Contact List

Catalog Content	Contact	Contact Information
Kakenhi (p.22); Collaboration with Industry, Government, and Academia (p.27)	Planning Division, Office for Social Collaboration Collaboration Support Team	kaken@nii.ac.jp
Collaborative Research Promotion (p.25); Academic Consultation by Researchers (p.27)	Planning Division, Office for Social Collaboration Collaboration Support Team	keiyaku@nii.ac.jp
Intellectual Property (p.26)	Planning Division, Office for Social Collaboration Big Project and Intellectual Property Team	chizai@nii.ac.jp
Top SE (p.24)	GRACE Center	general@topse.jp
International Exchange (MOU) (p.29); (NII International Internship Program) (p.29)	Planning Division, International Affairs and Education Support Team	international@nii.ac.jp
International Exchange (NII Shonan Meetings) (p.31)	Office of NII Shonan Meetings	shonan@nii.ac.jp
International Exchange (DAAD, JFLI) (p.32)	Planning Division, International Affairs and Education Support Team	international@nii.ac.jp
Graduate Program (p.33)	Planning Division, International Affairs and Education Support Team	daigakuin@nii.ac.jp
Science Information NETwork (p.37)	Academic Infrastructure Division, SINET Promotion Office	support@sinet.ad.jp
GakuNin Cloud (p.40)	Academic Infrastructure Division, Cloud Promotion Team	cld-office-support@nii.ac.jp
Authentication Platform (p.41)	Academic Infrastructure Division, Academic Authentication Systems Office	gakunin-office@nii.ac.jp
Supporting Information Security Framework through Inter-University Collaboration (p.42)	Academic Infrastructure Division, NII-SOCS Team	soc-office@nii.ac.jp
Open Science (p.43)	Research Center for Open Science and Data Platform	rcos-office@nii.ac.jp
Institutional Repositories (p.44)	Scholarly and Academic Information Division, Institutional Repository Desk	ir@nii.ac.jp
CiNii (p.45)	Scholarly and Academic Information Division, CiNii Desk	ciniiadm@nii.ac.jp
Catalog Information Service (NACSIS-CAT/ILL) (p.46)	Scholarly and Academic Information Division, CAT/ILL Desk	catadm@nii.ac.jp
SPARC Japan (p.47)	Scholarly and Academic Information Division, SPARC Desk	sparc@nii.ac.jp
Education and Training Services (p.47)	Scholarly and Academic Information Division, Education and Training Desk	edu@nii.ac.jp
NII Library (p.50)	Scholarly and Academic Information Division, Library Desk	library@nii.ac.jp
Public Communications (p.51)	Planning Division, Publicity Team	kouhou@nii.ac.jp
News Releases (p.52)/Media Relations	Planning Division, Publicity Team/Media Relations Desk	media@nii.ac.jp / +81-3-4212-2164
Facilities and Locations (p.57)	General Affairs Division, General Affairs Team	soumu@nii.ac.jp

August 2022

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

2-1-2 Hitotsubashi, Chiyoda-ku, Tokyo, 101-8430 Japan
National Center of Sciences Bldg.

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

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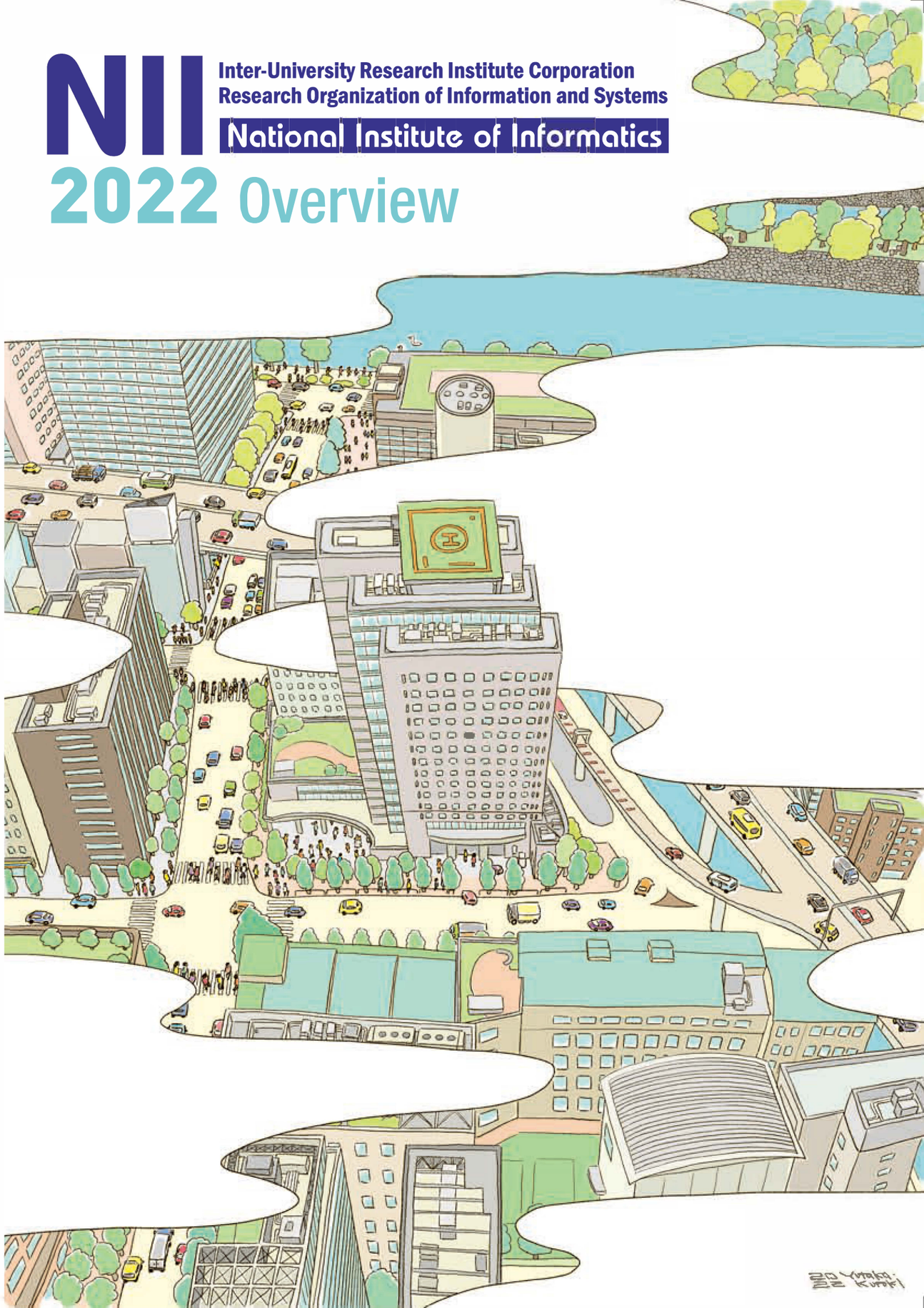
NII 2022 Overview

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



Top Message

——Making use of massive amounts of data to dynamically contribute to society

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

There are three basic kinds of hardship that afflict humanity. The first is natural disasters. Japan has been subjected to major earthquakes and floods quite frequently in recent years. The second hardship is epidemics. Right now, COVID-19 is raging throughout the world. And thirdly, there is war. Russia's invasion of Ukraine is wreaking devastation. So, we are currently facing all three kinds of hardship.

Many people have even started to feel that things will never go back to how they were. That is precisely why we need to move forward with a positive focus on the future, rather than just waiting to see what happens. The National Institute of Informatics (NII), Japan's only academic research institute dedicated to informatics, is now proactively pushing ahead with important measures for the future, without any defensiveness at all.

An initiative that symbolizes this approach is NII's "Next-generation Academic Research Platform," which was rolled out for universities and research institutions in April 2022. This platform was developed by advancing and fusing the high-speed networking system and research data infrastructure that NII has long operated.

Our SINET5 high-speed network system, which was running nationwide at 100 Gbps, was upgraded in April 1, 2022, to become the 400-Gpbs SINET6, the world's fastest ultra-high-speed national network infrastructure.

At 400 Gbps, it is possible to transfer a 50-GB Blu-ray disc worth of data in just a second, and to stream 8K video in real time. Although a shortage of semiconductors and other factors have slowed the rollout process, approximately 1,000 institutions were using SINET6 as of April 2022.

