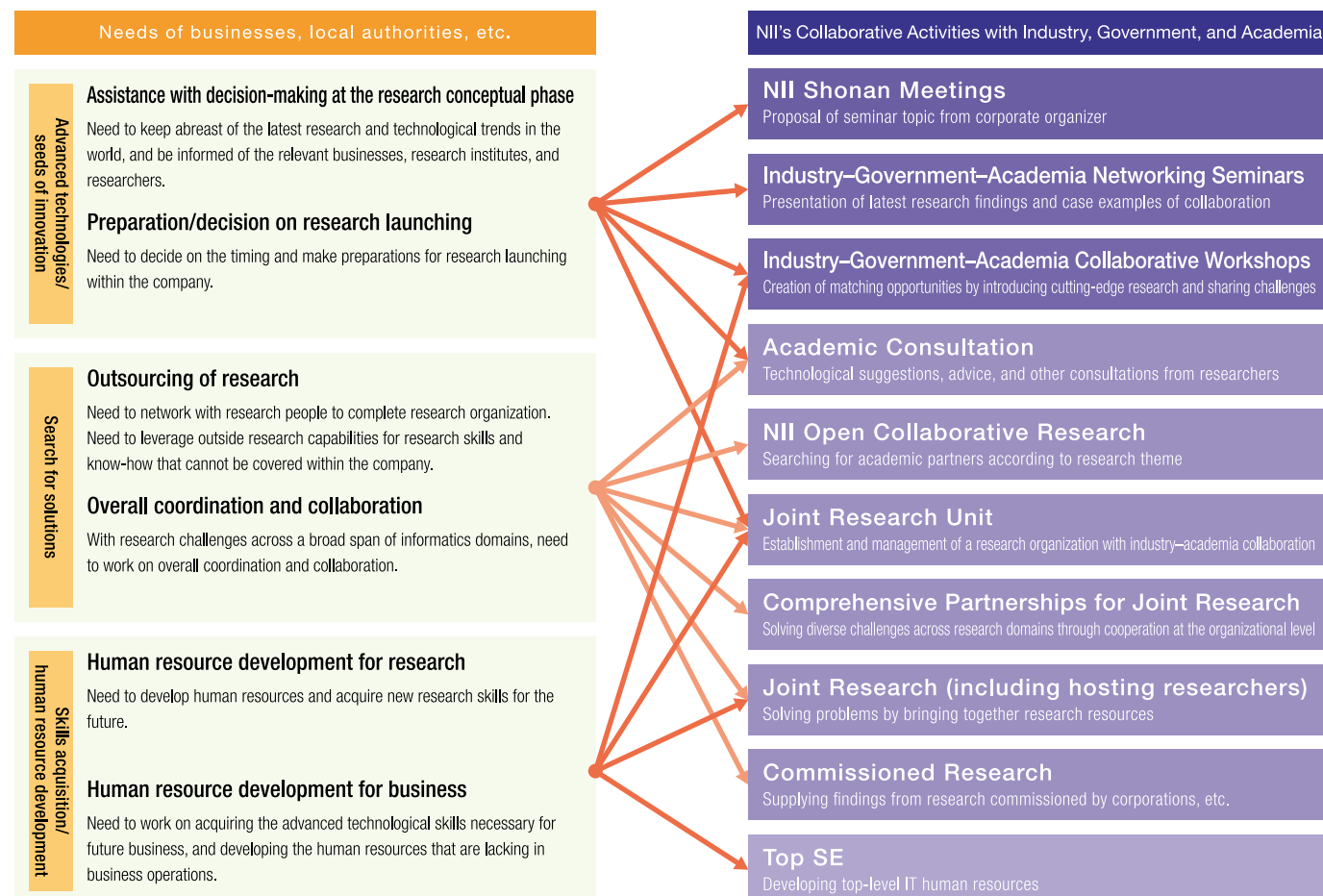
*SIGVerse (International Registration No. 1203063) and PrivacyVisor (International Registration No. 1208262) are also registered trademarks in Europe, the United States, and China.

Collaboration with Industry, Government, and Academia (Advancing Practical R&D and Collaborative Activities)

NII carries out practical R&D in order to address real social issues in the field of informatics. Collaborations between industry, government, and academia are critical to implementing our R&D achievements in the real world. NII engages in industry–government–academia collaborations to strengthen and deepen such collaborations, as well as to help ensure that our R&D meets the needs of businesses and local authorities.

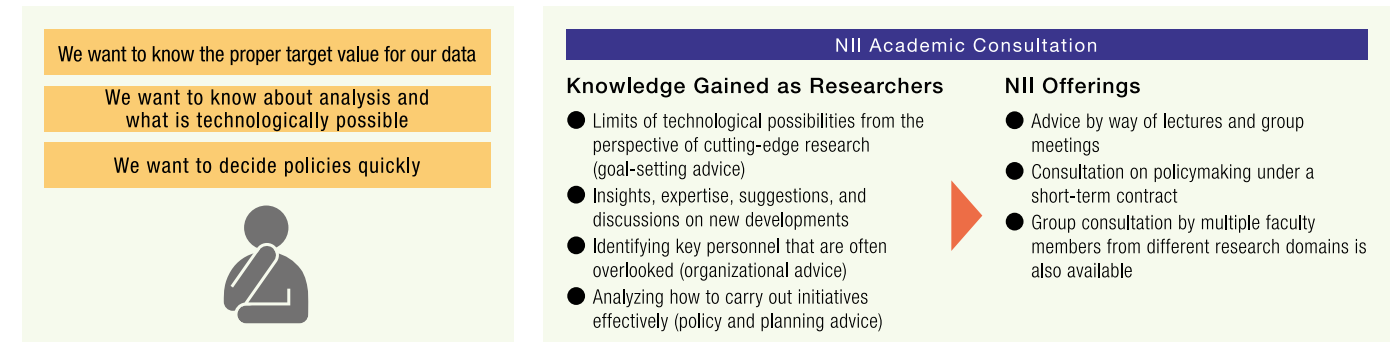


Action Program for Industry–Government–Academia Collaborations



Academic Consultation by Researchers

NII offers consulting services that aim to expand the framework for industry–government–academia collaborations, explore possible collaborations with new partners, and contribute to society at large. Through communications between researchers and business people, our consulting services support startups by providing relevant policy advice from researchers on various issues that are likely to lead to innovations through industry–academia collaboration and benefit society.



Innovation Produced by Knowledge

Model Case of Collaboration with Industry, Government, and Academia



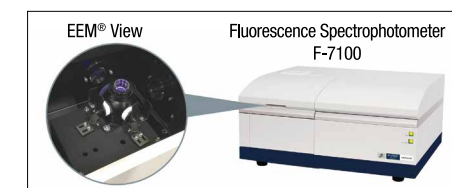
Example Case of Collaboration with Industry, Government, and Academia: NII - Hitachi High-Tech Science Corporation

Achieving visualization of separated reflected light image and fluorescence image of objects

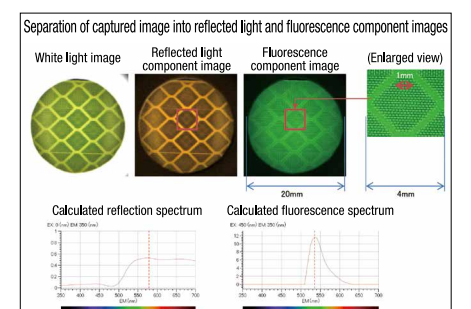
EEM® View: CMOS Camera Imaging System for Fluorescence Spectrophotometer

A new technology capable of simultaneously capturing both spectroscopic images and spectral data. The computational algorithm developed by NII Professor Imari Sato and Associate Professor Yingqiang Zheng of the Digital Content and Media Sciences Research Division has made it possible to separate and display the fluorescent component and reflected component of images. By integrating it into Hitachi's fluorescence spectrophotometer, an object's spectral data and the fluorescence/reflected light images taken by the CMOS camera can be captured at the same time. These captured sample images can then be subdivided into 25 sectors to obtain enlarged images and spectral fluorescence/reflection data for each sector. Whereas conventional fluorescence spectrophotometers are limited to obtaining the average spectral data for the entire sample, this technology allows visualization of the reflection/fluorescence spectra, making it possible to observe parts of the image with fluorescence emissions and

obtain spectral data for specific locations, and enabling higher-precision measurements of fluorescent substances. The fluorescence analysis tool in this device holds promising uses for R&D and quality control in a wide range of fields, not only in electronic and industrial materials for LEDs and display devices—areas in which the need for fine-grained measurement technologies is increasingly urgent—but also in areas such as food inspection, life sciences, and biotechnology.



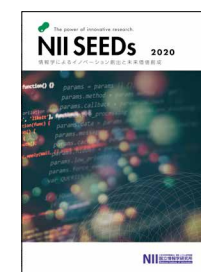
A dedicated fluorescence spectrophotometer measurement system capable of simultaneously capturing both spectroscopic images and spectral data.
*EEM® is a registered trademark of Hitachi High-Tech Science Corporation in Japan.



The image separation algorithm separated the captured image into its reflected light component and fluorescent component. In the images, the reflected component is orange and the fluorescent component is green. These colors correspond to the respective spectral colors in the reflection and fluorescence spectra.

Research Seeds Collection: NII SEEDs

Since FY2014, NII has been publishing NII SEEDs every year to present our cutting-edge research in informatics that has great potential for industrial applications, as well as to provide an opportunity for joint research and partnerships with the industrial sector and government agencies. The latest issue entitled, "NII SEEDs 2020: Creating Innovation and Future Value through Informatics," showcases the research results of 26 researchers in a special report format classified into six categories: Foundation of Informatics, Information Infrastructure Science, Software Science, Multimedia Information Science, Intelligent Systems Science, and Information Environment Science. In addition, the issue begins with a section called "Researcher file" that features three of our researchers and highlights their personalities, the trajectories of their careers, their thoughts on research work, and much more.



NII SEEDs FY2020 edition.
(Contains a list of NII's patents in Japan)



NII SEEDs website (in Japanese)
<https://www.nii.ac.jp/seeds/>

International Exchange

NII set up Global Liaison Office (GLO) to promote international exchange with overseas universities and research institutes. GLO handles various activities including entering into international exchange agreements through Memorandum of Understanding (MOU), running the NII International Internship Program for students from institutes under MOU agreements with NII, and coordinating MOU Grant/Non-MOU Grant to dispatch and invite researchers and students under research exchange grants.

International Exchange Agreements (MOU)

NII enters into international exchange agreements through MOU to systematically and actively promote international exchange with overseas universities and research institutes. As of March 2020, we have agreements with 127 institutions in 34 countries and regions. *See page 25 for the list of institutions

NII International Internship Program

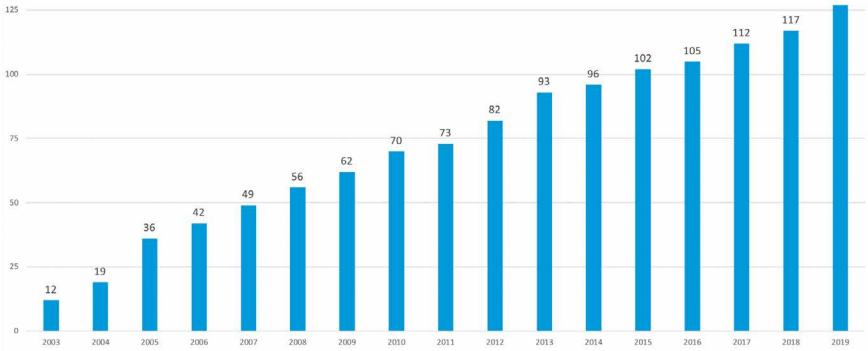
The NII International Internship Program welcomes students in masters or doctoral courses from institutions having MOU with NII. We accept applications from MOU signatory institutes twice a year on a broad range of nearly 100 research topics proposed each time by NII faculty members. Students work on their research topics under the supervision of their NII academic advisor during the internship period of two to six months (up to 180 days). Living expenses for the duration of the internship are covered and certificates of completion are issued upon completion. Since the start of the program in FY2005, NII has accepted more than 1,500 students and the program has greatly contributed to NII's research activities by promoting exchanges with MOU signatory institutions, presentations at international conferences, and a greater number of international papers, as well as other positive effects.



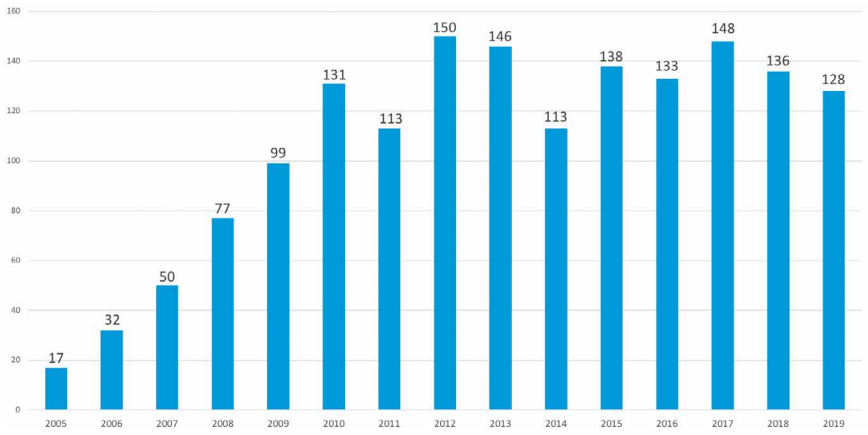
MOU/Non-MOU Grant

MOU Grant was established in FY2005 and Non-MOU Grant was established the following year as a financial assistance program for research exchange with our partner and non-partner institutions. With the aim of promoting and intensifying research exchange, MOU Grant dispatches and invites researchers and students for research exchanges with institutes under MOU, while Non-MOU Grant accepts foreign researchers for research exchanges with institutes without MOU. Expenses (travel and stay expenses) are covered for NII faculty and students, as well as for overseas researchers.