NII's Research Data Cloud (NII-RDC) was initially equipped with the basic functionality to store, manage, and utilize research data. However, we have energetically continued to add more functions to the system, such as analysis functions for ensuring reliability, functions for systematically supporting the training of data management personnel, and functions for calculating data in cryptographic spaces when collaborating with private companies.

Our academic research platform combines SINET6, which serves as the "lower body," with the advanced functionality of NII-RDC, which serves as the "upper body." As a supporting foundation for the whole of Japan's academic community, the platform will not only contribute to world-leading research, including Nobel Prize-level investigations, but also powerfully promote interdisciplinary research and international joint research through the promotion of open science. Furthermore, the platform will facilitate digital transformation ("DX") at universities and other institutions. On top of this, it is expected to make a significant positive contribution to society through industrial applications and utilization in lifelong education and elementary and secondary schooling.

In May 2022, another important NII initiative, the "DX Symposium for Educational Institutions," held online regularly since March 2020, was held for the 50th time. Originally, the meetings focused on sharing the lessons learned from trying to hold online classes, mainly between the seven prestigious national universities, but they soon became valuable webinars for exchanging a wide variety of knowledge about digital transformation in education, including clinical practice (hospital rounds) at medical schools and the online implementation of physical education skills. At the 45th symposium in January 2022, held as a New Year planning event, FUJII, Teruo, president of The University of Tokyo, gave a lecture in the Metaverse, an online virtual space platform. The lecture was watched live in various formats by an audience of approximately 1,700 people. Ironically, it has been the COVID-19 crisis, which has tended to weaken the connections between people, that has inspired this organic gathering to continue online for two whole years. It has turned out to be a very valuable journey.

NII has also pursued research on "security," as system defense measures, to keep up with the latest changes in computing environments. In July 2021, NII launched the Global Research Center for Synthetic Media, which pursues research on detecting fake media and ensuring media reliability. In September 2021, NII developed "SYNTHETIQ: Synthetic video detector," a program for automatically detecting fake AI-generated facial videos. For a long time, NII has engaged in research on the generation of audio, images, and video for practical public infrastructure. Now our research findings are also being used for security measures like these.

To counter the threat of cyberattacks on SINET, the Center for Strategic Cyber Resilience Research and Development operates Security Operation Collaboration Services (NII-SOCS), to facilitate inter-university cooperation. Since the launch of SINET6, the security functions at data centers have also become more robust. Despite the frequency of cyberattacks in recent years, NII's network and research data infrastructure has not experienced any major disruptions.

NII is committed to making even more dynamic contributions to the public good over the coming years by applying the findings of its various kinds of informatics research to improving academic research infrastructure, all the while accelerating synergies using the feedback obtained from studies to drive further research.

One of the models for this approach is our medical big data cloud platform. This was developed by NII in response to the COVID-19 crisis, based on earlier research into medical big data infrastructure. The project began by collecting a large volume of medical images from medical institutions all over Japan, through academic societies in multiple fields of medical diagnosis and treatment. With around 300 million images, this medical big data cloud platform is internationally unrivalled. The database has powered a substantial advance in AI analysis of medical images and remote medical care. In April 2022, the work of the responsible NII research group was recognized by the Ministry of Education, Culture, Sports, Science and Technology with an Award for Science and Technology. A paper on "nature-machine intelligence" in the MIT Technology Review, the world's oldest science and technology magazine, stated, "As of 2022, there was no practicable COVID-19 pneumonitis AI anywhere in the world." Yet, in fact, NII had developed such an AI tool; one that was even endorsed by the Japan Radiological Society.

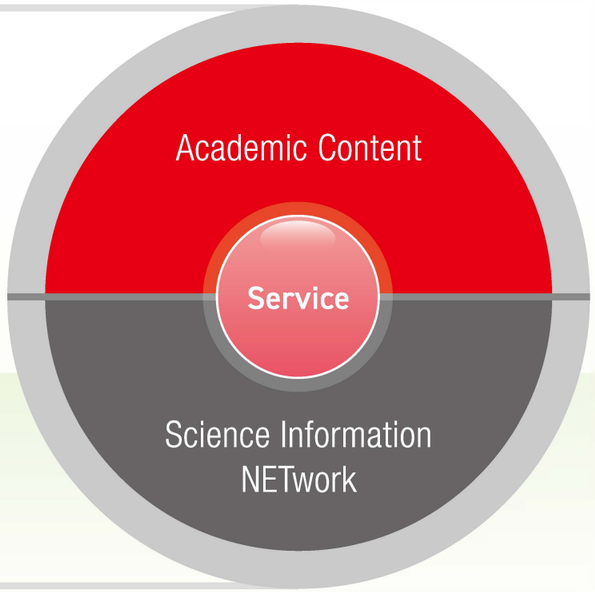
The key factor in successfully making such concrete contributions to a data-driven society, with a strong presence, is collecting massive amounts of data. And the essential requirements for this are an "eye" for data design and the spirit to keep on tackling new challenges. We look forward to seeing more NII breakthroughs in the years ahead.

May 2022

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 Systems is the only academic research institute in Japan dedicated to creating future value in informatics, a new academic field. From the basic theory of informatics to cutting-edge fields such as artificial intelligence, big data, internet of things, and information security, NII carries out long-term basic research as well as practical studies that attempt to address current social issues. Furthermore, NII is undertaking diverse services, including development and operation of the Science Information NETwork (SINET) and other essential scientific information infrastructures used by the entire academic community in Japan for research and education. It is also providing academic content and service platforms, as well as improving research data infrastructure. NII is thus committed to services based on leading-edge technologies through mutual feedback of knowledge obtained from those services and from academic studies. Through these activities, NII is committed to human resource development and social/international contribution, and conducts its operations with an emphasis on collaboration and cooperation between universities, research institutes, and private sector businesses in Japan and globally. Furthermore, NII is engaged in graduate education with the aim of fostering original world-class academic research and pioneering 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 institutes as well as research communities, NII builds and operates the Science Information NETwork (SINET). Leveraging the SINET network's ultra-high speed, high reliability, and multifunctionality, NII works to expand and provide an authentication federation platform, cloud adoption and utilization supports, and an academic content platform, as well as to promote open science and develop a next-generation scientific research digital platform. Furthermore, NII Security Operation Collaboration Services (NII-SOCS) contribute to building the framework enabling national universities and other academic institutions to respond quickly to cyber security 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 the management of the MOU/Non-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

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: SATO, Imari

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: ECHIZEN, Isao

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 16 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 990 universities and research institutes in Japan.

Director: URUSHIDANI, Shigeo (Vice Director-General, NII;Professor, Information Systems Architecture Science Research Division)
Vice Director: KURIMOTO, Takashi (Associate 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)
Vice Director: ISHIKAWA, Fuyuki (Associate Professor, Information Systems Architecture Science Research Division)

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 Strategic Cyber Resilience Research and Development
https://www.nii.ac.jp/en/research/centers/cyberresilience/

Leveraging the knowledge acquired from building and operating information security infrastructure for the Science Information NETwork, we pursue research on technology development and strategies for enabling the utilization of robust cyberspace environments and collaborate with universities on the training of highly skilled professionals to support this work.

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
(Assistant Director-General,NII; Professor, Digital Content and Media Sciences Research Division)

Research Center for Open Science and Data Platform
https://rcos.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)
Vice Director: KOMIYAMA, Yusuke (Associate 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 (Project Professor, Principles of Informatics 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 (Professor, Principles of Informatics Research Division)
Vice Director: YOSHIDA, Yuichi (Professor, Principles of Informatics 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 (SINET) built and operated by NII, and develops artificial intelligence (AI) that analyzes large collections of medical images to assist doctors with diagnosis.

Director: MORI, Kensaku (Visiting Professor, NII)
Vice Director: HARADA, Tatsuya (Visiting Professor, NII);
AIDA, Kento (General Manager, Cyber Science Infrastructure Development Department; Professor, Information Systems Architecture Science Research Division);
SATOH, Shin'ichi (Professor, Digital Content and Media Sciences 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, Atsuhiro
(Vice Director-General, NII; Professor, Digital Content and Media Sciences Research Division)

Research Center for Mathematical Trust in Software and Systems
http://group-mmm.org/eratommsd/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 (Professor, Information Systems Architecture Science Research Division)
Vice Director: ISHIKAWA, Yutaka (Professor, Information Systems Architecture Science Research Division)

Global Research Center for Synthetic Media
http://research.nii.ac.jp/~iechizen/synmediacenter/en

With a view to realizing an AI society focused on human beings, we promote research and development for generating synthetic media covering face, voice and various other modalities, detecting fake media, ensuring the media's reliability, and supporting decision-making.

Director: ECHIZEN, Isao (Director, NII; Professor, Information and Society Research Division)
Vice Director: YAMAGISHI, Junichi (Professor, Digital Content and Media Sciences Research Division)

Industry–Academia Collaboration

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) Vice Director: INUI, Kentaro (Visiting Professor, NII)

Contents

List of Researchers

As of August 1, 2022

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
Director
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
Director, Global Research Center for Big Data Mathematics
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.

Associate 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: Discrete algorithms; Combinatorial optimization; Matching theory; Market design
Research themes: Computational and mathematical aspects of matching theory, which is applied to, for example, university advancement selection systems and medical residency assignment systems. Design of efficient algorithms for avoiding improper participation and producing fair matching.

Professor
YOSHIDA, Yuichi
Vice Director, Global Research Center for Big Data Mathematics
Ph.D. (Informatics)

Specialties: Constant time algorithms; Constraint satisfaction problems; Discrete optimization; Spectral Graph Theory
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>

Project Associate Professor
AZUMA, Hiroo
Ph.D. (Science)

Specialties: quantum information, quantum optics, quantum cryptography
Research themes: Planning and production of online contents for lectures about quantum information theory. Research on implementation of quantum processors and measurement problem of quantum mechanics.

Associate Professor
SOEDA, Akihito
Ph.D.

Specialties: Quantum information theory. Quantum algorithms. Higher-order quantum information processing.
Research themes: Theoretical research on quantum information processing (QIP) to develop quantum algorithms addressing practically relevant problems while respecting the recent progresses of QIP devices/systems.

Project Professor
NEMOTO, Kae
Director, Global Research Center for Quantum Information Science
Ph.D. (Science)

Specialties: Quantum information and computation; Quantum optics; Theoretical physics
Research themes: Creation and discovery of new physics generated by quantum computers, and their applications. In addition, realizing a scalable quantum information system and elucidating the quantal essence that is held by such a system through constructing a theoretical basis of that scalable quantum information system and a dispersible quantum information system.

As of August 1, 2022

Principles of Informatics Research Division

<Intelligent Informatics>

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.

Project Associate Professor
YAMAGATA, Koichi
Ph.D. (Science)

Specialties: Quantum Statistics
Research themes:
Conducting research on quantum statistics, which is statistics applicable to systems that behave according to quantum mechanics. The aim is to efficiently estimate unknown quantum states, taking maximum advantage of the properties of quantum mechanical characteristics.

Associate Professor
INAMURA, Tetsunari
Ph.D. (Engineering)

Specialties: Human-Robot Interaction, Human Digital Twins, Cognitive Models
Research themes: Conducting research on robots that assist people in their living environments. In addition to robot-based physical assistance, working on cognitive human support using VR and digital twin technologies.

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.

Assistant Professor
KOBAYASHI,Taisuke
Ph.D. (Engineering)

Specialties: Intelligent robot/Reinforcement learning/Latent representation learning
Research themes:
Developing new machine learning methods for real-world intelligent robots, e.g. reinforcement learning to obtain controllers and latent representation learning of robotic systems from empirical data.

Professor
SATOH, 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.

Project Professor
SATO Taisuke
Ph.D. (Engineering)

Specialties: artificial intelligence, inference, probabilistic modeling
Research themes:
Logic-based artificial intelligence unified with probability working in vector spaces

Project Assistant Professor
JOO,Sungmin
Ph.D. (Informatics)

Specialties: Semantic Web, Knowledge Sharing Systems, Agricultural Informatics
Research themes: Research on ontology, and knowledge graph construction, and construction methods. Development of a common vocabulary necessary for data linking and integration, using Semantic Web technologies such as domain ontology and Linked Open Data.

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
Head, Advanced ICT Center
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. Towards safe and efficient contol of the Internet, we measure, analyze and model information flows on the Internet.

<Information Network>

Assistant Professor
AOKI, Shunsuke
Ph.D.

Specialties: Autonomous driving; Cyber-physical systems; Real-time embedded systems; Internet-of-things
Research themes:
Autonomous driving and real-time systems for autonomous mobile robots and computing platforms; also, task scheduling and allocation of computing resources, for the realization of "cyber-physical systems" in which computer components and the real world are deeply intertwined.

Professor
URUSHIDANI, Shigeo
Vice Director-General;
Director, Research and Development Center for Academic Networks
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 NII's original or academic-specific network functions and new services in collaboration with system vendors.

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

Specialties: Wireless communications; Radio resource allocation; Interference management; mobile networks; IoT communication systems
Research themes: Beyond 5G needs to support huge mobile data traffic, despite a severe spectrum crunch: radio resource allocation optimization for Beyond 5G; wireless access design for IoT massive connectivity.

Associate Professor
KURIMOTO, Takashi
Vice Director, Research and Development Center for Academic Networks
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
Director
Ph.D. (Engineering)

Specialties: Resource management; Quality of service; Mobile computing
Research themes:
Conducting researches on resource allocation and service quality control in wired and wireless networks for supporting high-quality, large-capacity and sustainable networking services.

Associate Professor
SAKANE, Eisaku
Ph.D. (Science)

Specialties: Authentication, Access Control
Research themes: Research on personal identification, authentication and authorization technology, operation management, and interoperability technology for the secure and efficient use of increasingly diverse online services. The aim is to build a more advanced federated authentication platform to facilitate a wide variety of academic research activities.

Professor
TAKAKURA, Hiroki
Director, Center for Strategic Cyber Resilience Research and Development
Ph.D. (Engineering)

Specialties: Cybersecurity; High-reliability networks; Anomaly detection, Organizational Resilience Management
Research themes: To achieve resilient organizational operations against cyber attacks, which have been becoming more sophisticated every year, by realizing technologies that prevent damage from attacks, mitigate the impact of damage through damage control, and ensure business continuity with degraded operations.

Assistant Professor
SHIMIZU, Sayako
Ph.D.(Informatics)

Specialties: Authentication and authorization; Information security; System operation technology; Data Science
Research themes: More reliable authentication required to provide various services, and technology for handling the information associated with it. At the same time, aiming to reflect the research result in NII's authentication-related services.

<Computer Architecture>

Professor
AIDA, Kento
General Manager, Cyber Science Infrastructure Development Department;
Director, Center for Cloud Research and Development
Vice Director, Research Center for Medical Bigdata
Ph.D. (Engineering)

Specialties: Cloud computing; IoT; Parallel and distributed 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.

Project Assistant Professor
KAWANO, Ryuta
Ph.D.

Specialties: Interconnection Networks, Deadlock-free Routing, High Performance Computing
Research themes:
Development of high-performance and highly expandable packet routing methods for inter-host networks on supercomputers and data centers that can achieve theoretically optimal communication performanc

As of August 1, 2022

Information Systems Architecture Science Research Division

Professor
KOIBUCHI, Michihiro
Ph.D. (Engineering)

Specialties: Computer system networks; interconnection networks; computer architecture
Research themes: The topic I work on is interdisciplinary research on networks using graph theory, system design, and photonics for parallel computers, such as network design using randomness and free-space optics.

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.

Professor
TAKEFUSA, Atsuko
Ph.D. (Science)

Specialties: Parallel and distributed processing; Cloud infrastructure technologies; IoT; Cyber-physical systems
Research themes: Building a new information platform that securely connects multiple computers in different environments ranging from mobile to cloud computing, thus making advanced analysis easier. Also, R&D on software that supports the development of a program for highly efficient IoT data collection and analysis, and on technology for building a computing environment using container-based virtualization.

<Software Infrastructure>

Project Assistant Professor
HIRASAWA,Shoichi
Ph.D. (Informatics)

Specialties: Computer Systems, Programming Language Systems, Auto-tuning
Research themes: Research on optimizing computer architectures, particularly to reduce routing delays in interconnection networks, and on optimizing whole computer systems with complex performance parameters by fast auto-tuning.