Number of MOU signatory institutes



Number of accepted students to the NII International Internship Program



List of International Exchange Agreements (MOU)

34 countries and regions

MOU for research cooperation: 110 institutes

Country/Region	Name of Institution
People's Republic of 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)
	College of Electrical Engineering and Computer Science, National Taiwan University
	National Tsing Hua University, College of Electrical Engineering and Computer Science (NTHU EECS)
Taiwan	Department of Computer Engineering, Chulalongkorn University
Thailand	School of Engineering and Technology, Asian Institute of Technology
	Faculty of Science, Kasetsart University
Socialist Republic of 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
Republic of Korea	Department of Computer Science and Engineering, Seoul National University
Republic of Singapore	School of Computing, National University of Singapore (NUS)
India	Institute for Infocomm Research
Commonwealth of Australia	Indraprastha Institute of Information Technology, Delhi
	Commonwealth Scientific and Industrial Research Organisation (CSIRO) (Data61)
The Kingdom of Saudi Arabia	The University of Queensland (UQ)
	The Faculty of Engineering and Information Technologies, The University of Sydney
	School of Computing & Information Systems, Melbourne School of Engineering, The University of Melbourne
	Royal Melbourne Institute of Technology
	King Abdullah University of Science and Technology (KAUST)
United States of America	College of Engineering and 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
Canada	University of Illinois at Urbana-Champaign
	Faculty of Mathematics, University of Waterloo
	Faculty of Science, Department of Computing Science, Alberta Machine Intelligence Institute, University of Alberta (Amii)
	School of Computer Science, McGill University
	Simon Fraser University
	Polytechnique Montréal
	York University
Brazil	Pontifical Catholic University of Campinas
Argentine Republic	The Faculty of Exact and Natural Sciences of Buenos Aires University
Republic of Chile	Pontificia Universidad Católica de Chile
Ireland	The Irish Software Research Centre (Lero)
	Trinity College Dublin
French Republic	Dublin City University
	University of Nantes (Atlantisc 2020)
	Institut National de Recherche en Informatique et en Automatique (INRIA)
	Institut National Polytechnique de Grenoble
	Université Grenoble Alpes (Université Joseph Fourier-Grenoble 1, UJF)
	Laboratoire d'Informatique de Paris 6, Sorbonne Université (l'université Pierre et Marie Curie) (LIP6)
	Toulouse INP-ENSEEIH
	National Center for Scientific Research (CNRS)
	Université Toulouse III - Paul Sabatier

MOU for development and operational cooperation: 17 institutes

Country/Region	Name of Institution
Asia-Pacific	Asia-Pacific Ring (APR) Collaboration
United States of America	Indiana University
	North American Coordinating Council on Japanese Library Resources
	The New Venture Fund (NWF) on behalf of the Scholarly Publishing & Academic Resources Coalition (SPARC)
	Center for Open Science (COS)
Republic of Korea	Korea Education & Research Information Service (KERIS)
	Korea Institute of Science and Technology Information (KISTI)
Republic of the Union of Myanmar	Department of Higher Education (DHE)
	Myanmar Rectors' Committee (RC)
	EIFL (Electronic Information for Libraries)

(as of March 2020)

Country/Region	Name of Institution
French Republic	Claude Bernard University Lyon 1
	Université Paris Sud
	University of Nice Sophia Antipolis
	LIMOS, Université Clermont Auvergne (formerly, The Blaise Pascal University of Clermont-Ferrand)
	The French National Audiovisual Institute (INA)
	Centre de Recherche en Informatique de Lens (CRIL)
	Institut de Recherche en Informatique et Systèmes Aléatoires (IRISA)
United Kingdom of Great Britain and Northern Ireland	Ecole Normale Supérieure de Lyon (ENS Lyon)
	Department of Computer Science, Faculty of Engineering Science, University College London
	Faculty of Science, Technology, Engineering & Mathematics, 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
Federal Republic of Germany	University of Kent, Faculty of Sciences, School of Computing
	Department of Theoretical and Applied Linguistics, University of Cambridge
	Department of Computer Science & Technology, University of Cambridge
	The Alan Turing Institute
	Faculty of Applied Computer Science, 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 Mathematics, Computer Science and Natural Sciences)
	The German Academic Exchange Service (DAAD)
	Saarland University
	Ludwig-Maximilians-Universität München
	Berlin Institute of Technology (TU Berlin)
	Technische Universität Braunschweig (TU Braunschweig)
	Technische Universität München (TUM)
	Georg-August-Universität Göttingen
Republic of Austria	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
	Vienna University of Technology
	Dipartimento di Informatica, Università degli Studi di Torino
Italian Republic	Politecnico di Milano, Dipartimento di Elettronica, Informazione e Bioingegneria
	Università degli Studi di Ferrara (UNIFE)
	Dipartimento di Informatica - Scienza e Ingegneria (DISI), Università di Bologna
Swiss Confederation	Institute of Electrical Engineering in Ecole Polytechnique Federale de Lausanne
Republic of Finland	University of Zurich
Aalto University	
The Kingdom of 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 Kingdom of Spain	The Institute of Physiology of the Czech Academy of Sciences
	Universitat Politècnica de València (UPV)
Hellenic Republic	Universidad Politécnica de Madrid (UPM)
	Facultat d'Informàtica de Barcelona, Universitat Politècnica de Catalunya (UPC)
Netherlands	Athena Research & Innovation Center
Portuguese Republic	Faculty of Electrical Engineering, Mathematics and Computer Sciences of Delft University of Technology (TU Delft)
	Computer Sciences of Delft University of Technology (TU Delft)
	Instituto de Engenharia de Sistemas e Computadores, Investigação e Desenvolvimento em Lisboa (INESC-ID)
Arab Republic of Egypt	INESC Technology and Science (INESC TEC)
	University of Minho
	Egypt-Japan University of Science and Technology (E-JUST)

Country/Region	Name of Institution
Federal Republic of Germany	Hochschulbibliothekszenrum des Landes Nordrhein-Westfalen
	German National Library of Science and Technology (TIB)
	German National Library of Medicine (ZB MED)
European Union (EU)	Gigabit European Academic Network (GEANT)
Europe and others	European Organization for Nuclear Research (CERN)
Africa	West and Central African Research and Education Network (WACREN)
Asia-Pacific and Europe	Asiapacific-Europe Ring (AER) Collaboration

International Exchange

NII Shonan Meeting

<https://shonan.nii.ac.jp>

NII launched the NII Shonan Meeting in February 2011. The NII Shonan Meeting constitutes the first seminar series in Asia in the style of the Dagstuhl Seminars, which brings together top-class researchers from around the world for intensive discussions on issues in the field of informatics with the goal of solving difficult problems. The meetings are jointly hosted by NII and Kanagawa Prefecture under a partnership agreement.

The venue, Shonan Village Center, is easily accessible from Narita Airport and Haneda Airport, and is located in an environment blessed by nature where participants can focus on their research work. More than 150 seminars have been held so far. In August 2014, we also launched NII Shonan School, which is intended primarily for students and young researchers.

*Dagstuhl Seminar: A renowned seminar series in the field of informatics held almost every week in Dagstuhl, Germany. It is famous for its training camp style format where participants stay for about a week to hold intensive discussions on a specific topic.



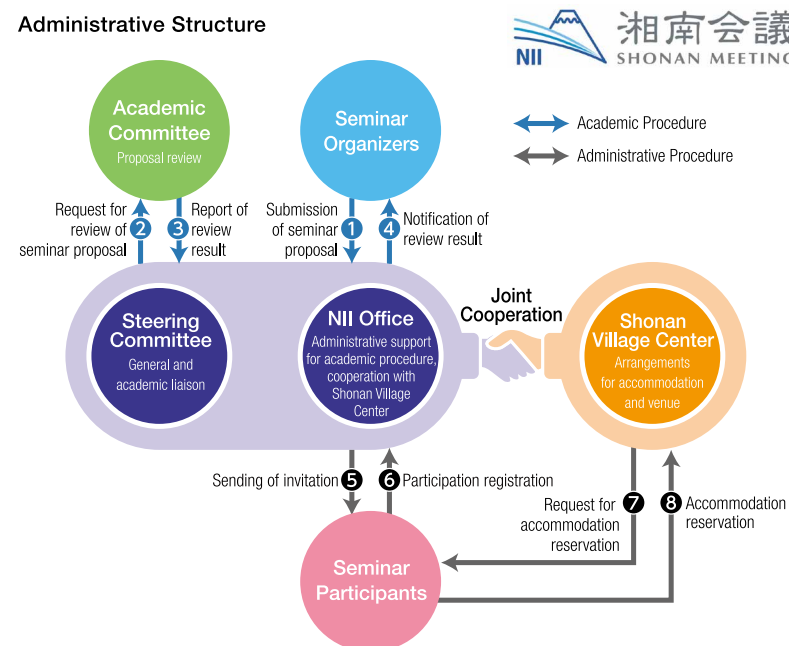
Shonan Village Center



Support Setup

The Office of NII Shonan Meeting and Shonan Village Center staff manage various activities on behalf of seminar organizers, including sending invitations, providing information on accommodations, and preparing the venue on seminar days. The program also includes events such as historical walks through Kamakura to cultivate personal exchanges and friendships among participants.

Administrative Structure



NII Shonan Meeting Memorial Lectures

The NII Shonan Meeting Memorial Lectures are held annually and co-hosted by NII and Kanagawa Prefecture. NII researchers give open lectures on the latest research topics in the field of informatics.



NII Shonan Meeting Memorial Lecture

Call for Seminar Proposals

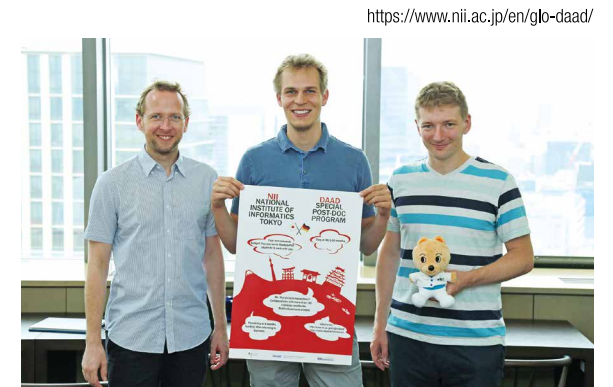
We accept seminar proposals for the NII Shonan Meeting throughout the year. The deadlines for submission are twice a year, June 15 and December 15. Following the review of the proposal by the Academic Committee at NII, seminar organizers will be notified of the result.

Contact: Office of NII Shonan Meeting, shonan@nii.ac.jp

Agreement with the German Academic Exchange Service (DAAD)

NII has a special agreement with the German Academic Exchange Service (DAAD) that allows German postdoctoral researchers to carry out research projects under the supervision of NII faculty members.

Under this agreement, postdocs can stay at NII for a minimum of three months (six months is recommended) and up to a maximum of two years with the support of DAAD. During their stay, they will carry out their own programs and receive research advice from the faculty at NII. The postdocs can also enlist the help of Master's and Ph.D. students and engineers on conducting projects. Since NII is an inter-university research institute, they can visit NII's partner universities and research institutes in Japan to build their network in Japan.



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

Japanese-French Laboratory for Informatics (JFLI)

The Japanese-French Laboratory for Informatics (JFLI) was founded in 2008 as a hub for informatics research exchange between France and Japan by five institutions, namely the National Center for Scientific Research (CNRS) in France, Sorbonne University (University of Paris VI), The University of Tokyo (Graduate School of Information Science and Technology), Keio University, and NII. It was turned into a Joint International Unit (JUI) of CNRS in 2012, and has since been more active in conducting research exchange. JFLI carries out collaborative research with a special emphasis on the important and challenging areas of informatics. The main research topics are (1) next-generation networks; (2) high-performance computing; (3) software, programming models, and formal methods; (4) virtual reality and multimedia; and (5) quantum computing. The institutions have all engaged in collaborative research, including Japanese institutions accepting researchers and graduate students from French research institutes. Workshops for enhancing collaborative research and research presentations that serve as venues for graduate internship students to present their research are also held regularly. The JFLI Seminar is another one of its regular activities. Networks of researchers have recently been forming as a result of such activities conducted through JFLI. In March 2016, a JFLI-wide workshop was held at NII that invited outside researchers who have been involved with JFLI. JFLI also organizes joint workshops with universities and other non-member institutions. There are now plans to collaborate with other JUIs of CNRS across the Asian region with similar research interests. Going forward, JFLI will continue working to promote informatics research through research collaboration between the two countries and in partnership with universities in Japan.



<http://jfl.cnr.fr>

Minister of Higher Education, Research and Innovation of France Frédérique Vidal (left) and Director-General Masaru Kitsuregawa



Active research exchange at JFLI

Department of Informatics, School of Multidisciplinary Sciences, The Graduate University for Advanced Studies, SOKENDAI

Establishment of Graduate School

In April 2002, NII joined The Graduate University for Advanced Studies, SOKENDAI and opened the Department of Informatics doctoral course with a three-year transfer program, seeing its first students graduate in March 2005. A doctoral course with a five-year integrated program was launched in AY2006. SOKENDAI was founded as the first graduate university in Japan with the aim of fostering original, world-class academic research that transcends the boundaries of traditional disciplines and pioneering advanced fields of study that create new lines of scientific inquiry.

Content and Structure

The Department of Informatics aims to develop young IT researchers and engineers who will take the lead at the international level in the 21st century. Students will be able to earn a Doctor of Philosophy in Informatics degree (or a Doctor of Philosophy in Science degree, depending on the course content). The Department offers education and research guidance 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. Around 70 subjects are available as special subjects of the department and common specialized subjects of the school.

Features of the Department

The Department of Informatics actively welcomes students from overseas and is a place filled with lively cross-cultural communication between students. There are also many working students, accounting for around 20% of the student body.



SOKENDAI (Hayama Campus)



Lecture at the Department of Informatics

Number of students in the Department of Informatics
(as of April 2020) * () indicates number of international students

Five-year doctoral course	Three-year doctoral course	Total
46 (28)	53 (26)	99 (54)

[Message from the Dean of the Department of Informatics]



SUGIMOTO Akihiro

(Professor, Digital Content and Media Sciences Research Division, National Institute of Informatics)

The Department of Informatics encompasses six fields: foundations of informatics, information infrastructure science, software science, multimedia information science, intelligent systems science, and information environment science. These fields are comprehensive and cover a wide range of academic studies, including not only conventional computer science and information engineering, but also artificial intelligence, mathematics, and data science, which are core study areas in a data-driven world, as well as human informatics and social informatics, which address human and social issues. The Department conducts research and education at various phases—basic, applied, and practical—with the goal of educating researchers while at the same time educating highly specialized professionals and grooming leaders who will produce great achievements in the field of informatics.

We provide research supervision in a form that matches the ambition, purpose, and research plan of each student, using a nearly one-to-one coaching system and degree teaching program conducted by NII's world-class researchers. Moreover, we have set up a sub-advisor system, in which several faculty members conducting research in different fields, or from different angles in the same field, act as sub-advisors to give advice on the content and direction of research from a broad range of perspectives. Using the dual-degree system, it is also possible to receive doctoral research guidance at overseas research and educational institutions for a period of time. We have put in place a teaching program that provides plenty of time for students with a bachelor's degree to work on their own research topics in the five-year doctoral course, while students with a master's degree can concentrate on working on their ongoing research topics in the three-year doctoral course. Students in the Department of Informatics are both students of SOKENDAI and members of NII. They can therefore study in an environment of international collaboration on a daily basis, join various research projects, and gain training experience as an international researcher through exchange programs with partner universities and research institutes overseas. Around half of our Japanese students are working students who enrolled in the course to overhaul what they have worked on so far from a research standpoint, as well as to learn the latest technologies, while keeping their current positions at companies and other organizations. Another key feature of the Department is the high percentage of international students. Many lectures are in English, and many laboratories also hold seminars in English. For young people aspiring for international success, it offers a rare environment for cross-cultural exchange among students. Furthermore, students can expand their social circle considerably and build rich human networks through collaborations with other core institutions and departments of SOKENDAI.

Message from a Student

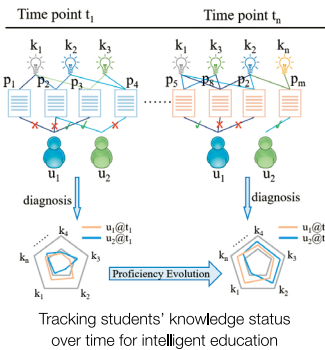


GAN, Wenbin

Enrolled in April 2019 to the three-year Ph.D. course, Department of Informatics, School of Multidisciplinary Sciences, SOKENDAI
Main Supervisor: Associate Professor SUN Yuan

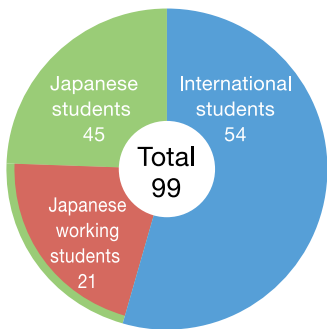
Intelligent tutoring systems (ITS) have provided students with substantial opportunities to learn and perform exercises individually. One of the key issues in such systems is knowledge tracing (KT), which is essential for adaptive learning to obtain students' current states of knowledge for the purpose of providing an adaptive service.

My research involves creating new methodologies to assess and trace students' knowledge states based on their past performance in solving exercises. I have proposed a KT model that traces the evolution of students' knowledge acquisition over time by explicitly modeling their learning and forgetting behaviors, as well as the cognitive item difficulty. The new model I proposed and related results will potentially benefit the development of online learning systems and related research on educational management.