Professor
YONEDA, Tomohiro
Vice Director-General
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.

Professor
ISHIKAWA, Yutaka
Vice Director, Research Center for Mathematical Trust in Software and Systems
Ph.D. (Engineering)

Specialties: System software; Operating systems; Communication and File I/O middleware; Parallel and distributed processing
Research themes: The system software stack, such as operating system, communication and file I/O middleware, have become fatten and fatten. We review such a system software stack in order to build the next-generation system software for smart devices and server systems. The new system software stack will be constructively designed from the aspect of security and energy consumption.

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.

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.

Professor
HASUO, Ichiro
Director, Research Center for Mathematical Trust in Software and Systems
Ph.D. (Computer Science)

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

Project Professor
HU, Zhenjiang
Ph.D. (Engineering)

Specialties: Foundation of Computer Science, Software
Research themes: Research on programming languages and software engineering in general, and functional programming, bidirectional transformation, and domain-specific languages in particular.

Project Associate Professor
ARCAINI, Paolo
Ph.D.

Specialties: Search-based testing, autonomous driving, automatic repair, software product lines
Research themes: Research focuses on testing complex systems, as autonomous driving systems. Search-based approaches are designed to efficiently generate tests and tackle problems as the absence of precise oracles.

Digital Content and Media Sciences Research Division

<Software Engineering>

Associate Professor
ISHIKAWA, Fuyuki
Vice Director, Grace Center: Center for G-oba- Research in Advanced Software Science and Engineering
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.

Project Associate Professor
KATSUMATA, Shinya
Ph.D.

Specialties: "Programming language semantics Theory of computation and verification"
Research themes: Semantics is to study mathematical models of programming languages and systems. I have been working on categorical semantics and its applications to verification.

Project Assistant Professor
ZHANG, Xiao-Yi
Ph.D.

Specialties: Software Engineering; Autonomous driving systems; Machine learning engineering
Research themes: Software engineering for intelligent systems, such as testing and assessing approaches for autonomous driving systems or deep learning models, towards the design and use of dependable AI applications.

Project Assistant Professor
EBERHART, Clovis
Ph.D.

Specialties: Formal methods, semantics of programming languages, mathematical logic
Research themes: Most of my current research focuses on specification and verification, in particular for physical and cyber-physical systems, as well as systems with uncertainties.

<Foundations of Content Management>

Associate Professor
KATAYAMA, Norio
Ph.D. (Engineering)

Specialties: Data Management Technology for Video Corpus Analysis, Multimedia Data Analytics
Research themes: Efficient high-speed analysis of multimedia databases storing large amounts of video data. Pursuing applications to multimedia data analytics for TV archives.

Associate Professor
KOMIYAMA, Yusuke
Vice Director, Research Center for Open Science and Data Platform
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, Atsuhiro
Vice Director-General; Director, Global Research Center for Cyber-Physical Systems
Ph.D. (Engineering)

Specialties: Data engineering; Structural matching; Sequence data analysis
Research themes: Analytical technology for identifying and extracting underlying knowledge in series data such as large-scale text data and sensor data, as well as data management technology that makes efficient analysis possible.

Assistant Professor
NISHIOKA, Chifumi
Doktor der Ingenieurwissenschaften (Dr.-Ing.)

Specialties: Scholarly Communication, Open Science, Bibliometrics
Research themes: Research and development on open science platforms to promote publication and sharing of scholarly outcomes including academic publications and research data. Surveys and research to verify the effectiveness of open science platforms based on citation and other data.

<Text and Language Media>

Professor
YAMAJI, Kazutsuna
Director, Research Center for Open Science and Data Platform
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
Vice Director-General; Director, Research Center for Knowledge Media and Content Science
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.

Project Associate Professor
ABEKAWA,Takeshi
Ph.D. (Engineering)

Specialties: Natural Language Processing, Japanese Language Education, Information Retrieval
Research themes: Research based on natural language processing focused on applications to Japanese language learning support and information retrieval. Recently, research and development on the utilization of organized data, for building digital archives, visualization, and other purposes.

Professor
OYAMA, Keizo
Assistant Director-General; Director, Center for Dataset Sharing and Collaborative Research
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.

Digital Content and Media Sciences Research Division

Associate Professor
KANAZAWA, Teruhito
Ph.D. (Engineering)

Specialties: Information Access Technology, Bibliographic and Personal Identification, Machine Learning, Big Data Processing
Research themes: Supporting the daily activities of researchers through "smart navigation," which utilizes information retrieval, information identification, and information integration to actively provide information that matches the interests of users. Also pursuing the development of data and utilization environments that contribute to the institutional research capability analysis.

Project Assistant Professor
COOPER, Erica
Ph.D.

Specialties: Speech information processing; speech synthesis; machine learning
Research themes: Speech synthesis and voice cloning for low-resource languages and data scenarios; automatic quality assessment of synthesized speech; music synthesis.

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
Vice Director, Global Research Center for Synthetic Media
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.

Assistant Professor
ASANO, Yuta
Ph.D. (Engineering)

Specialties: Computer Vision Based on Optical-Physical Models, Computational Photography, Medical Image Analysis
Research themes: Image processing technologies that utilize physical-optical characteristics as feature quantities. Particular aims are the realization of image sharpening and depth estimation below the sea, especially the effects of light absorption and scattering, and technology to visualize diseased areas for medical diagnosis using light absorption and polarization.

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
Director
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
SATOH, Shin'ichi
Vice Director, Research Center for Medical Bigdata
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.

Project Assistant Professor
SHIMANO,Mihoko
Ph.D. (Information Science and Technology)

Specialties: Analysis of the physical properties of objects using computer vision technologies; Medical Image analysis; Analysis of cell characteristics
Research themes: Research on elucidating the physical properties of objects, such as composition and light propagation, using a 3D imaging technique that combines light source patterns and cameras. Also analyzing medical images and cell characteristics by elucidating complex scattering processes in biological samples and other complex structures.

Professor
SUGIMOTO, Akihiro
Assistant Director-General
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.

<Human and Knowledge Media>

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.

Project Assistant Professor
WANG, Xin
Ph.D. (Informatics)

Specialties: Speech information processing / speech synthesis / fake speech audio detection / machine learning
Research themes: Speech waveform model based on new theory of fusing classical digital signal processing and deep learning, and detection of speech-synthesis-based fake speech audio.

Associate Professor
ANDRES, Frederic
Ph.D., HDR (Habilitation à Diriger des Recherches)

Specialties: Mulsemedia; 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: Artifical Intelligence, Deep Learning, Unmanned Aircraft Systems Traffic Management
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.

As of August 1, 2022

Information and Society Research Division

<Information Use>

Professor
ARAI, Noriko
Director, Research Center for Community Knowledge
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.

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
ECHIZEN, Isao
Director;
Director, Global Research Center for Synthetic Media
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.

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
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.

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.

<Science Information>

Associate Professor
MIZUNO, Takayuki
Ph.D. (Science)

Specialties: Computational social science; Econophysics; Complex network science
Research themes: Creation of a field that fuses informatics and social science. Resolution of economic, international political, and social issues through bigdata analysis and large-scale simulations. Building sustainable social systems on the strength of information technology and economic power.

Associate Professor
SUN, Yuan
Head, NII Library
M.A. (Education)

Specialties: Educational Measurement; Psychological statistics; Test theory; Bibliometrics
Research themes: Cognitive diagnostic assessment for indiviaula learners based on learner and domain modelling, and support for personalized learning; Preprints on scholarly communication and Research evaluation

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.

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.

Assistant Professor
FURUKAWA, Masako
Ph.D. (Informatics)

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.

<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.

Professor
SATOH, Ichiro
Ph.D. (Engineering)

Specialties: OS and middleware for distributed systems including cloud computing and IoT
Research themes: Research on middleware-level techniques for reliable distributed systems, e.g., consistent data replication mechanism for multiple computers and software migration mechanisms between computers.

Executives (related to research)

See p.54 for the list of Executives.

Director-General
Director, Center for Robust Intelligence and Social Technology;
KITSUREGAWA, Masaru
Professor, NII;
Professor Emeritus, University of Tokyo

Acting Director-General;
Vice Director-General
SHINOZAKI, Motoshi
Professor, NII

Vice Director-General
Chief Cyber Science Infrastructure Director
YASUURA, Hiroto
Project Professor, NII;
Professor Emeritus, Kyushu University

GLO Acting Director
PLANAS, Emmanuel
Professor, NII;

Service Division

<Research Center for Open Science and Research Data Patform >

Project Assistant Professor
ASAOKA, Makoto
M.A.

Specialties: Media Informatics and Databases, Library Information Science, Humanistic and Social Informatics, Sociology
Research themes: Conducting research on research data publication and licensing from the perspective of data protection and protecting the rights of data providers. Also tackling the development of methods to securely share content that is difficult to publish due to issues of privacy protection or licensing.

Project Associate Professor
ONAMI, Jun-ichi
Ph.D. (Science)

Specialties: Information Retrieval/Open Science/Systems Genomics
Research themes: Integrating scholarly datasets across multiple fields with appropriate schemas. Involved in the information retrieval and the design of interfaces to provide a large-scale discovery service.

Project Assistant Professor
SHIMOYAMA, Takeshi
Ph.D. (Engineering)

Specialties: Research Data Management Platform Information Security(Cryptanalysis)
Research themes: Engaged in research and development related to research data management platform GakuNin RDM, especially research integrity.

Project Assistant Professor
NAGAOKA,Chikako
Ph.D.

Specialties: Online Learning Environment, Sharing and Utilizing Learning Content, Open Education
Research themes: Design and construction of an online learning environment with LMSs such as Moodle and a framework to support the sharing of learning contents and their utilization by other institutions.

Project Assistant Professor
HAYASHI, Masaharu
Ph.D. (Knowledge Science)

Specialties: Research on buliding research output publication infrastructure for academic institutions / Research on metadata sharing and utilization for research output
Research themes: Development of repository functions for publishing and utilizing research papers and research data. Research on provision and utilization of the repository function as a shared repository platform.

Project Assistant Professor
FUJIWARA, Ikki
Ph.D. (Engineering)

Specialties: Computer Architecture, Distributed Systems, Cloud Computing
Research themes: Working on data analysis services and research reproducibility services integrated in the NII Research Data Cloud.

<Center for Coud Research and Deveopment>

Project Associate Professor
OE, Kazuichi
Ph.D. (Information Science)

Specialties: Computer System/Analysis of workloads/Replacement Algorithm
Research themes: By allocating resources for DRAM, non-volatile memory, SSD, and HDD according to the characteristics of each application, I will research computer system with high cost performance.

<Center for Robust Intelligence and Social Technology>

Project Professor
HIROSE, Keikichi
Ph.D. (Engineering)

Specialties: Spoken language information processing
Research themes: Speech synthesis, speech recognition, dialogue system, pronunciation training system, etc. With a special focus on speech prosody. Currently, activities are mostly research advices.

<Research Center for Medica Bigdata>

Project Associate Professor
MURAO, Kohei
Ph.D. (Engineering)

Specialties: Medical image processing/Diagnosis support/Computer Aided Detection and Differentiation/Cloud platform construction and maintenance
Research themes: Medical imaging for abnormality detection, differentiation, severity estimation, etc. The establishment and maintenance of the cloud platform for the development of these technologies.

<Center for Strategic Cyber Resilience Research and Development>

Project Assistant Professor
HASEGAWA, Hirokazu
Ph.D. (Information Science)
Specialties: Cybersecurity, Information Networks
Research themes: Research on security technologies to counter cyberattacks. Pursuing research and development on technologies for automatically designing, and recommending to managers, effective countermeasures to mitigate damage in the event of a cyberattack, with an emphasis on business continuity.

Project Assistant Professor
LIU, Jia
Ph. D.

Specialties: Information Security; Wireless Communications Engineering; System Information Science
Research themes: Physical Layer Security in Wireless Communication Systems; Large-scale Wireless Network Performance Modeling; Resilient Air-Space-Ground Integrated Networks; Game Theory for Network Economics

<Research and Deveopment Center for Academic Networks >

Project Professor
AKASHI, Osamu
Ph.D. (Science)

Specialties: Distributed Computing/Network Management/Network Architecture
Research themes: The Internet is a huge distributed system and its stability is essential. This research focuses on autonomous and cooperative network management through feedback based on analysis of network behavior.

Project Associate Professor
KITAGAWA,Naoya
Ph.D. (Information Science)

Specialties: Network Systems, Information Networks, Information Security
Research themes: Pursuing research and development on highly reliable, secure systems, including the design of low-load, low-latency systems and the development of effective security measures that take into account the real-world operating conditions of various network services.

Project Professor
SASAYAMA, Koji
Ph.D. (Engineering)

Specialties: Telecommunication Network, Mobile Network, Photonic Network
Research themes: Research and development of mobile services in the academic network SINET, especially research and development on 5G mobile network and private 5G network construction.

<Research Center for Community Knowedge >

Project Associate
MASUKAWA, Ryuji
Information Mathematics

Specialties: Software, Intelligent Informatics, Information Security
Research themes: Visualization of performance information, research results, etc., of researchers. Web software development and deployment of machine learning. Support of network-based collaborative activities.

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

Project Professor/ Professor Emeritus, NII
HONIDEN, Shinichi
Director of the center
Ph.D. (Engineering)
Specialties: Software Engineering, Agent Engineering, Self-adaptive Engineearing
Research themes: We assume that Software(S) satisfies Requirement(R) on the condition of Domain(D). My research aim is how to design the software architecture to modify S by itself to adjust the change of R or D.

* Project professors, project associate professors, and project assistant professors may not be listed in this catalog, in accordance with their wishes or for other reasons.
List of Project Researchers : https://www.nii.ac.jp/faculty/list/project-profs/
List of Project Researchers : https://www.nii.ac.jp/faculty/list/visiting-profs/

Research

Major Project Involvement

Japan Science and Technology Agency (JST) PRESTO: Future Led by IoT

Security and Privacy for Cooperative Autonomous Vehicles

Principal investigator: AOKI, Shunsuke, Assistant Professor, Information Systems Architecture Science Research Division

While the development of technologies for autonomous vehicles that make use of various IoT sensors and communication devices has advanced rapidly, little progress has been made in utilizing the real-time data and stored data from IoT sensors in such systems. The main reason is that since autonomous vehicle systems are equipped with cameras, GPS receivers, and many kinds of sensors such as LiDAR, they collect privacy-sensitive information about people around the vehicle during operation. Furthermore, since autonomous vehicles are IoT control systems that put human life at risk directly, a high level of reliability and safety must be assured at all times. It is therefore difficult to design a system that takes data utilization fully into account.

To solve this problem and thus enable the use of autonomous vehicles as a sensor data collection platform for a future society, this PRESTO research proposal tackles the "development of a cooperative autonomous vehicle with safe data sharing." The project focuses on three specific research themes: (1) secure sensor data sharing technology with infrastructure-side IoT devices and other vehicles; (2) cooperative driving technology to avoid collisions and deadlocks of multiple autonomous vehicles for high reliability; and (3) a privacy protection mechanism to ensure that autonomous vehicles can be used as a secure data collection platform. Like this, the study aims at developing and designing autonomous vehicle systems capable of safely, securely, and reliably sharing data and cooperating with infrastructure-side IoT devices, other vehicles in the vicinity, and remote general users.

The study is expected to construct an autonomous vehicle system that shares driving data and sensor data in real time and dramatically improves not only the safety of the system itself, but also the overall safety and convenience of urban transportation, as well as the comfort and living environment of urban life.