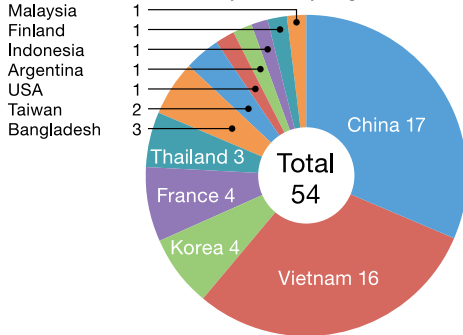


Student Data (as of April 2020)

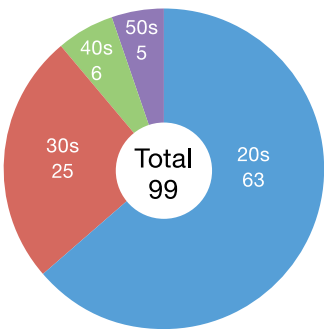
Number of Students



Number of international students by country/region



Age distribution of students



Career paths of students after course completion

(over the past three years) * () indicates number of international students

Year of completion	University/Research institution	Private sector	Undetermined	Total
AY2019	5 (3)	7 (4)	2 (2)	14 (9)
AY2018	5 (5)	5 (2)	1 (1)	11 (8)
AY2017	5 (4)	2 (1)	0 (0)	7 (5)



Graduation and Outstanding Student Award Ceremony (September 2019)

Curriculum

The Department of Informatics provides research and education conducted by world-class researchers within the state-of-the-art environment and international atmosphere of NII.

The Department covers a broad range of interdisciplinary fields, from fundamental disciplines such as mathematics to the basics of computer architecture and networks, and extending to software and media engineering, artificial intelligence, information sociology, and research informatics. We have run a flexible educational system since the Department was first established, through classes and research guidance in small groups in order to meet each student's needs. Cutting-edge research and education are provided every day, with the aim of producing professionals capable of working at the forefront of the informatics field. The academic year consists of two semesters: the first running from April to September and the second semester running from October to March.

To complete the course, students are required to earn the necessary credits, carry out their research under proper supervision, and pass a review of their doctoral dissertation summarizing their research findings. The minimum number of credits required is 10 units for the three-year doctoral course and 40 units for the five-year doctoral course. Program duration is flexible, and may be shortened for students who have shown excellent research achievements. If a student enrolled in the integrated program withdraws before graduation, they may be awarded a master's degree as long as they meet certain requirements.

1. Special Subjects of the Department of Informatics

Foundations of Informatics	Logic in Computer Science (TATSUTA Makoto); Theory of Numerical Methods (HAYAMI Ken); Algorithms (UNO Takeaki); Discrete Mathematics (KAWARABAYASHI Ken-ichi); Mathematical Logic (TATSUTA Makoto)
	Quantum Information Systems (NEMOTO Kae); Quantum Computation (MATSUMOTO Keiji); Computational Neuroscience (TBD); Sublinear Algorithms (YOSHIDA Yuichi)
	Control Theory and Optimization (KISHIDA Masako); Numerical Analysis (TBD); Graph Algorithms (TBD); Algorithmic Market Design (YOKOI Yu)
	Computational Complexity Theory (HIRAHARA Shuichi); Computational Game Theory (IGARASHI Ayumi); Combinatorial Optimization for Machine Learning (FUJII Kaito)
Information Infrastructure Science	Computer System Design (YONEDA Tomohiro, GOSHIMA Masahiro); Information and Communication Systems (JI Yusheng, ABE Shunji, FUKUDA Kensuke, KANEKO Megumi)
Software Science	Mathematical Structures in Programming (TBD); Distributed Systems (SATOI Ichiro); Data Engineering (TAKASU Atsuhiko); Software Engineering (NAKAJIMA Shin); Signal Processors (HASHIZUME Hiromichi)
	Probabilistic Models in Informatics (KITAMOTO Asanobu); Modeling in Software Development (ISHIKAWA Fuyuki); Mathematical Structures in Formal Methods (HASUO Ichiro)
	Database Theory (KATO Hiroyuki); Programming Languages and Theory (TSUSHIMA Kanae); Formal Methods for Cyber-Physical Systems (HASUO Ichiro); Software Verification (SEKIYAMA Tarō)
Multimedia Information Science	Digital Media Infrastructure (ECHIZEN Isao, SUGIMOTO Akihiro, KATAYAMA Norio, ZHENG Yingqiang, TAKAYAMA Kenshi); Fundamentals of Media Processing (YAMAGISHI Junichi, KODAMA Kazuya, IKEHATA Satoshi, MO Hiroshi, SATOH Shin'ichi)
	Applications of Multimedia Processing (YAMAGISHI Junichi, SUGIMOTO Akihiro, SATO Imari, AIZAWA Akiko, ZHENG Yingqiang, ANDO Ryoichi); Interactive Media (ARAI Noriko, AIHARA Kenro, GOTODA Hironobu, YU Yi)
Intelligent Systems Science	Logical Foundations for Artificial Intelligence (INOUE Katsumi); Knowledge Sharing System (TAKEDA Hideaki); Reasoning Science (SATOI Ken); Human-Agent Interaction (YAMADA Seiji)
	Machine Learning (ICHISE Ryutaro); Natural Language Processing (AIZAWA Akiko, SUGAWARA Saku); Robot Informatics (INAMURA Tetsunari); Intelligent User Interfaces (PRENDINGER Helmut)
	Cluster Analysis (HOULE Michael E); Communication Environments (BONO Mayumi); Econophysics (MIZUNO Takayuki)
	Data Mining (SUGIYAMA Mahito); Cognitive Robotics (TBD)
Information Environment Science	Digital Publications (OYAMA Keizo); Information Retrieval (KANDO Noriko); ICT-Enabled Business (OKADA Hitoshi); Introduction to Statistical Methods in Bibliometrics (SUN Yuan); Methodology of Scientometrics (NISHIZAWA Masaki)
Common Subjects (Faculty in Charge of the Department of Informatics)	Research in Informatics for Ph.D. Thesis IA, IB - VA, VB
	Seminar on Basic Knowledge in Informatics IA, IB - IIA, IIB
	Research in Informatics for Master Thesis IA, IB - IIA, IIB

2. 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 Multimedia Information Science (All Professors in Multimedia Information Science)
Introduction to Intelligent Systems Science I (INOUE Katsumi, YAMADA Seiji, AIZAWA Akiko, INAMURA Tetsunari, ICHISE Ryutaro, HOULE Michael E)
Introduction to Intelligent Systems Science II (SATOI Ken, TAKEDA Hideaki, PRENDINGER Helmut, SUGIYAMA Mahito, BONO Mayumi, MIZUNO Takayuki, SUGAWARA Saku); Introduction to Information Environment Science (All Professors in Information Environment Science)
Scientific Presentation (HOULE Michael E, KANEKO Megumi, HAYAMI Ken, WU Stephen (Institute of Statistical Mathematics), JONES Caryn (Visiting Lecturer))
Scientific Writing (HOULE Michael E, HAYAMI Ken, WU Stephen (Institute of Statistical Mathematics), JONES Caryn (Visiting Lecturer)); Introduction to Information Security Infrastructure (ECHIZEN Isao, OKADA Hitoshi, TAKAKURA Hiroki)
Applied Linear Algebra (HAYAMI Ken, GOTODA Hironobu, SATOH Shin'ichi, KISHIDA Masako); Introduction to Big Data Science (Professors Related to Big Data); Practical Data Science (YAMAJI Kazutsuna)

Partnership with Graduate Schools

NII actively cooperates on graduate school education with The University of Tokyo, Tokyo Institute of Technology, Waseda University, Japan Advanced Institute of Science and Technology, Kyushu Institute of Technology, The University of Electro-Communications, and Tokyo University of Science. In partnership with these institutions, we give lectures and accept graduate students for research supervision.

Partner Graduate Schools

University	Graduate School	Note
The University of Tokyo	Graduate School of Information Science and Technology	Since AY2001
	Graduate School of Information Science and Engineering	Since AY2002
Tokyo Institute of Technology	Interdisciplinary Graduate School of Science and Engineering	Since AY2003
	School of Engineering	Since AY2016
	Graduate School of Engineering	
	Graduate School of Fundamental Science and Engineering	Since AY2005
Waseda University	Graduate School of Creative Science and Engineering	
	Graduate School of Advanced Science and Engineering	
Kyushu Institute of Technology	Graduate School of Computer Science and Systems Engineering	Since AY2010
	Faculty of Computer Science and Systems Engineering	
The University of Electro-Communications	Graduate School of Information Systems	Since AY2012
	Graduate School of Informatics and Engineering	
Tokyo University of Science	Graduate School of Science	Since AY2015

Research Students for Special Collaboration

As an inter-university research institute, NII accepts graduate students from other universities in Japan and overseas as research students for special collaboration (exchange graduate students). Research students for special collaboration are supervised by NII faculty members of the National Institute of Informatics according to their research topics.

University Affiliations of Research Students for Special Collaboration

(AY2019)

Graduate School of Chiba University	Claude Bernard University Lyon 1	Shanghai Jiao Tong University
Graduate School of The University of Tokyo	École Nationale Supérieure des Sciences Appliquées et de Technologie	Sichuan University
Graduate School of Tokyo City University	École Normale Supérieure de Lyon	Technische Universität München
Graduate School of Tokyo University of Agriculture and Technology	École Normale Supérieure - Paris	University of Clermont-Ferrand
Graduate School of Tokyo University of Science	The Hong Kong Polytechnic University	Université Toulouse III - Paul Sabatier
Graduate School of Nagoya University	ICMC, Universidade de São Paulo	University of Science and Technology of China
Graduate School of Hiroshima University	ISIMA, University Clermont Auvergne	University of Wuppertal
Graduate School of Keio University	KTH Royal Institute of Technology	Wuhan University
Graduate School of Nihon University	LRI University Paris-Saclay	Xidian University
Beijing Institute of Technology	National Taiwan University	

Number of Students Accepted through Both Schemes:

Partnership with Graduate Schools and Research Students for Special Collaboration

(AY2019)

Master's course	Doctoral course	Total
45	42	87

Science Information NETwork (SINET) Available Nationwide at Ultra-High Speed with Low Latency

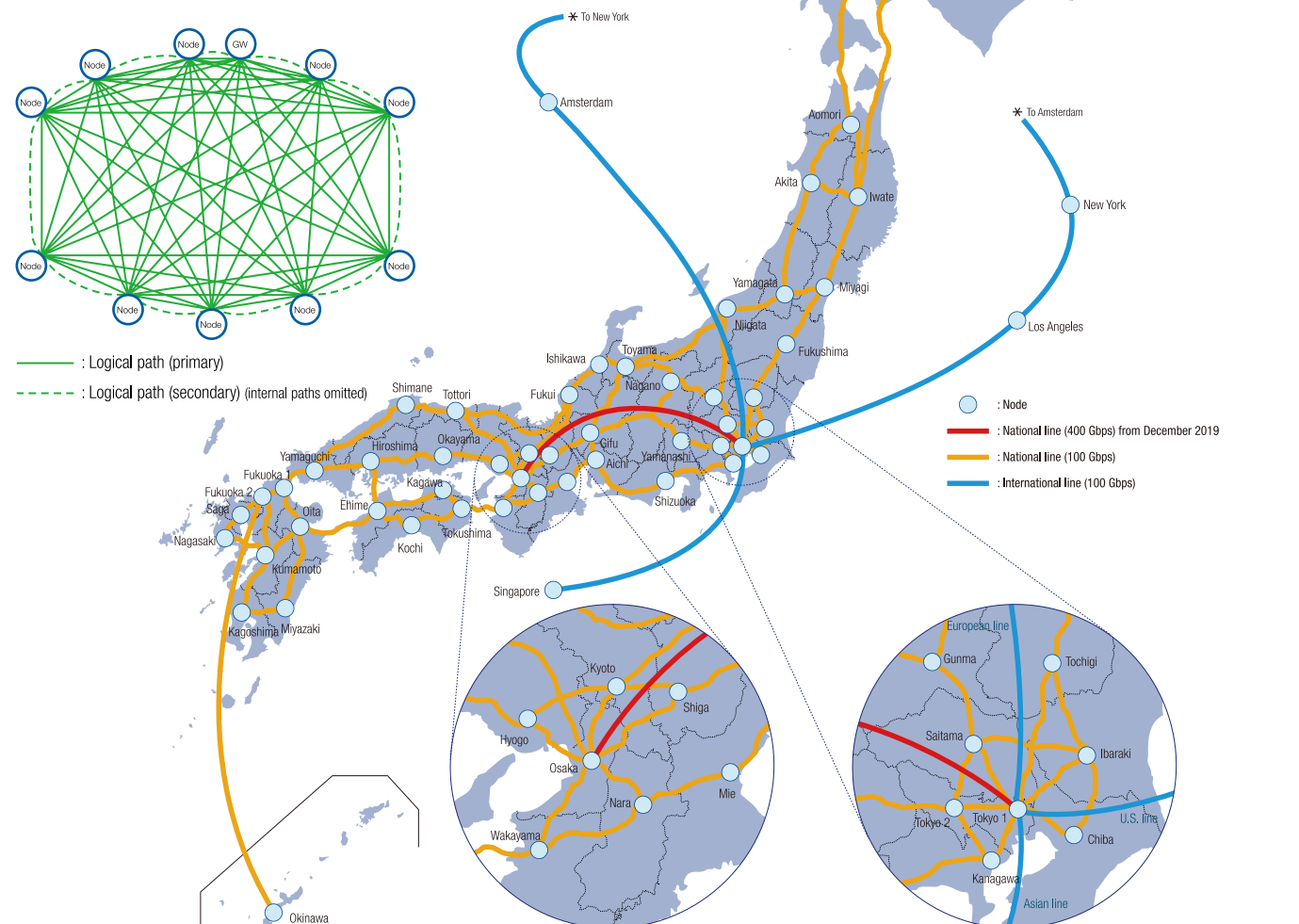
100G full-mesh connectivity opens up new possibilities

The Science Information NETwork (SINET) is an information and communications network built and operated as an academic information infrastructure for universities and research institutions throughout Japan. With nodes (network connection points) across Japan, the advanced network is provided to universities and research institutes in order to help support community-building among the numerous people involved in research and education, and to encourage wide distribution of scientific information. SINET is also interconnected with many research networks overseas, including Internet2 in the U.S. and GÉANT in Europe, to facilitate the circulation of research information between countries that is vital for advanced international research projects.

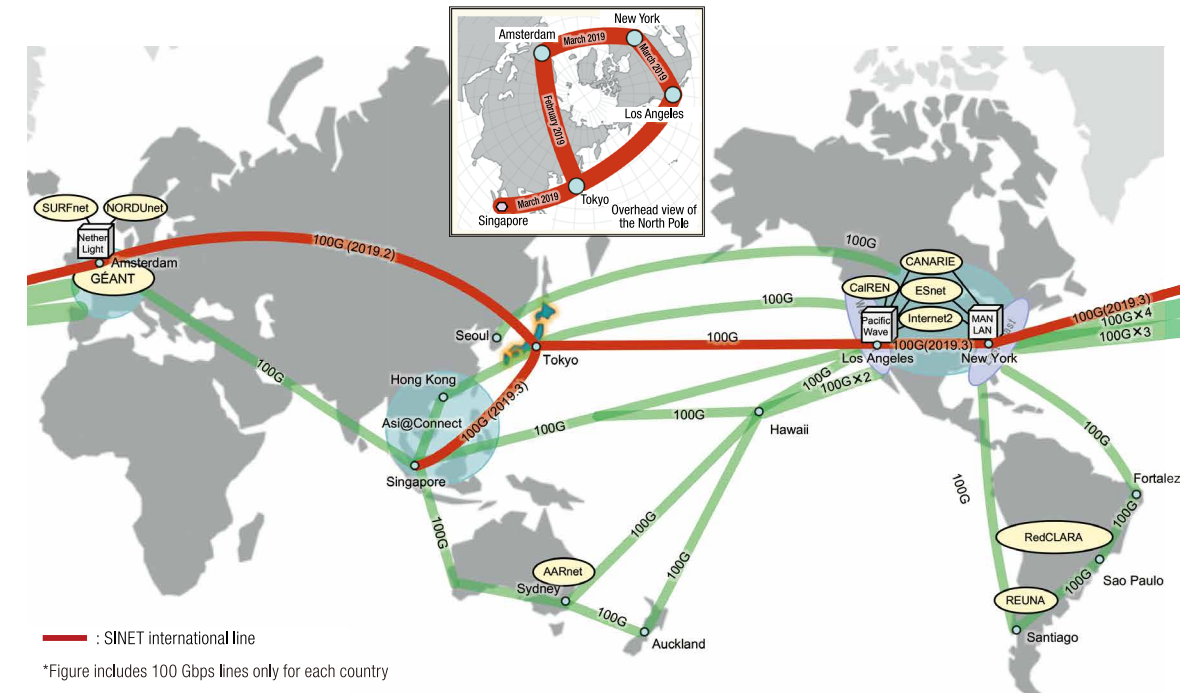
SINET5 is an upgrade of the previous version of the network, SINET4. Full-scale operations of SINET5 started in April 2016. SINET5 provides high-level academic information platforms to more than 900 universities and institutions by organically connecting and coordinating cloud, security, and academic content infrastructures on a 100 Gbps nationwide network. In December 2018, we launched the pilot test of a core function directly connecting mobile networks and SINET. The service enables users to flexibly use the computing resources of universities and cloud resources as needed for data collection and analysis using mobile networks. We also began operations of an international 100 Gbps ultra-high speed ring network circling the globe, Japan—U.S.—Europe—Japan, in March 2019. As a national research and education network (NREN), this is the world's first international line circling the globe to be built as a single network. At the same time, we also upgraded the line between Japan and Singapore to 100 Gbps. To meet increasing traffic demand within Japan, we implemented a 400 Gbps line directly connecting Tokyo and Osaka in December 2019, which will enable stable, uninterrupted operations of scientific research projects. We believe these efforts will help to further strengthen international cooperation and Japan's international competitiveness. We also hope that these will speed up the advanced integration of cyberspace (virtual space) and physical space (real space), and ultimately help achieve Society 5.0, Japan's vision of the ideal society in the future.