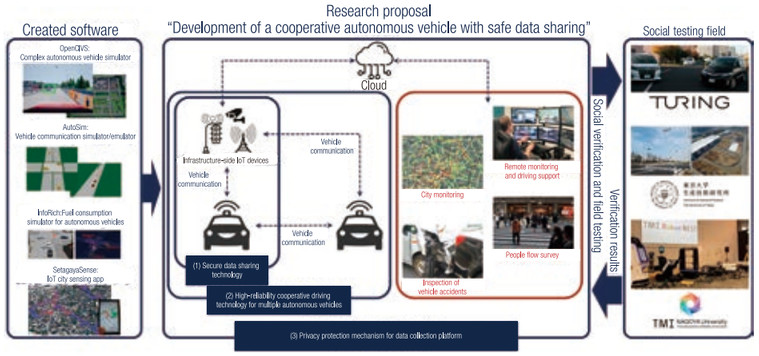


Fig. Developing a cooperative autonomous vehicle with data sharing for the creation of new urban applications

JST CREST: Society 5.0 System Software Creation of System Software for Society 5.0 by Integrating Fundamental Theories and System Platform Technologies

Zero Trust IoT by Formal Verification and System Software

Principal investigator: TAKEFUSA, Atsuko, Professor, Information Systems Architecture Science Research Division

In Society 5.0, sensor data from security cameras, indoor and outdoor environmental sensors, industrial robots, and a wide range of other IoT devices will be collected and stored in clouds. The data will also be processed by AI, which is expected to create new value, e.g., increasing the quality of life, monitoring nature, preventing and mitigating disaster, and making urban environments more efficient. However, such IoT systems are facing a variety of cybersecurity threats. Enormous damage to public infrastructure has been reported in some cases. This study aims to realize a secure IoT system in accordance with the concept of Zero Trust (ZT-IoT), by the fusion of theoretical research and system software research. Zero Trust is a cybersecurity design methodology in which computers and data are protected without relying unconditionally on VPNs, firewalls, and other security measures, but protected by continuously monitoring, assessing, and improving security measures. This study enables the development of highly secure Zero Trust-based IoT systems, through the fusion of formal verification and system software technologies. The theoretical research will provide mathematical proofs for validating the trust chain of the IoT system and establish a new formal verification technique that works together with dynamic verification techniques to counter undiscovered threats. The system software research, on the other hand, will realize the security of the ZT-IoT system by developing execution isolation, automatic detection, and automatic countermeasure techniques to support the above trust chain in conjunction with the theoretical findings. Furthermore, the security of ZT-IoT will be assured in an accountable manner, to promote the social acceptance of IoT systems and to contribute to the realization of Society 5.0.

https://zt-iot.nii.ac.jp/en/

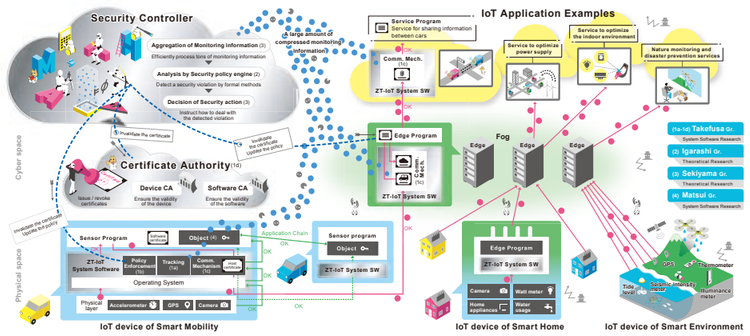


Fig: Overview of Zero Trust IoT system

JST CREST: Team-type research to produce excellent achievements leading to scientific and technological innovation

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

Trust Interaction Design for Convincing Human-AI Cooperative Decision Making and its Social Penetration

Principal Investigator: YAMADA, Seiji, Professor, Digital Content and Media Sciences Research Division

AI systems often make mistakes, due to the algorithms they use, the quality and quantity of data and knowledge, and biases. However, due to their own preconceptions and biases, most end-users are unable to properly assess AI performance, so they tend to either straightforward believe or reject the solutions output by AI. The latter phenomenon, known in cognitive science as "algorithm aversion," is an essential problem in human-AI cooperative decision-making, and solving it is a major challenge for achieving trustworthy AI. Solving this problem and optimizing the performance of human-AI cooperative decision-making cannot be easily achieved by just improving the performance of AI itself, as was done in the past. It is necessary to optimize trust so that AI performance can be accurately estimated through interaction between humans and AI.

In light of this, this project aims to develop a theory of trust interaction design in which AI detects a breakdown in the trust relationship (over-trust or under-trust) based on cognitive biases and values, and adaptively issues calibration cues to prompt trust calibration, thereby optimizing the trust relationship and increasing the sense of confidence. A further aim is to achieve social diffusion of this method through medical checkups.

In human-AI cooperative decision-making, humans repeatedly decide whether to take a decision themselves or leave it to the AI. The trust calibration AI calculates the trust of human and AI based on the trust model and compares the rational choice determined from the trust magnitude relationship and the actual human choice, to detect whether there is over-trust or under-trust. If a trust breakdown is detected, a calibration cue to prompt a trust calibration is indicated. In response to the calibration cue, a human takes the initiative of performing a trust calibration. In this way, humans can build optimal trust with a sense of confidence.

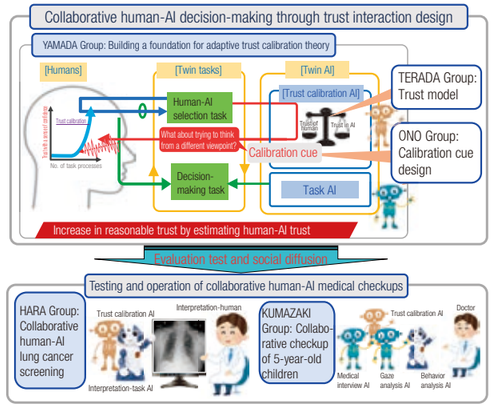


Fig: Trust interaction design and its applications

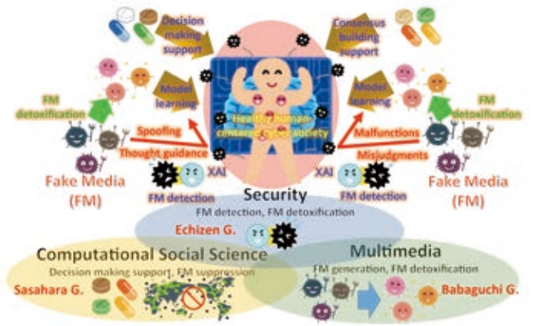
[Reliable AI Systems] Core Technologies for Trusted Quality AI Systems

Social Information Technologies to Counter Infodemics

Principal Investigator: ECHIZEN, Isao (Professor, Information and Society Research Division; Director, Global Research Center for Synthetic Media)

This research aims to establish social information technologies that support diverse communication and decision-making, while dealing appropriately with the potential threats posed by AI-generated fake media (FM). Specifically, while we work to detect and defend against advanced attacks by FM through various AI-generated modalities, such as fake images, fake voices and fake documents, we will establish social information technologies that promote human decision-making and consensus building by actively incorporating various reliable media, and that lead to enhanced human immunity in cyberspace. In this research, we will address three types of AI-generated FM. In particular, we will focus on (1) media clone (MC) type FM, which is infinitely close to but not quite real; (2) propaganda (PG) type FM, which is generated by deliberately editing the real media for the purpose of manipulating public opinion; and (3) adversary example (AE) type FM, which is difficult for humans to identify and is generated for the purpose of causing AI technology to malfunction or misjudge. Our aim is to establish technologies to generate and detect these three types of FM. Furthermore, we will study "detoxification", which consists of utilizing FM as normal media after processing it to prevent people being led toward false thoughts, as well as to prevent the FM from causing malfunction and misjudgment. Using these technologies, we will construct an experimental social media platform that presents information to support decision-making. We will then test and verify that platform through behavioral experiments involving approximately 1,000 people.

http://research.nii.ac.jp/~iechizen/crest-e.html



Major Project Involvement

JST-Mirai Program "Super Smart Society (Society 5.0)" mission area

Prioritized Theme: Modeling and AI that Connects the Cyber and Physical Worlds

Engineerable AI Techniques for Practical Application of High-Quality Machine Learning-based Systems

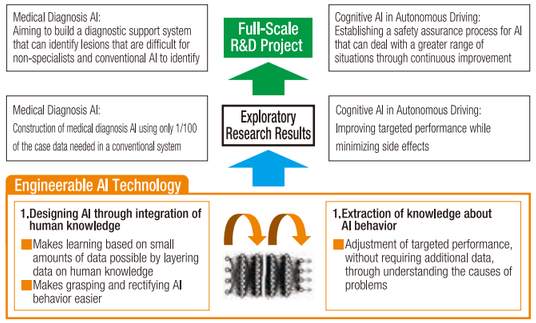
Principal Investigator: ISHIKAWA, Fuyuki (Associate Professor, Information Systems Architecture Science Research Division)

High expectations are placed on the application of Artificial Intelligence (AI) in various fields because it can find regularities hidden within a large amount of data, which can then be used for classification, predication, and anomaly detection. However, since conventional AI requires a large amount of data for training, it is difficult to deal with cases in which only a small amount of data can be obtained or where modifications are required. For example, when AI is used in the healthcare field, a problem is likely to arise since it easily overlooks atypical lesions, for which it is difficult to obtain a large amount of data. In addition, when errors have occurred in road sign recognition in autonomous driving using AI, it takes an enormous amount of time to correct the errors. In order to apply AI to critical fields like healthcare and autonomous driving, the solving of these issues becomes an urgent task.

We are therefore aiming to establish a new general-purpose fundamental technology called "Engineerable AI (eAI)" to build up and enhance the safety and reliability of AI. In contrast to conventional AI based on learning and repetitive correction through the use of large amounts of data, eAI is a technology that guarantees and corrects AI operations by extracting and analyzing not only the technologies used in constructing AI that reflect human knowledge, but also factors that cause AI errors.

This research and development project is expected to bring into realization a diagnostic support system that can detect atypical lesions, even with a limited amount of data, thus contributing to alleviating the shortage of medical specialists and rectifying the irregular quality levels in healthcare. In the case of autonomous driving, the ability to extract and target specific AI performances that need to be corrected will reduce the time required for system development and contribute to the improvement and assurance of safety in autonomous driving. Our aim is to demonstrate the effectiveness of eAI in solving problems in healthcare and autonomous driving and contribute to the establishment of internationally competitive production technology incorporating eAI.

Figure: Project overview

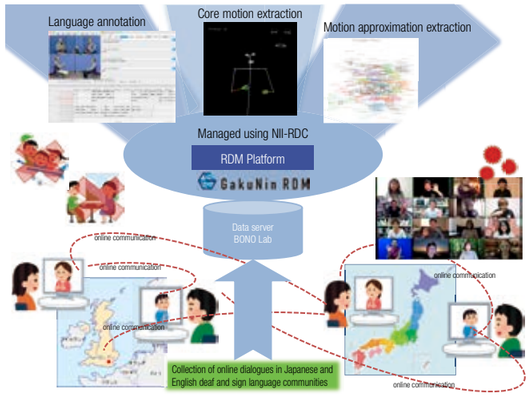


Japan Society for the Promotion of Science (JSPS): International Joint Research Program with the U.K. (JRP-LEAD with UKRI)

Understanding cross-signing phenomena in video conferencing situations during and post-COVID-19

Principal investigator: BONO, Mayumi, Associate Professor, Information and Society Research Division

This study analyzes the improvisation and change of sign language communication styles in the context of videoconferencing systems, focusing on how deaf people living in different regions and countries modify and simplify their languages (e.g., translanguaging) when they engage in cross-signing (communication between deaf people who do not share the same sign language, achieved through a simple impromptu sign conversation). The scientific value of this study is in understanding how native sign language speakers have been affected by the dramatic changes in communication environment arising from the COVID-19 pandemic. This situation is an unusual case of the rapid penetration of information technology into communities that use a specific language (e.g., a sign language) and is significant from the viewpoint of cultural and linguistic anthropology, particular in view of the likelihood of humans encountering a similar situation in the future. The originality of this project lies not only in the pioneering nature of the linguistic research, aimed at investigating changes in linguistic practices in online videoconferencing, but also in the development of new AI techniques for generating sign language corpora. The 3D information and body movement information obtained using deep learning will be distributed to the sign language research community to promote further interdisciplinary research on sign languages and informatics. Specifically, this study involves interview surveys, extensive questionnaire surveys, linguistic analysis, and interaction analysis, both in Japan and the U.K. An online sign language dialogue corpus will be created and movements will be detected and annotated using AI techniques. The data collected in this study will be managed in the NII Research Data Cloud (NII RDC), with the aim of making parts of it available for academic use



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 (FY2021)

	No. of applications accepted	Amount (in thousands of yen)
Project Leader (Principal Investigator)	69	397,950
Co-investigator (Other institutions → NII)	59	84,988

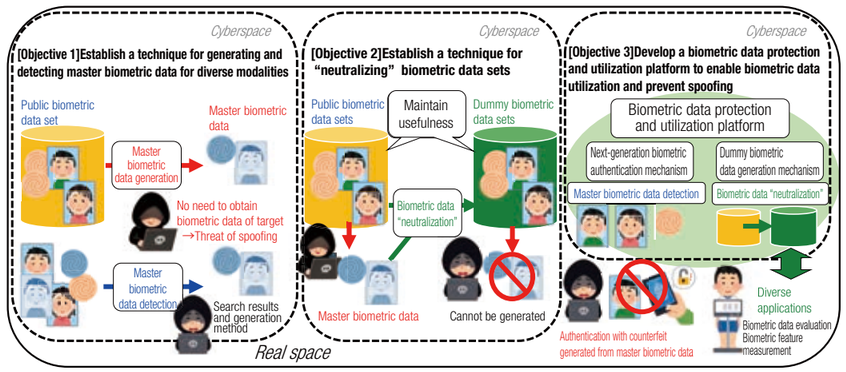
[Model Cases of Research Funded by Kakenhi]

Grant-in-Aid for Scientific Research (A)

Research on master biometric information protection and utilization platform

Principal Investigator: ECHIZEN, Isao, Professor, Information and Society Research Division

With the proliferation of high-performance cameras and microphones, biometric data defining human faces, voices, gaits, fingerprints, veins, irises, and other characteristics can now be captured and recorded remotely and shared in cyberspace. This poses the threat of "spoofing," i.e., breaches of biometric authentication to commit fraud or identity theft. For this kind of spoofing, it was previously necessary to restore the biometric data of a person from the captured image or recorded audio, but now with advances in machine learning, it is possible to generate biometric data that can be recognized as matching multiple persons from publicly available biometric data sets (i.e., master biometrics) without restoring biometric data of a specific person. This study aims to establish a biometric data protection and utilization platform that prevents spoofing by detecting master biometric data while at the same time continuing to guarantee the usefulness of biometric data sets used to generate such information and "neutralizing" the inherent threat posed by biometric data sets.



Grant-in-Aid for Scientific Research (A)

Explainable next-generation media forensics technologies based on fake media detection and automatic fact verification

Principal Investigator: YAMAGISHI, Junichi, Professor, Digital Content and Media Sciences Research Division

In the current age of "infodemics," fake media in the form of video, audio, and text that resemble the real thing can be generated easily with machine learning, resulting in floods of fake news and other inaccurate information. To counter this threat, this study proposes a pioneering next-generation media analysis technology to help ensure the publication of accurate media and information and support effective decision-making. It firstly proposes a liveness detection method that improves the explanatory power of authenticity judgments by identifying and indicating the falsified areas and methods of fake media as evidence. Next, the study proposes a new detection method that, in principle, incorporates the ability to deal with unknown fake media generation methods, so that the method is capable of robustly dealing with constantly changing media generation techniques. An approach to learning this detection method is also suggested. Additionally, the study aims to make advances in automatic fact verification, for automated fact checking, and to integrate this with media analysis technology.

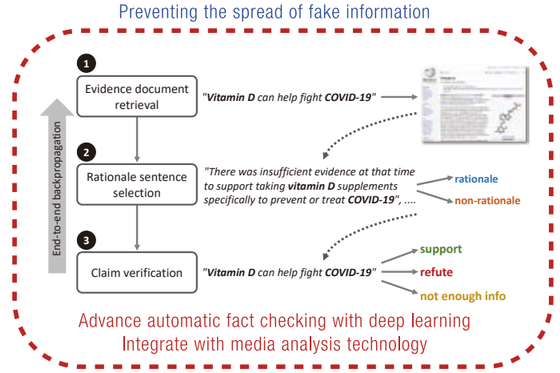


Fig: Framework for automated fact-checking based on deep learning

Kakenhi

Grant-in-Aid for Scientific Research (A)

Robust AI by integration of knowledge representation and machine learning

Principal Investigator: INOUE, Katsumi,
Professor, Principles of Informatics Research Division

In Artificial Intelligence (AI) research, pattern recognition capabilities have improved dramatically in recent years, thanks to advances in the development of machine learning (ML). However, for advanced intelligence tasks involving symbolic processing, knowledge representation and reasoning (KR) have been used. This study integrates the two technologies of ML and KR, which up to now have been studied independently, to establish a technological foundation for building a next-generation AI system that is both explainable and robust. For this purpose, three research goals were set: (1) to improve the explainability and updatability of ML methods by deploying KR techniques; (2) to develop robust KR methods supported by ML techniques; and (3) to develop groundbreaking AI applications through the integration of ML and KR.