Number of member institutions in SINET (as of March 31, 2020)

National universities	86
Public universities	86
Private universities	406
Junior colleges	77
Technical colleges	56
Inter-university research institutes	16
Others	205
Total	932



Interconnection with Overseas Research Networks



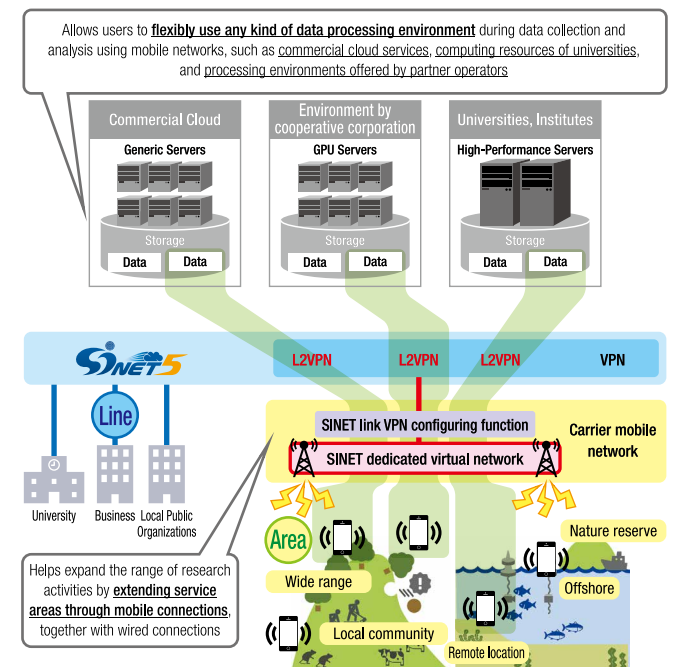
SINET5 Services

We provide new services through joint consideration and development, based on requests from universities and institutes. SINET5 offers 100GE, 40GE, and other ultra-high speed network interfaces. To create a secure and flexible research environment at universities and research institutes, we are expanding our network services to better serve our users; this effort includes university LAN virtualization, L2 on demand, and wide-area data collection infrastructure. We also provide the world's most advanced high-speed file transfer software for users needing high-capacity data transfer.

Service	Notes
L3 Service	Internet connection (IPv4 & IPv6) Full Route Provision IP multicast (+QoS) QoS per application L3VPN(+QoS)
L2 Service	L2VPN/VPLS(+QoS) University LAN Virtualization L2 on demand (Basic) L2 on demand (International collaboration: NSI) L2 on demand (Cloud collaboration: REST)
L1 Service	Leased wavelength line
Wide-Area Data Collection Infrastructure	Secure mobile connection
Redundancy of Access Line	Multihoming Link aggregation Redundant trunk group service
Stabilization of Network Operations	DDoS mitigation
Next-Generation Network Functions	NFV service
Enhanced Transfer Performance	Performance measurement High-speed file transfer

Wide-Area Data Collection Infrastructure <https://www.sinet.ad.jp/en/wadci-e>

In December 2018, we began pilot tests of a new service, the SINET Wide Area Data Collection Infrastructure. It offers a one-stop data collection and data processing service from mobile devices for use in research on the environment, ecology, and IoT, among others, bringing us one step closer to the realization of Society 5.0. The service allows users to collect research data from a wide range of areas that were previously unreachable by wired networks, using mobile networks provided by private mobile carriers. In conjunction with a secure network service, namely, L2VPN, research data can be collected safely. Users can connect to various data processing environments and create a one-stop extensive research environment.



Concepts and Features of SINET5

<https://www.sinet.ad.jp/en/>

Five Major Concepts of SINET5

(1) Innovative Connectivity

Uses leading-edge technologies that minimize communication lags
The latest transmission technologies made it possible to create a full-mesh topology that minimizes transmission delays between all node connections.

(2) Ultra-High Speed

Delivers a high-speed 100 Gbps nationwide network
SINET5's state-of-the-art digital coherent technology created an overall stable 100 Gbps nationwide network.

(3) Robust and Reliable

Provides a highly robust and reliable network without interruptions or downtime
SINET5 adopts a multilayered advanced network architecture (physical layer, MPLS-TP network layer, IP/MPLS network layer), with redundancies configured at each layer, as well as bottleneck avoidance and bypassing features, which are all linked together to create a highly robust and reliable network.

(4) Global Reach

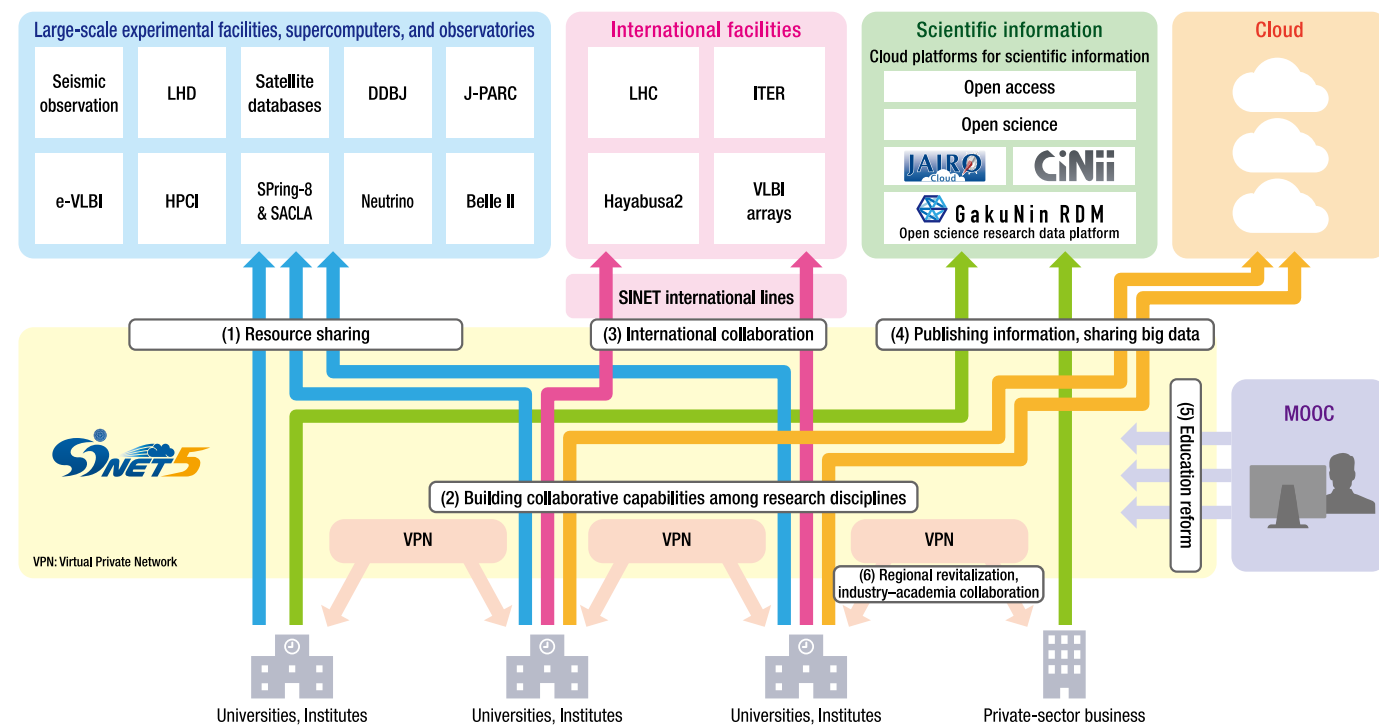
Offers high-speed international lines directly connected to the U.S., Europe, and Asia
Low latency is achieved by building a direct line to Europe, not going through the U.S.
SINET5 strengthens support for international joint research projects by upgrading to 100 Gbps bandwidth in all directions to the U.S., Europe, and Asia, in order to create a ring of connectivity between Japan, the U.S., and Europe.

(5) Multifunctionality

Promotes a variety of developments in academic information infrastructure, such as security, use of cloud systems, and academic content

Features of SINET5

SINET was built and operated as a platform for (1) resource sharing of large testing facilities; (2) building the collaborative capabilities among research disciplines; (3) international collaboration with countries worldwide; (4) publishing academic information and sharing big data; (5) improving the quality of university education; and (6) knowledge-intensive centers of regional revitalization, local universities, and collaboration between industry and academia.

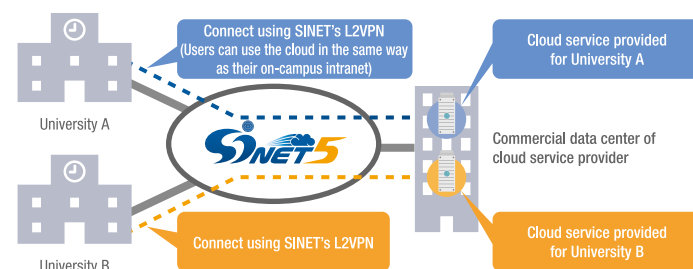


SINET Cloud Connection Service

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

The service allows member universities and research institutes to access secure and fast cloud environments by directly connecting SINET and commercial clouds using L2VPN.

Note that SINET does not offer cloud services. This service provides an environment that directly connects SINET to commercial clouds for the convenience of cloud users in member institutions.



GakuNin Cloud: Support for Cloud Adoption and Use

<https://cloud.gakunin.jp/>

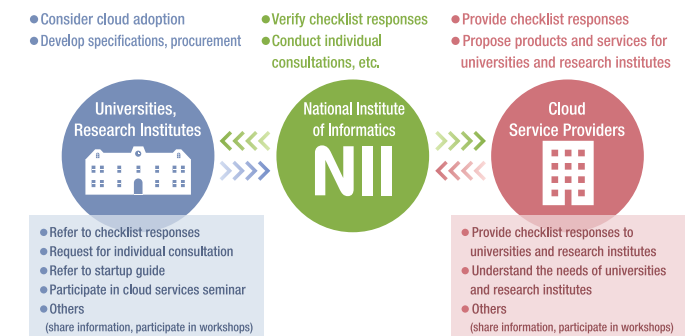
NII provides three services under the GakuNin Cloud brand to support the adoption and use of clouds in universities and research institutes. We do this with the aim of developing advanced academic information platforms using clouds.

GakuNin Cloud Adoption Support Service

The GakuNin Cloud Adoption Support Service collects, distributes, and shares information on the criteria for selecting cloud services, as well as on their adoption and use, for universities and research institutes. We have developed and published a checklist of items that need to be confirmed before universities and research institutes adopt cloud services. We have also added the implementation status of cloud service providers to the checklist based on responses from providers. The responses are verified by NII and made available to institutions considering to adopt those services.

When developing specifications for cloud procurement, the verified checklist makes it possible to compare several cloud services with the same criteria and thereby select cloud services which meet the needs of the institution.

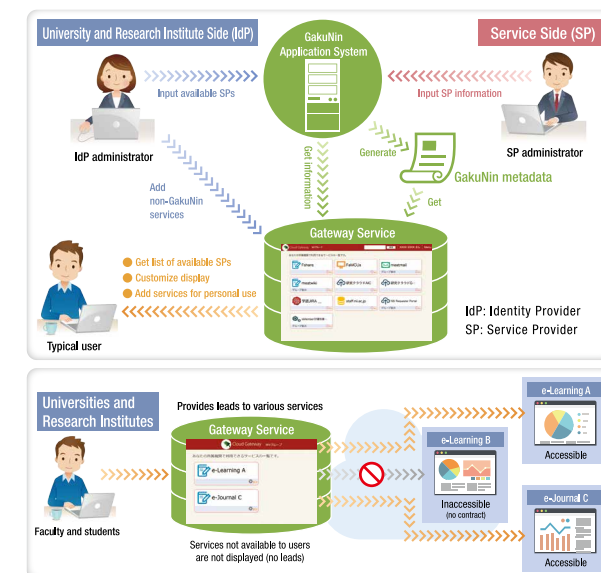
In addition, NII conducts individual consultations on cloud adoption, hosts seminars on cloud services for universities and research institutes, and provides documents such as cloud startup guides and cloud use cases.



GakuNin Cloud Gateway Service

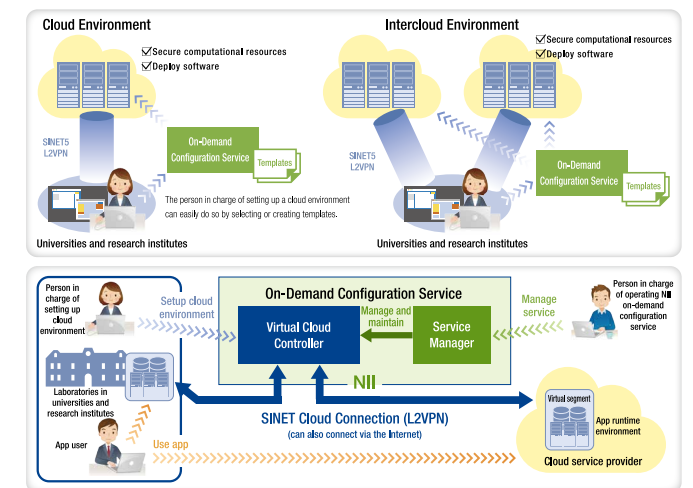
The GakuNin Cloud Gateway Service provides a portal for one-stop access to various cloud services required for conducting research and education, as well as to electronic journals and other online services.

Users (faculty and students) at universities and research institutes can see the various services available at their institution by accessing the portal site via the authentication platform operated by their institution. They can then quickly and easily use these services. Moreover, IdP administrators at universities and research institutes can customize the list of services displayed to users, and the users themselves can add services, providing a high degree of flexibility and usability.



GakuNin Cloud On-Demand Configuration Service

The GakuNin Cloud On-Demand Configuration Service provides support for setting up complex applications environment over clouds. Users of this service can install and set up an application environment on cloud resources relatively easily using prepared templates. The service is also applicable to the SINET5 Cloud Connection Service. This makes it possible to setup a secure on-demand intercloud environment consisting of computers at universities and research institutes and multiple cloud environments connected to SINET5, for use in research, education, and IT system operations.



SINET Cloud Connection: Provides cloud connection to member institutions by directly connecting SINET and commercial clouds. A SINET service allows high-performance, safe, and low-priced use of commercial cloud services.

Building an Authentication Infrastructure

GakuNin: Academic Access Management Federation in Japan



The Academic Access Management Federation in Japan, GakuNin, is a framework for utilizing the authentication platform of universities not only for on-campus services but also for collaboration with other universities and commercial services. GakuNin enables safe and secure use and provision of academic services on the Internet through identification of individuals and institutions. With Single Sign-On, users can seamlessly and automatically login to multiple on- and off-campus services with a single login. Meanwhile, for universities, creating an authentication platform compatible with GakuNin makes it possible to reduce personnel cost for ID management and raise the level of security measures.

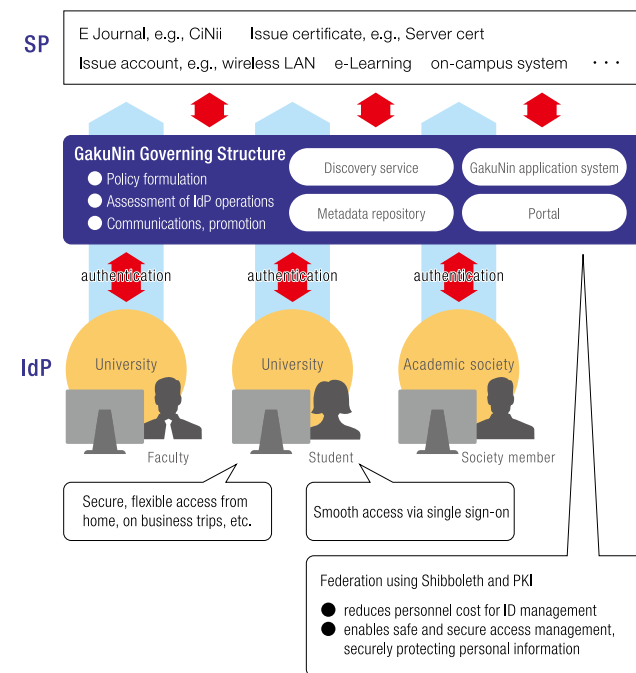
Data on Participants (as of the end of March 2020)

Number of organizations (IdP: Identity Providers)	242
Number of service providers (SP: Service Providers)	Total 166

[Features]

- Users only need one ID (integrated authentication)
- Input password only once (single sign-on)
- Accessible anywhere on- and off-campus (remote access)
- Requires web browser only (software not required)
- Also supports client certificate authentication and/or multifactor authentication (centralized security level management)

GakuNin strives to maintain reliability through annual assessments of IdP operations. GakuNin also offers Level of Assurance 1 (LoA1) authentication service as specified in the trust framework of the U.S. Federal Government's Federal Identity, Credential, and Access Management (FICAM). Universities that have been LoA1-accredited can use U.S. government services, including the National Institutes of Health database. The Committee for Academic Authentication makes plans, draws up proposals, and manages GakuNin. In addition, three working groups were established under the Committee for Academic Authentication: (1) the Operation Working Group, which considers matters related to operations; (2) the Trust Working Group, which studies matters related to trust in GakuNin; and (3) the Library Service Working Group, which considers matters regarding GakuNin's library services.



Issuing Digital Certificates: UPKI Digital Certificate Issuance Service



NII launched the UPKI Digital Certificate Issuance Service in January 2015 as a service for issuing digital certificates to universities and research institutes. In addition to the server certificates issued so far, NII now also issues client certificates and code signing certificates.

We continue to issue highly secure server certificates that conform to the unified international standards of the WebTrust for Certification Authorities (WTCA). The use of these server certificates enhances web security in that they certify the authenticity of the web server provider (domain name and organization name), which makes it easier to distinguish authentic sites from phishing ones. We also issue client certificates to individuals of member institutions, which can be used for authentication and signing emails, as well as for multifactor authentication and preventing identity theft.

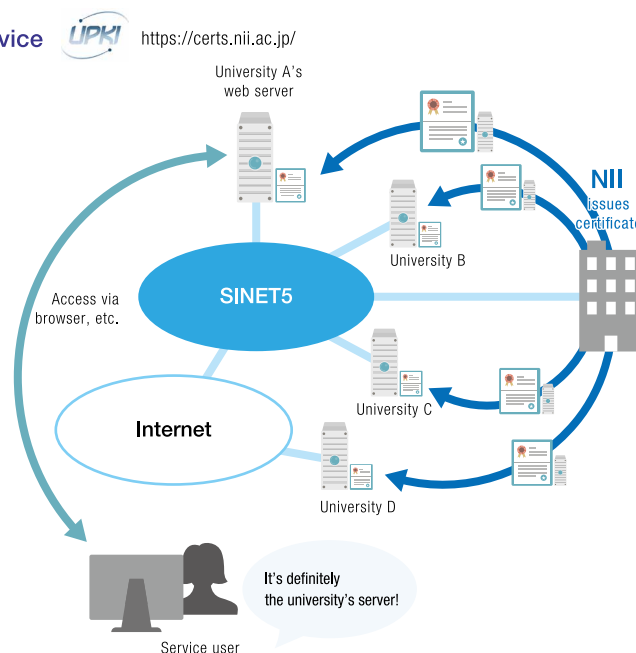
Additionally, by signing software, code signing certificates verify the identity of the developer and ensure that the code has not been tampered with. This helps users determine whether to trust and use the software.

The UPKI Digital Certificate Issuance Service aims to improve the security of universities and research institutes as a whole by providing these certificates for their use.

Institutions using UPKI Digital Certificate Issuance Service

(as of the end of March 2020)

Number of institutions	350
Number of domains	471



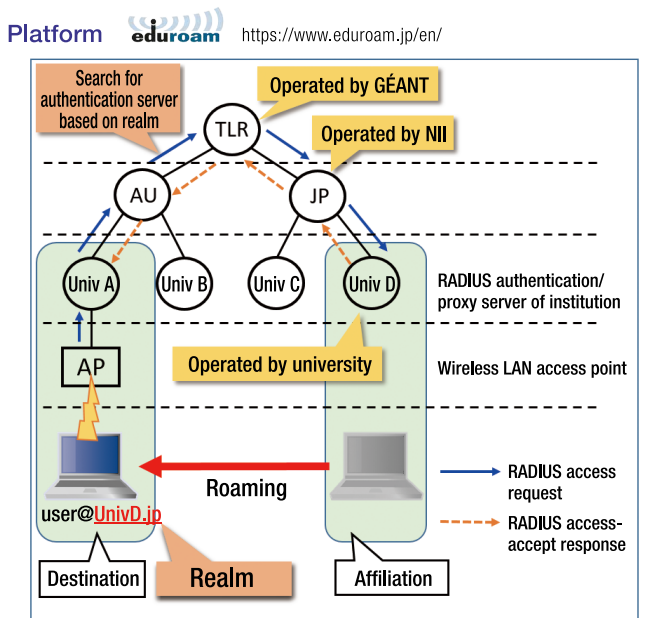
eduroam: World-wide Academic Wireless LAN Roaming Platform



eduroam is an academic wireless LAN roaming platform developed by GÉANT (formerly TERENA) in Europe, enabling shared access of on-campus Wi-Fi across universities and other research and educational institutions. Introduced in Japan in 2006 as part of NII's University Public Key Infrastructure (UPKI) project under the name "eduroam JP", NII operates, provides support for, and develops the technology of the platform. eduroam is based on the industry-standard IEEE 802.1X, meaning that it is able to provide a safe and convenient wireless LAN environment.

eduroam JP participants (as of the end of March 2020)

Number of participating institutions in Japan	282
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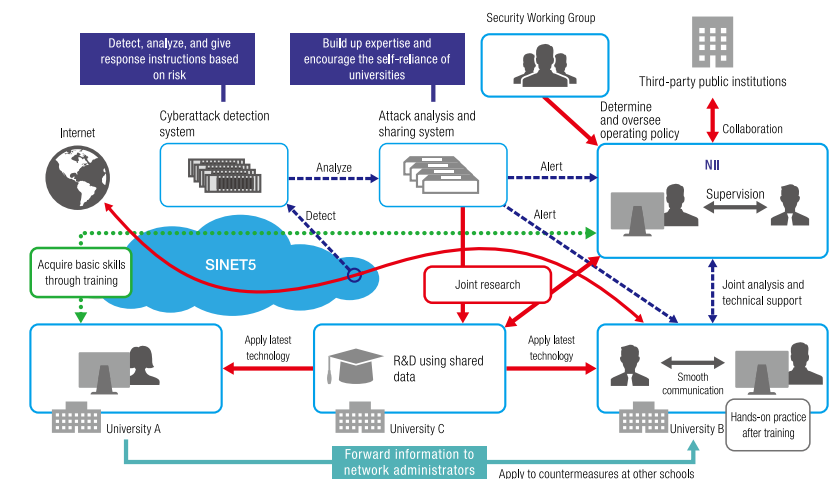


Supporting Information Security Framework through Inter-University Collaboration

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

NII established the Center for Cybersecurity Research and Development in 2016 to support the creation of a framework that enables national universities and other institutions to quickly respond to incidents and accidents due to cyberattacks, while the NII Security Operation Collaboration Services (NII-SOCS) began operations in 2017.

We develop cybersecurity experts through inter-university collaboration and at the same time apply our research findings as appropriate on detecting attacks and improving defense capabilities. Our aim is to improve the quality of cybersecurity infrastructure at national universities and other institutions and to carry out R&D that will provide an environment that promotes cybersecurity research, as well as a safe and secure educational and research environment for all academic and research fields.



Organization for Science Network Operations and Coordination

The operations of the Science Information NETwork are carried out through the collaboration and cooperation of information technology centers at universities and research institutes and four R&D centers at NII, under the supervision of a joint organization of universities and research institutes and NII called the Organization for Science Network Operations and Coordination.



Publishing and Communicating Academic Information

CiNii

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

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

CiNii is a service enabling exhaustive searches of academic information from academic articles, books, journals, and doctoral dissertations, among others.

NII is working to expand the pool of data available and improve hit rates in text by linking various types of database services other than those from NII.

CiNii also makes full use of intersystem links to university libraries and other facilities by providing search APIs (application programming interfaces) such as OpenSearch.

The service also provides a display exclusively for smartphones for a better experience searching.

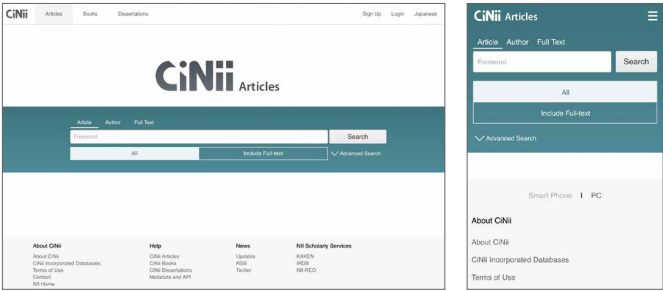
CiNii Articles: Searching for Research Papers in Japan

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

Contains information on over 20 million Japanese academic articles published in academic society journals and research bulletins, and articles included in the Japanese Periodicals Index Database of the National Diet Library, among others.

Data on coverage (as of the end of March 2020)

Number of articles on which information is included
22.01 million



CiNii Books: Searching for Books in University Libraries

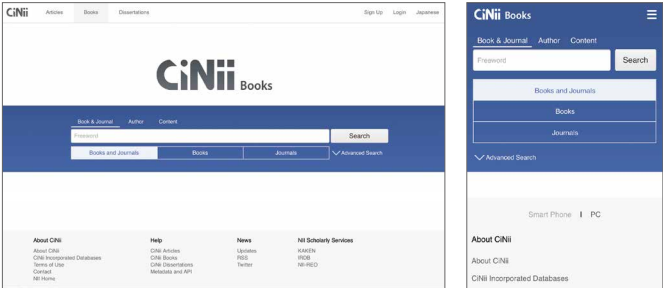
<https://ci.nii.ac.jp/books/en>

Enables search of information on books and journals held by university libraries in Japan.

Contains book and author information on about 12 million titles held by university libraries nationwide, which were stored through the Catalog Information Service (NACSIS-CAT) operated by NII.

Data on coverage (as of the end of March 2020)

Number of bibliographic records	Number of holding records	Number of participating libraries
12.18 million	144.55 million	1,341



CiNii Dissertations: Searching for Doctoral Dissertations in Japan

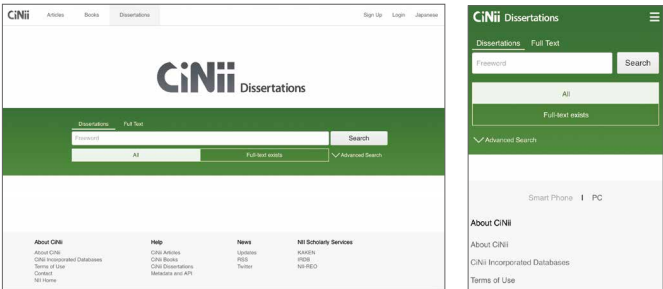
<https://ci.nii.ac.jp/d/en>

Enables comprehensive centralized searching of doctoral dissertations in Japan.

In addition to dissertation texts digitized by the National Diet Library, enables searching and viewing of dissertation texts publicly available in institutional repositories of universities and research institutes.

Data on coverage (as of the end of March 2020)

Number of doctoral dissertation records	Number of full texts from dissertation records
660,000	Approximately 270,000



Support for Construction and Linkage of Institutional Repositories (JAIRO Cloud)

<https://www.nii.ac.jp/irp/en/>

NII supports the construction and linkage of institutional repositories that publicly disseminate the results of education and research conducted by universities and other institutions. As well as these activities, we promote open access, with the aim of helping establish the next generation of academic content platforms. NII has provided support for content expansion, system linkage and community building at academic institutions in Japan, and has built and operated institutional repositories for over 810 institutions.

JAIRO Cloud: Shared Repository Service <https://community.repo.nii.ac.jp/eng>

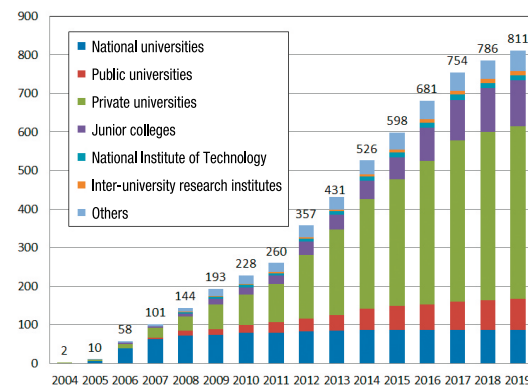
NII provides an environment for a shared repository system as a cloud service, based on the NII-developed institutional repository software WEKO (<http://weko.at.nii.ac.jp/>), for institutions that have difficulty constructing and operating their own repositories.



Usage data (as of the end of March 2020)

Number of institutions using the service
609

Number of institutions with institutional repositories in Japan



Integrated Search of Academic Information in Institutional Repositories in Japan

IRDB: Institutional Repositories Database

<https://irdb.nii.ac.jp/en>

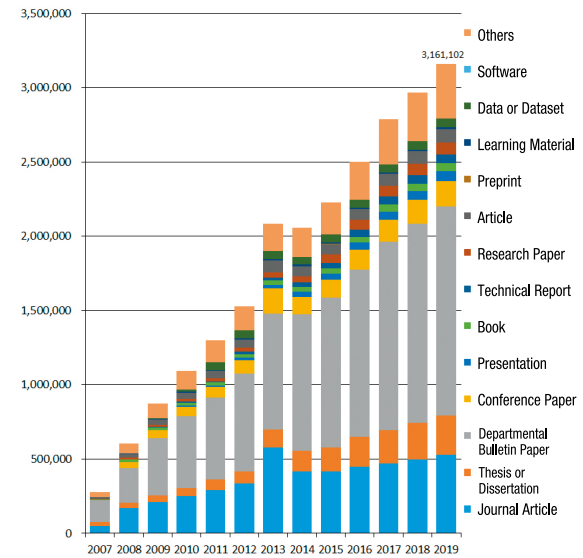
Enables integrated searching of education and research results (journal articles, theses or dissertations, departmental bulletin papers, research papers, learning materials, etc.) at universities and other institutions that are stored in institutional repositories in Japan.

Full texts are available to users through this system as well as access via CiNii. This service took over from JAIRO, an institutional repository portal, which ended operations in March 2019.

Data on coverage (as of the end of March 2020)

Number of institutional repositories	Contents
734	3.16 million items

Number of IRDB records



* Figures before FY2018 are JAIRO statistics
* Categories for the number of contents are based on the juni2 schema (NII Type) until FY2018, and on the JPCOAR schema from FY2019

Japan Consortium for Open Access Repository

<https://jpcoar.repo.nii.ac.jp/>

JPCOAR: Japan Consortium for Open Access Repository

JPCOAR is a community of institutions with repositories where universities and other research institutions in Japan can work more effectively on their efforts to widely disseminate research results and enhance the significance of building and operating institutional repositories. The consortium is also working on improving scholarly communication, which includes open science, as well as on joint operation of the institutional repository system platform (JAIR Cloud).

NII supports these activities as well as JPCOAR by providing assistance such as physical support for collaboration with university libraries.



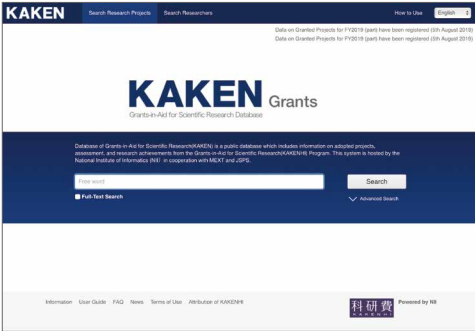
JPCOAR general assembly

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 enables users to browse adopted projects, as well as reports and summaries of research conducted through funds from the Grants-in-Aid for Scientific Research implemented by 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 in a wide range of fields in Japan. 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).



Data on coverage (as of the end of March 2020)

Number of adopted projects
910,000

Catalog Information Service

NACSIS-CAT NACSIS-ILL

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

The Catalog Information Service consists of the online cataloging system (NACSIS-CAT) and the interlibrary loan system (NACSIS-ILL).

NACSIS-CAT: Online Cataloging System

NACSIS-CAT is a system for creating a unified and comprehensive database designed to instantly provide information on the academic literature (books and journals) archived at university libraries and similar institutions throughout Japan. To form the database efficiently, the cataloging system has the capability to refer to standard cataloging data (MARC), and university libraries and other institutions nationwide sharing the work of inputting records online.

Registration and usage data (as of the end of March 2020, * indicates figure for one year, FY2019)

Number of institutions participating in NACSIS-CAT	Cumulative number of registered book records	Number of institutions participating in NACSIS-ILL	Number of NACSIS-ILL copies*	Number of NACSIS-ILL loans*
1,341	139.92 million	1,111	422,000	74,000

NACSIS-ILL: Interlibrary Loan System

NACSIS-ILL is a system that makes use of the unified and comprehensive catalog database created by the NACSIS-CAT cataloging system to support the exchange of books and journal articles between libraries, thereby facilitating the provision of academic literature to researchers at universities and institutions.

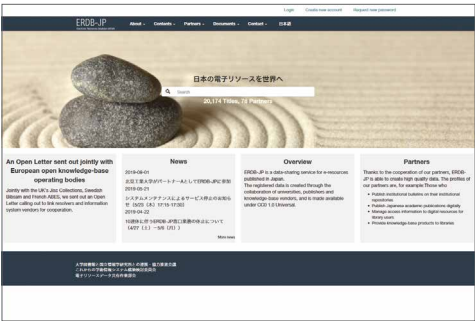
NACSIS-ILL also supports interlibrary loan services with university libraries overseas by linking to ILL systems such as KERIS in South Korea, and promotes more efficient library operations through ILL document copying and other services.

Database Sharing Service for Electronic Resources

ERDB-JP: Electronic Resources Database-JAPAN <https://erdb-jp.nii.ac.jp/en>

ERDB-JP is a service that builds and shares knowledge bases (databases) of electronic resources, such as e-journals and e-books, published in Japan. ERDB-JP is operated by NII and the E-resources Data Sharing Working Group, which is made up of staff responsible for managing e-resources at universities. Content metadata are collected and updated in collaboration with partner institutions encompassing universities, publishers, and knowledge base vendors. The collected content metadata are made available under CCO license. They can be exported and used to create lists of e-resource titles for use in OPAC and discovery services provided by universities and other institutions.

The application for ERDB-JP can now be carried out at the same time as the application for JAIRO Cloud.



Number of participating institutions *Partner A: Can modify all contents in ERDB-JP; Partner B: Can modify own institution's contents only (as of the end of March 2020)

	National universities	Public universities	Private universities	Inter-university research institutes	Publishing companies	Others	Total
Partner A	33	3	14	4	3	14	71
Partner B	6	0	17	1	0	3	27
Total	39	3	31	5	3	17	98

Data registrations (as of the end of March 2020)

Number of registrations	Number of new registrations (FY2019)	Number of updates (FY2019)
20,583	1,650	Automatic updates 179,773 Manual updates 13,571

Digital Archives

https://reo.nii.ac.jp/index_en.html

NII is engaged in the following activities to store and provide digital academic information on a permanent basis.

NII-REO: NII Repository of Electronic Journals and Online Publications

Back issues of online journals outside Japan (approximately 4.12 million records) and electronic collections in the field of humanities and social sciences (approximately 660,000 records) are stored 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 2020)

Online journal archives	Years covered	Coverage
Springer Online Journal Archive	1832-1999	Journal 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	Journal titles: 311; Number of records: Approx. 640,000
Kluwer Online	1997-2005	Journal titles: Approx. 800; Number of records: Approx. 350,000
IEEE Computer Society Digital Library (CSDL)	1988-2011	Journal titles: 30; Number of records: Approx. 350,000
Taylor & Francis Online Journals Classic Archives (science and engineering collection in three fields)	1798-1996	Journal titles: 124; Number of records: Approx. 220,000
Humanities and social sciences electronic collection	Years covered	Coverage
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: books, 61,000; periodicals, 445
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
America's Historical Imprints Series I:Evans	1639-1800	Number of records: Approx. 36,000 (scheduled for registration from 2020)
The Making of the Modern World Part III (MOMW III)	1890-1945	Number of records: Approx. 5,000 (scheduled for registration from 2020)

Promoting Scholarly Communication

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

SPARC Japan

Since FY2003, SPARC Japan has been working together with academic societies and university libraries in Japan, in collaboration with SPARC (USA) and SPARC Europe, to promote the digitization and internationalization of academic journals published by academic societies and other organizations in Japan, to help improve international standards for scholarly communication, and at the same time to promote the wider dissemination of the achievements of academic, scientific, and technological research in Japan.

In particular, the SPARC Japan Seminars address the latest issues in scholarly

communication and function as a forum for stakeholders on academic information. The coalition moved under the Academic Information Distribution Promotion Committee from FY2019, and is engaged in assessing the trends and actual conditions in scholarly communication in Japan and overseas, considering and coordinating strategies for publishing and use of academic information, and carrying out advocacy work in collaboration with stakeholders mainly from the academic community, with the ultimate goal of promoting open access and open science.

Education and Training Services

<https://h/rd.nii.ac.jp/>

We offer education and training services such as those below to develop human resources in universities and other institutions who work on academic information infrastructures in Japan.

- Training courses (NACSIS-CAT/ILL self-learning)
- Specialized training courses (bibliography creation for catalog systems, information processing technology seminars)
- Comprehensive training (NII on-the-job training, comprehensive IT training for university librarians), etc.



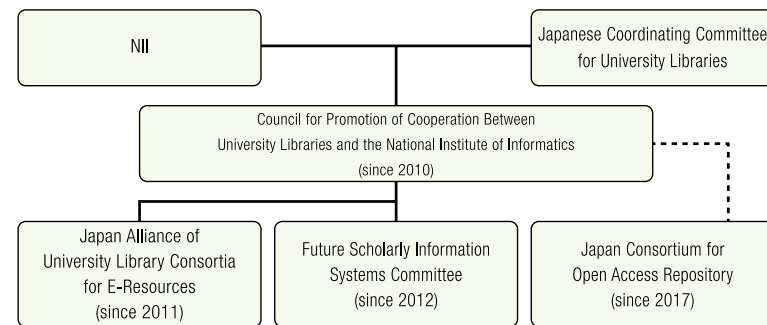
Collaboration with University Libraries

<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 to promote services in collaboration with university libraries. The Council for Promotion of Cooperation Between University Libraries and the National Institute of Informatics was established under this agreement. The Council, together with the Japan Alliance of University Library Consortia for E-Resources and the Future Scholarly Information Systems Committee established under it, carries out collaborative and cooperative services related to digital materials and scholarly communication.

The Council 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

One of the world's largest consortia of over 500 participating national, public, and private university libraries, with the aim of implementing a range of activities that provide stable uninterrupted access to academic information from online journals and other resources.

NII established the JUSTICE Secretariat in the Library Liaison Cooperation Office to support the activities carried out by JUSTICE, with a full-time staff on loan from university libraries.



Future Scholarly Information Systems Committee

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

Future Scholarly Information Systems Committee

The Committee was established with the aim of further promoting activities related to the building, management, sharing, and provision of platforms for scholarly information resources. The Committee is composed of university library staff recommended by national, public, and private university library associations and councils, experts, and NII staff. In addition to identifying the various issues that are relevant to the future of scholarly information systems, the Committee also reviews future visions of systems and their operating communities, as well as plans to achieve these visions.

NII participates as a committee member and provides support for its activities by taking up the secretariat role for the Committee.

Working Group for Examination System Models

This working group performs two tasks: (1) examination of new library system networks that enable integrated discovery environments, as well as sustainable operating systems; and (2) examination of issues in joint procurement and operations of systems.

Working Group for Examination System Workflows

This working group performs five tasks: (1) examination of integrated discovery environments, (2) examination of data sharing of digital information resources, (3) examination of advanced metadata distribution, (4) ERDB-JP operations work, and (5) support for operating system transition of NACSIS-CAT in 2020. The working group consists of university library staff and others in charge of contracts, management, and provision of electronic resources, or of cataloging work.

Open Science

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

Open Science has been gaining traction as a new way of conducting research that promotes open access and sharing not only of papers but also of research data and software over the Internet.

Together with universities and research institutes nationwide, NII contributes to the development of Open Science in Japan by providing three platforms for managing, publishing, and searching various types of files generated in the course of research.*

Research Data Management Platform



A platform for managing and sharing research data and materials generated during the research project among researchers and their supporters. GakuNin RDM enables effective file management among collaborators by linking with existing storage and research tools. It also has a time-stamping function for research trail tracking and providing research integrity. GakuNin RDM is also enhancing customizability for various use cases in research data management systems of universities and research institutes.

Publishing Platform



A platform for researchers to publish their research outputs, including their research papers and research data. WEKO3 is a repository platform designed to be flexible and expandable for supporting research outputs. Researchers can easily publish their research outputs on their institutional repository directly or with the GakuNin RDM platform. WEKO3 also assigns DOIs and metadata to submitted research outputs and publishes them on the internet. These functions of WEKO3 are provided through the institutional repository cloud service (JAIRO Cloud).

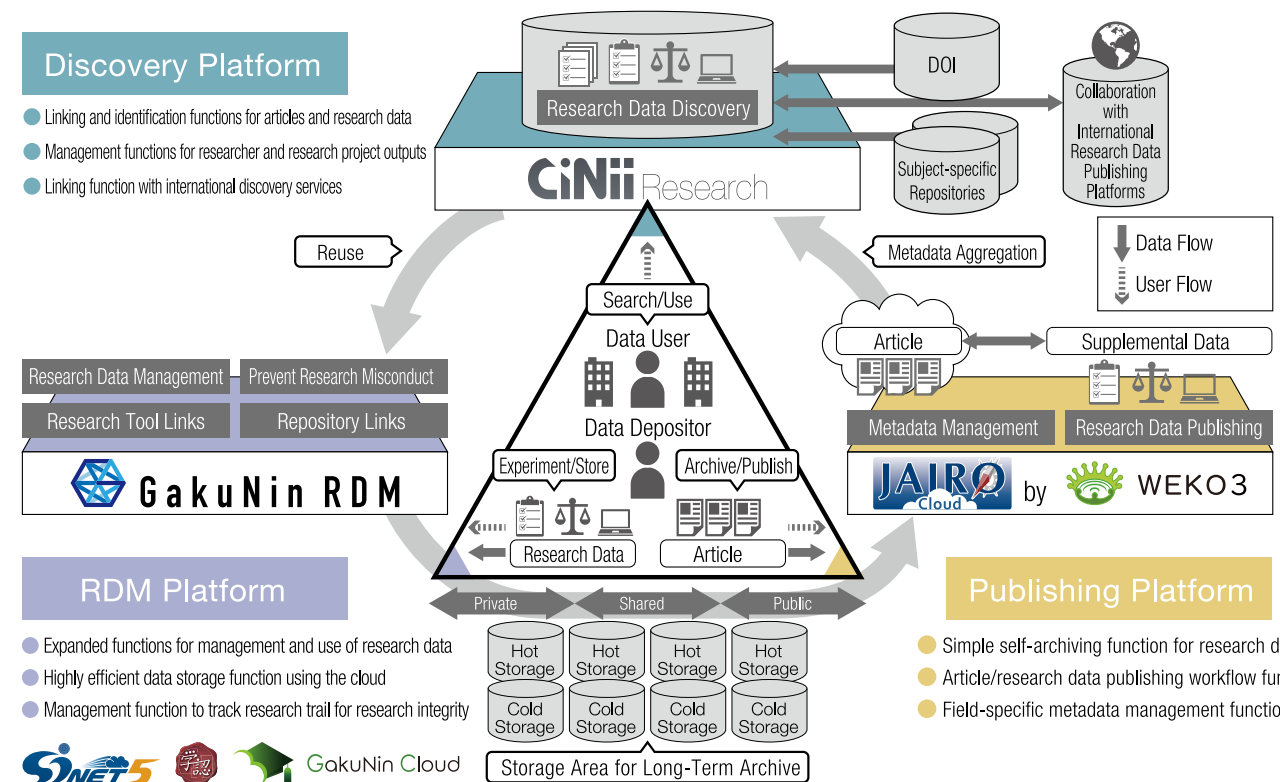
Discovery Platform



A platform aggregates information from the WEKO3 and other institutional databases and provides a comprehensive search for scholarly resources. Research data are closely related to scholarly articles, bibliographies, and other literature, as well as with the researchers and research projects that produced these academic resources. This discovery platform's core is a large-scale scholarly knowledge graph that interactively links all this information together. CiNii Research helps with making discoveries by providing the ability to navigate through these complex relationships intuitively.

*Full-scale operation of these three platforms is scheduled to begin in FY2020.

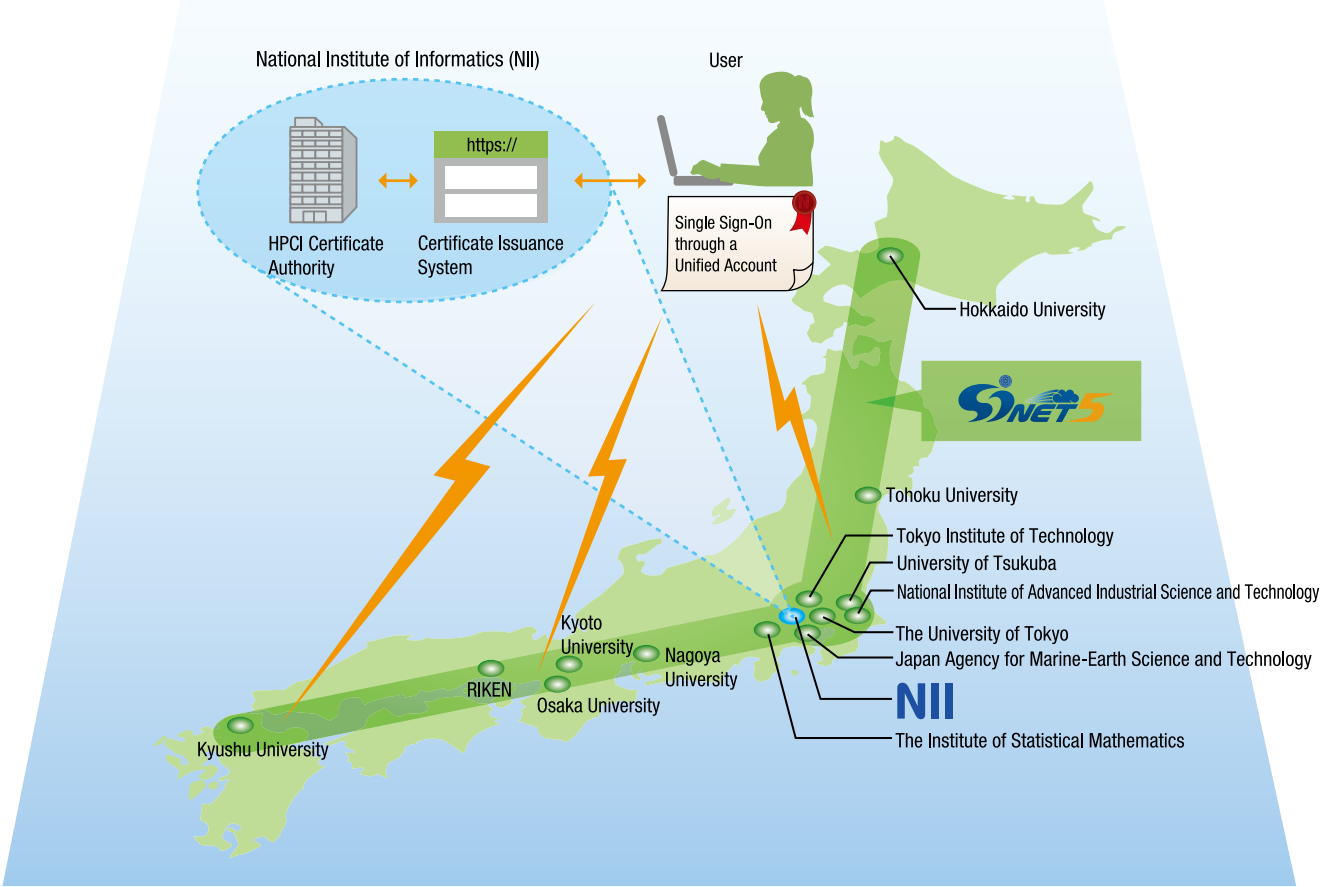
Research Data Cloud for Open Science	
Aim	To develop a common platform for managing, publishing, and searching the cutting-edge research data, and to promote open science in various fields, in close collaboration with academic communities.



Operating and Maintaining the Authentication Infrastructure for the High Performance Computing Infrastructure (HPCI)

HPCI connects supercomputers and storages installed at universities and research institutes across Japan (the Fugaku will be connected in FY2021), creating a revolutionary shared computing infrastructure to meet the diverse needs of a wide range of users, including the industrial sector. The second phase of the project began in FY2017. HPCI has an authentication system that allows users to gain access to any computing resource by using a unified login account, and offers users a platform that is easy to use. In collaboration with universities and research institutes nationwide, NII continues its work from the first phase of the project, operating and maintaining the authentication system that forms the core of the unified account authentication, which includes the certificate authority and certificate issuance system. The authentication system ensures communication and data security through a highly secure framework that uses digital certificates for

HPCI users, and also provides a single sign-on system that enables users to seamlessly use the supercomputers and storage resources in the HPCI. Moreover, NII plays a central role in the survey and research of rapidly advancing authentication infrastructure technologies and international usage trends. We carry out R&D on next-generation authentication platforms while considering the utilization of existing technologies and systems in addition to new technologies, with the aim of both improving user convenience and boosting the efficiency of its operations and management. The Science Information NETwork (SINET) takes over the responsibility of providing the essential high-speed network infrastructure for linking supercomputers in remote areas and sharing massive amounts of test data and calculation results.



NII Library: Contributing to Informatics Research and Education

As a facility for informatics research and education, the NII Library provides online journals, as well as books, journals, and other resources, in the field of informatics. Moreover, the Library is under a mutual library use agreement with the neighboring Meiji University Library, in order to provide access to references for graduate students of SOKENDAI.

Number of books and journal titles

(as of the end of March 2020)

Reference type	Books	Print journals	Journals (number of titles)
Japanese	15,338	9,431	130
Foreign	9,408	8,313	7
Total	24,746	17,744	137

Facilities and equipment

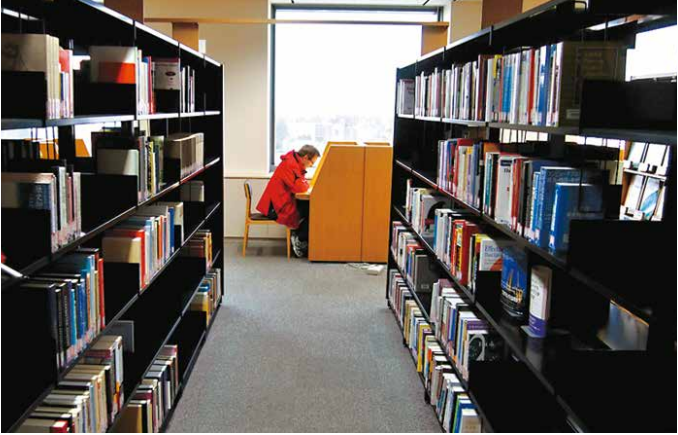
Available service	Reading room	Stack room
Area	140m ²	151m ²
Seats	10	—
Others	Automated book lending/returning machine Copier	



Reading room

Major online journals and databases

Service	Publisher
ACM Digital Library	Association for Computing Machinery
APS-ALL Package	American Physical Society
IEEE/IET Electronic Library	IEEE/IET
IOP	IOP Publishing
OUP	Oxford University Press
Nature	Springer Nature
Science	American Association for the Advancement of Science
ScienceDirect	Elsevier B.V.
Scopus	Elsevier B.V.
Springer eBook	Springer Nature
SpringerLink	Springer Nature
Web of Science	Clarivate Analytics
Wiley Online Library	John Wiley and Sons Inc.
IEICE	Institute of Electronics, Information and Communication Engineers
IPSJ Digital Library	Information Processing Society of Japan



Reading room

Public Communications

Communicating NII's Research and Services to Society at Large

NII holds open houses and public lectures at the institute, conducts special classes for high school and technical college students, creates exhibits for exhibitions, issues printed publications, and carries out other activities, in order to share the latest informatics-related research findings widely with society at large and deepen understanding of its projects and services.

We also strive to provide timely information through digital media such as our websites, email newsletters, and social media (Twitter, Facebook).

NII Open House

NII holds an annual Open House to open NII to the public and present the results of its various research projects to a broad audience that includes the general public, researchers, and graduate school applicants. In FY2019, we held the "100 NII Research Presentations," where 10 NII researchers present 10 research studies each for a total of 100 presentations, as well as demonstrations, poster exhibits, informatics workshops for children, and other events.



NII Computer Science Park, where children learn programming thinking without using a computer (June 2019)



"100 NII Research Presentations," where 10 researchers presented a total of 100 research studies (June 2019)

Public Lectures NII holds free lectures for the general public from time to time.

National Institute of Informatics Public Lectures: <https://www.nii.ac.jp/event/shimin/>

At the Forefront of Informatics

In these free lectures, researchers at NII discuss various subjects at the forefront of field of informatics to the general public. Videos, presentation materials, and Q&As of past lectures are available on the NII website.



At the third lecture in FY2019, Associate Prof. Ichiro Hasuo gave a lecture on theoretical computer science (November 2019)

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

Lectures on informatics and many other fields are held at the International Seminar House for Advanced Studies in Karuizawa, Nagano Prefecture, several times a year for local residents. A portion of the contents of past lectures has been published in six volumes of the Collection of Lectures from the Karuizawa Saturday Salon: Harmony of Intelligence and Art (Karuizawa Doyo Konwakai Koenshu: Chi to Bi no Hamoni), and is also available on the NII website.



At the second lecture in FY019, Prof. Hitoshi Murayama (Former Director of the Kavli Institute for the Physics and Mathematics of the Universe, The University of Tokyo Institutes for Advanced Study; Former Director; Professor at University of California, Berkeley) gave a lecture on the origin of the universe and the birth of stars (July 2019)

Special Classes at High Schools and Technical Colleges

NII researchers visit high schools and technical colleges to present the latest research findings in simple terms. The aim is to bring informatics closer to the students, who will be responsible for our future, and make them interested in it. The first class in FY2019 was held at Tokyo Metropolitan Toyama High School on the subject of robots, and the second class was held at the National Institute of Technology, Kurume College in Kurume City, Fukuoka Prefecture on the subject of machine learning.



At the first class, Associate Prof. Tetsunari Inamura gave a lesson on robots (November 2019)

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 latest issue, *Learning Compass: The Analytics of Learning*, was released in January 2020.



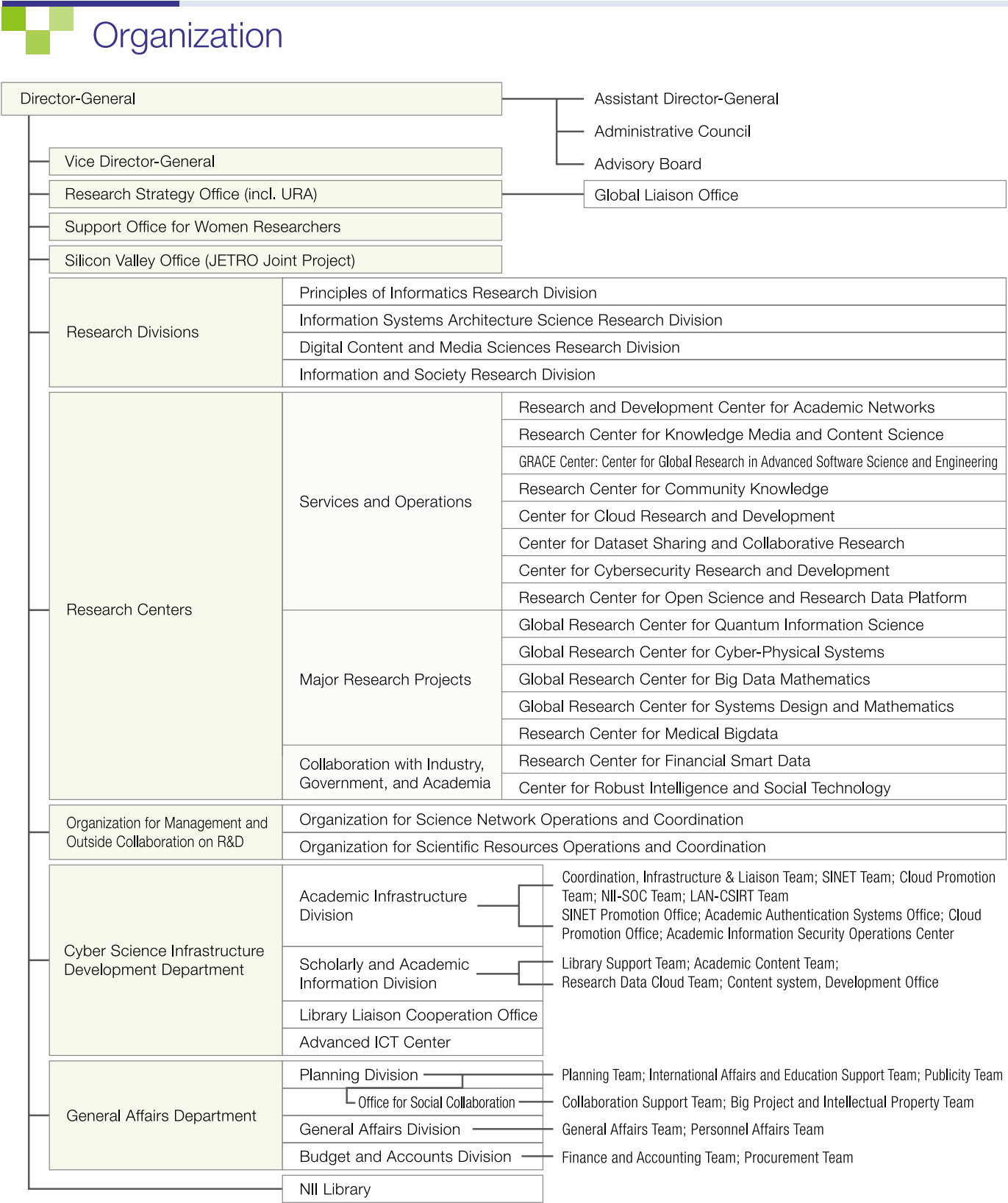
The public information magazine, NII Today, is issued four times a year.

Public Information Magazines

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

News Releases

(FY2019)	
Date issued	Title
April 4, 2019	Renewal of IRDB, the database that functions as a hub for scholarly communication in Japan: Supports new metadata standards in the era of Open Science
April 8	NII Open House 2019 held on May 31 (Fri.) and June 1 (Sat.): Keynote speech by Kengo Sakurada, Chairman of the Japan Association of Corporate Executives
April 9	NII Associate Professor Megumi Kaneko received the Young Scientist Award for research achievements to improve the efficiency of use of radio resources in mobile systems: FY2019 MEXT Minister's Award in Science and Technology
April 9	MEXT Minister's Award in Science and Technology (Development Category) received for the achievement of developing the authentication collaboration architecture for inter-university collaboration: Kyoto University Professor Yasuo Okabe, NII Project Researcher Takeshi Nishimura, University of Tokyo Associate Professor Hiroyuki Sato, Tohoku University Associate Professor Hideaki Goto, Tsuda University Professor Noboru Sonehara were jointly awarded
April 16	Crop Vocabulary built for computer brains: Enabling crop tracing even if they change their names
April 22	ERATO MMSD General Symposium for Reliability Assurance of Autonomous Driving Systems to be held for the first time on May 21: From Mathematical Foundation to Artificial Intelligence and Software Platforms
April 26	Wanted: People who have discovered huge graphs with simple structures connecting one million CPUs in a future supercomputer! "Graph Golf Competition 2019" to be held: Finding graphs that represent efficient network configurations
May 25	Experimental comparison of computational performance between coherent Ising machines using light and a quantum annealer using superconducting qubits: Shows that the mechanism allowing flexible node connections in coherent Ising machines is the key to solving complex graph problems
June 6	Fiscal 2018 Research Report on Social Problem-Solving Techniques Using LINE released
June 24	Providing realistic large-scale survey data from Oricon Customer Satisfaction® for academic research purposes: from July 1, NII to sequentially provide the data of the largest-scale survey in Japan, collected from over 2 million people in about 100 industries
July 9	AI researchers and programmers from around the world take on the challenge of Kuzushiji Character Recognition: Global competition to be held at Kaggle from July
September 13	Japanese Culture and AI Symposium 2019, AI for Reading Kuzushiji is Now Ready! on November 11, application now open
October 1	Neuron circuitry from brain signals: Using machine learning to construct a map of neuronal connections
October 11	New variations added to LINE Stamps of NII official character, Info Dog "Bit-kun": Second edition with 16 different stamps selected through voting by NII Open House visitors now on sale
October 29	Data of around 160,000 user reviews of diet products now provided free of charge for academic research purposes
November 18	AI achieved a score of 185 on the English written exam of the National Center Test for University Admissions in 2019!
November 26	Discovery of 16 graph patterns with theoretically minimum diameter at the Graph Golf Competition, a competition for finding graphs that lead to efficient supercomputer design: Potential applications to computing time minimization for next-generation supercomputers, among others
November 29	Successful detection of suspicious communications in a 20 Gbps high-speed large-capacity communication environment: Aiming for implementation to services using this technology in FY2020
December 6	NII starts operation of a 400 Gbps Tokyo–Osaka link to speed up SINET, the ultra-high-speed network supporting Japan's academic research: Putting a world-leading long-distance 400 Gbps link into practical operation
December 25	SINET Stream, a software package for wide-area data collection and analysis program development, has been released: Promoting research via SINET5 toward the realization of Society 5.0
2020 January 24	Development of a method for automated analysis of automotive systems design safety: Extracting risk factors from data of various design and operating environments and codifying these as knowledge, was awarded as Best Paper at ICECCS 2019, the flagship international conference on engineering of complex computer systems
January 28	Concluded an international exchange agreement (MOU) with the Center for Open Science (COS) in the U.S.: Research data management platform "GakuNin RDM" adopts Open Science Framework developed by COS
February 12	Handling confidential information in the cloud: A revision of the Collection of Sample Regulations for Information Security Measures of Higher Education, in line with the FY2018 edition of the Common Standards for Information Security Measures for Government Agencies
February 20	Development of a method to automatically detect hazardous motion from a route planning program for autonomous driving: Discovering both hazardous and realistic motions without making detailed specifications
February 21	Myanmar to be first country in ASEAN Region to launch free and open national research portal
February 25	An introductory video on research, Museum of the Future: Created by Cultural Property Digital Archives and Informatics, will be shown on the first floor, National Center of Sciences: Using research from the Takano Laboratory at NII
March 5	DEIM 2020 Academic Conference Held Online to Prevent Further Spread of COVID-19; 563 Researchers and Students Participate Remotely Using IT
March 11	"Legal advice for everyone" by Bengo4.com, Inc.: Data to be available for researchers at universities and public research institutes



Silicon Valley Office (JETRO Joint Project)

In May 2017, NII and the Japan External Trade Organization (JETRO) jointly established an office in Silicon Valley. This new office carries out studies and identifies international needs that will lead to the use and commercialization of NII's research findings in North America, particularly the West Coast. Using the resulting information gathered, it is also expected to conduct initiatives that will bring and develop NII's research achievements overseas. The office also manages joint research contracts between NII and overseas corporations, universities, research groups, and other organizations, as well as providing administrative support to international conferences and exhibitions held in neighboring areas.



Executives

Director-General

KITSUREGAWA Masaru

Acting Director-General/
Vice Director-General

SHINOZAKI Motoshi

Vice Director-General

URUSHIDANI Shigeo

Vice Director-General

KAWARABAYASHI Ken-ichi

Vice Director-General

OYAMA Keizo

Vice Director-General

AIZAWA Akiko

Vice Director-General

ADACHI Jun

Assistant Director-General

ECHIZEN Isao

Assistant Director-General

YONEDA Tomohiro

Executive Director of Research

FURUI Sadaoki

Cyber Science Infrastructure Development Department

General Manager

AIDA Kento

Deputy General Manager

KINOSHITA Satoru

Senior Coordinator

TAKEKAWA Toyomi

Academic Infrastructure Division

Manager

SATO Suguru

Scholarly and Academic Information Division

Manager

ONO Wataru

Library Liaison Cooperation Office

Head

HIRATA Yoshiro

Advanced ICT Center

Head

ABE Shunji

General Affairs Department

General Manager

MIZOGUCHI Hirokazu

Planning Division

Manager

GOHARA Masayoshi

General Affairs Division

Manager

SUGAWARA Akira

Budget and Accounts Division

Manager

KISHITANI Takahiro

NII Library

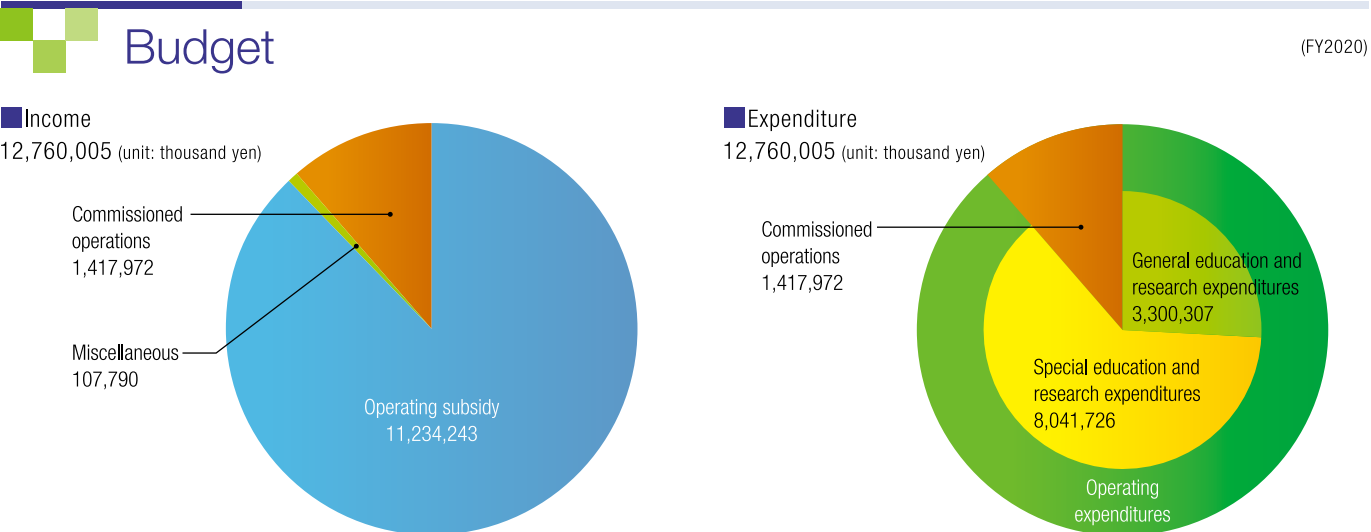
Head

SUN Yuan

Staff Numbers

(as of May 2020)

Category	Director-General	Vice Director-General	Assistant Director-General	Professor	Associate Professor	Lecturer	Assistant Professor	Subtotal	Administrative Staff	Total
Full-time staff	1	5	2	27	31		16	82	64	146
Project professor, etc.		1		11	15		19	46		46
Special term/fixed-term/short-term staff										262



Administrative Council

Conducts deliberations on important matters concerning the management and operation of NII, such as the selection of candidates for the post of Director-General and for research and academic staff, and joint research planning, as well as matters concerning NII in the medium-term targets and plans of the Research Organization of Information and Systems (ROIS).

Advisory Board

Composed of Japanese and overseas experts external to NII who possess deep and extensive knowledge of academic information. The Board responds to inquiries from the Director-General regarding issues involving research on informatics, as well as development and maintenance of infrastructure for communicating scholarly information.

Professors Emeriti

National Center for Science Information Systems (NACSIS)

Name	Award date
INOUE Hitoshi	1999 June 23

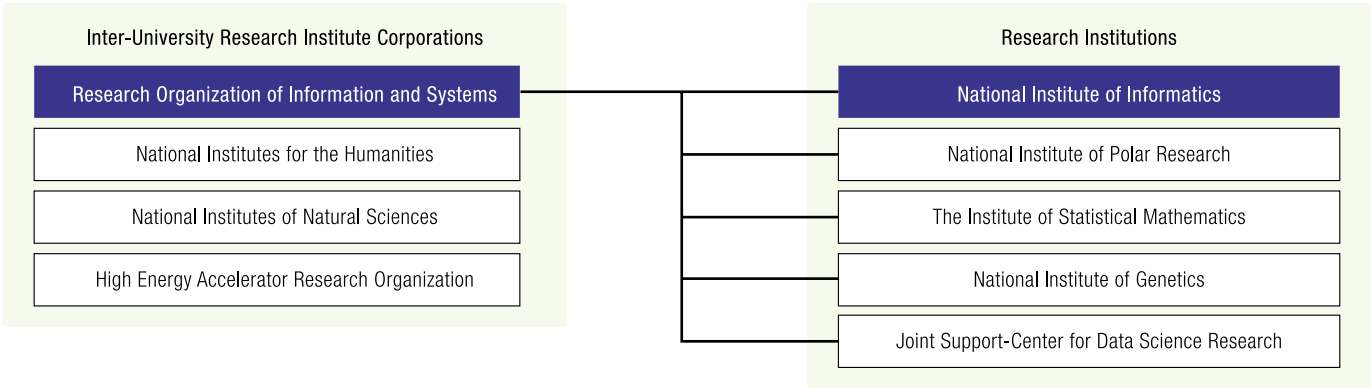
National Institute of Informatics (NII)

Name	Award date
SAWA Takamitsu	2002 April 1
NAITO Eisuke	2002 July 2
HATORI Mitsutoshi	2004 November 19
ONO Kinji	2004 November 19
YAMAMOTO Takeo	2005 April 1
SUEMATSU Yasuharu	2005 April 1
UENO Haruki	2007 April 1
MARUYAMA Katsumi	2010 April 1
NEGISHI Masamitsu	2010 April 1
MIURA Kenichi	2011 April 1

Name	Award date
SAKAUCHI Masao	2013 April 1
ASANO Shoichiro	2013 April 1
KOYAMA Teruo	2015 April 1
MIYAZAWA Akira	2015 April 1
YAMADA Shigeki	2015 April 1
YAMAMOTO Yoshihisa	2015 April 1
SONEHARA Noboru	2017 April 1
ADACHI Jun	2018 April 1
HONIDEN Shinichi	2018 April 1

Inter-University Research Institute Corporations

NII is one of the institutions operating under the auspices of the Research Organization of Information and Systems (ROIS). Inter-university research institute corporations are “research institutes for shared use among all universities” in different research fields. Unique to Japan, these research institutes offer state-of-the-art large-scale equipment that is difficult to install and maintain individually at the university level, as well as access to vast quantities of academic data, other valuable resources, and analytical techniques for the use of researchers across Japan, free of charge, in order to promote original collaborative research that exceeds the purview of individual universities. ROIS aims to carry out holistic studies across different disciplines by framing important issues of the 21st century related to complex phenomena, such as life, the Earth, the natural environment, and human society, from the perspective of information and systems.



History

Date	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, Sports and Culture. The Science Council issues a response in January 1980.
April 1983	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	National Center for Science Information Systems (NACSIS) is established, with the reorganization of the Center for Bibliographic Information, the 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-ku, 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, Sports 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-ku, 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	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 NETwork4 (SINET5) is launched.

Facilities and Locations

National Center of Sciences (Chiyoda-ku, Tokyo)

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

The National Center of Sciences was built as a center for research in informatics and other fields, academic exchange, dissemination of scientific information, and social collaboration, with the aim of expanding and strengthening Japan's academic research infrastructure. Construction was completed in December 1999.

The high-rise wing is primarily occupied by three institutions: NII, Hitotsubashi University Chiyoda Campus, and the National Institute for Academic Degrees and Quality Enhancement of Higher Education. The Center aims to provide an advanced base for intellectual creativity through the comprehensive interaction of the various academic capacities of each institution.

Conference facilities such as Hitotsubashi Hall are located in the low-rise wing. These facilities accommodate a wide variety of events such as international and academic conferences, lectures, and meetings organized by national universities and other institutions.

National Institute of Informatics

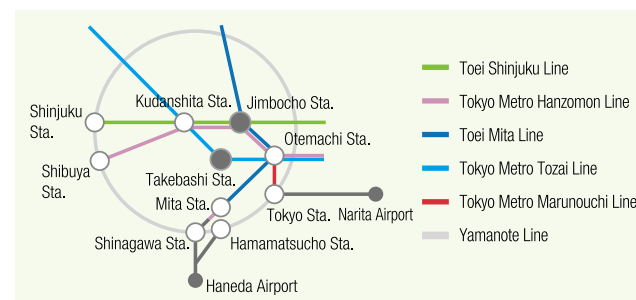
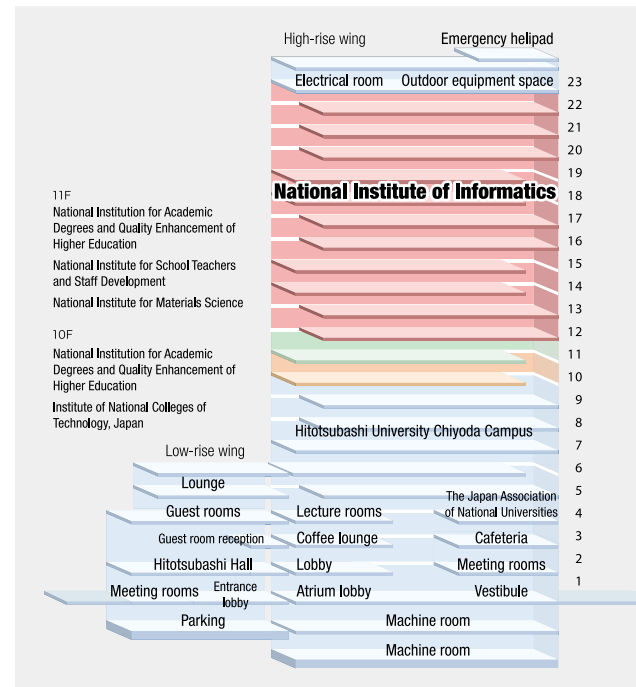
National Center of Sciences Bldg.

2-1-2 Hitotsubashi, Chiyoda-ku, Tokyo 101-8430

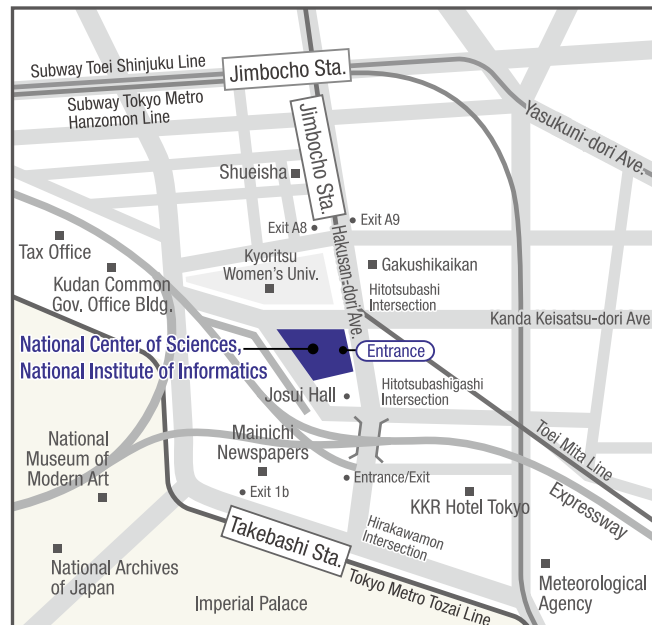
Tel: +81-3-4212-2000 (exchange)

■Site area: 6,842 m² (occupied by NII: 3,036 m²)

■Floor space: 40,585 m² (occupied by NII: 18,145 m²)



National Center of Sciences



Chiba Annex (Inage-ku, Chiba City)

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



Exterior of Chiba Annex

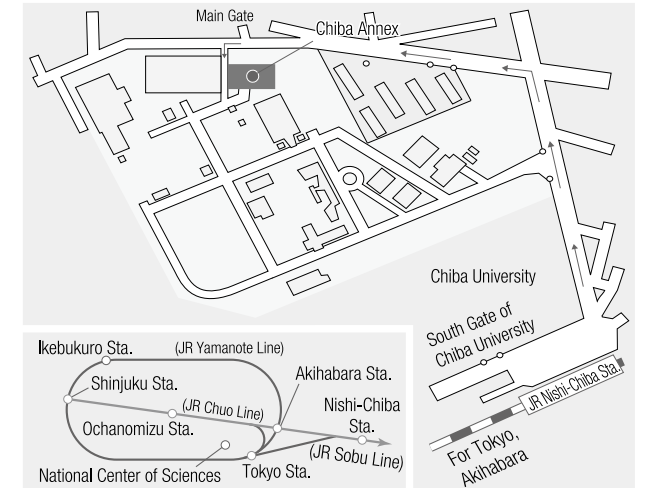
Chiba Annex

1-8 Yayoi-cho, Inage-ku, Chiba City, Chiba 263-0022

Tel: +81-43-285-4911 (exchange)

■Site area: 3,212 m² ■Floor space: 3,943 m²

Guide Map



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

<https://www.nii.ac.jp/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 wish was to create an ideal place for interdisciplinary and international study and 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

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 m² ■Floor space: 667 m²

Guide Map