Grant-in-Aid for Challenging Research (exploratory)

Exploration of super multi-view construction techniques for creating light fields in a real space in which visual obstacles are cancelled out

Principal Investigator: KODAMA, Kazuya,
Associate Professor, Digital Content and Media Sciences Research Division

Although plagued by pillars and walls that greatly obstruct views, cramped multitenant buildings have been diverted as inexpensive community spaces, becoming sustainable centers of community that powerfully support new countercultural activities such as theater, music, and film—from longstanding live music venues to theaters where numerous idol groups have been nurtured. Now, in the new era of social distancing required for pandemic control, it is essential to resolve these visual problems to enable more efficient use of compact urban spaces by further recycling cramped city spaces. This study sets out to construct a super multi-view system for freely inputting and outputting light rays through the space in front of and behind shielding objects, for the purpose of achieving a virtual transparency of visual obstacles.

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

Modeling of the motor recovery process and optimization of rehabilitation strategy using VR

Principal Investigator: INAMURA, Tetsunari
Associate Professor, Principles of Informatics Research Division

Rehabilitation for motor dysfunction has involved a lot of subjective elements and estimations on the part of physical therapists, who formulate rehabilitation policies by predicting the recovery conditions of the patients' physical functions. This research aims to realize a system that provides an optimum rehabilitation program in response to the individual patient's conditions by optimizing the interaction process between the physical therapist and the patient.
Our goal is to model the rehabilitation process Y=f(X), where the rehabilitation strategy f is applied to the current motor function state X – the current motor disability – to change the current motor function state into the desired motor function state Y.
We can expect physical therapists to decide on highly effective rehabilitation strategies with the proposed rehabilitation process model.

Grant-in-Aid for Scientific Research (A)

Researches on Model-aided Learning Approaches for Reliable Realtime Control in Future Wireless Systems

Principal Investigator: JI, Yusheng
Professor, Information Systems Architecture Science Research Division

To support advanced applications and intellectual innovation in the Super-smart Society, it is necessary to further enhance the functionality, performance and reliability of the information and communication service infrastructure. Using conventional model-based approaches, it becomes more and more difficult to solve the centralized and/or distributed control problems in multidimensional space of dynamically configured wireless systems. In this research, we study signal processing, resource allocation, interference mitigation, autonomous access control, and mobility control problems in wireless communication systems, by means of integrated approaches based on mathematical models and machine learning. By comprehensively considering spatio-temporal constraints on network resources and seamlessly coordinating communication, computation, storage, and control functions, we aim to achieve highly reliable real-time processing capability at an end-to-end basis.

Grant-in-Aid for Early-Career Scientists

Prevention from Automated Analysis Services with Object-Level Adversarial Examples

Principal Investigator: LE, Trung-Nghia
Project Assistant Professor, Information and Society Research Division

Data analysis services are typically trained on images crawled from social networks without authorization. As a result, users need solutions to protect their privacy. Conventional adversarial examples are applied to entire digital images to protect contents, but it leads to unnatural results in human vision. Results also are fragile and easily disabled by transformations and compression during sharing and storing. This research aims to explore object-level adversarial examples to protect the private information of users from data analysis services when they upload and share photos to social networks. We plan to against object localization, landmark recognition, and vision-language systems to prevent analyzing users' information without authorization. We expect our solutions to automatically identify manipulable regions in images to minimize the effect on image quality, make protected images look inconspicuous, and appear natural to human vision.

Grant-in-Aid for Scientific Research (B)

Study on Distributed Consensus by Using Synchronizing Vibration

Principal Investigator: SATOH, Ichiro
Professor, Information and Society Research Division

We will try to make distributed consensus more efficient by using a mechanism inspired from synchronization phenomena in vibrating systems in nature (e.g., the synchronization of the expansion and contraction cycle of the heart muscle and the transmission cycle of fireflies) into distributed systems. Distributed consensus serves as the basis for a variety of existing distributed algorithms, but it is known that the cost of reaching consensus increases significantly when multiple computers simultaneously demand consensus be reached, while simultaneously making other demands, because that many demands at one time cause the distributed consensus processing to be reworked. On the other hand, since most distributed consensus approaches tend to repeat multicast communication and replies to it in a sequential manner, thus resembling synchronization phenomena in vibrating systems in nature, we will propose and implement a method to introduce the synchronization mechanism in nature into distributed systems and will evaluate the proposed approaches.

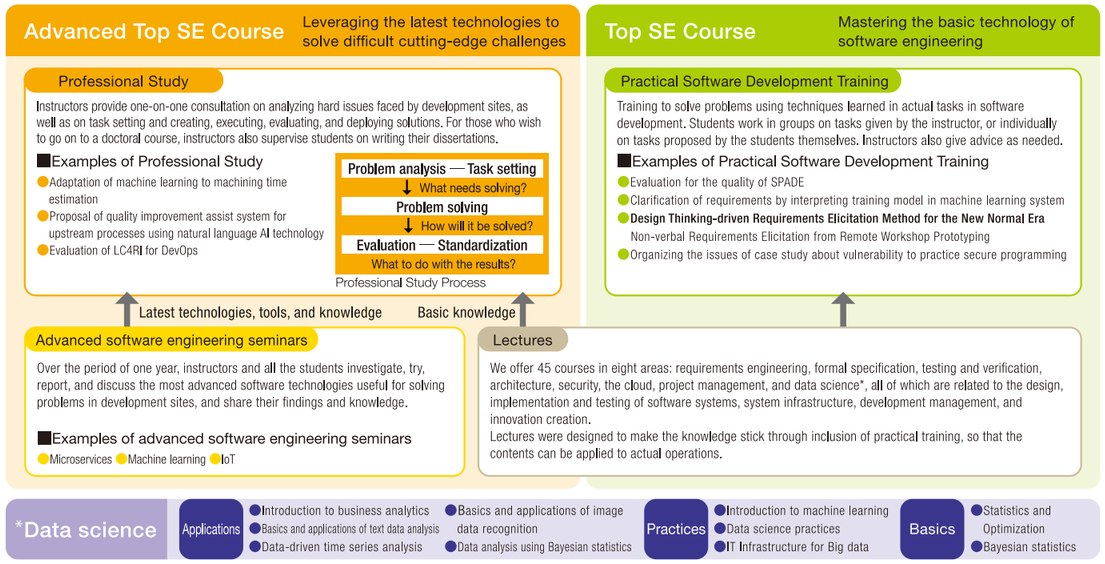
Human Resource Development

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.

We launched the Data Science Series, starting from the 2021 academic year. This is designed to provide a wide range of courses that, along with dealing with machine learning as a technology, also focus on its underlying statistics, its business applications, and domain-specific content.



Collaboration with Overseas Universities: UCL Training

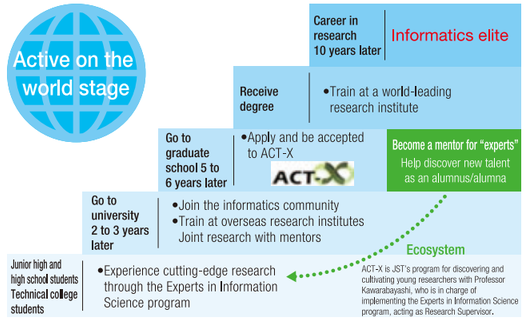
In the eighth session (from October 29 to November 2, 2018), one engineer from each of the nine sponsoring companies joined a group of five to six students at University College London (UCL) to undergo project-based learning training in which they, as a team, designed and developed requirements for AR collected from doctors, including 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

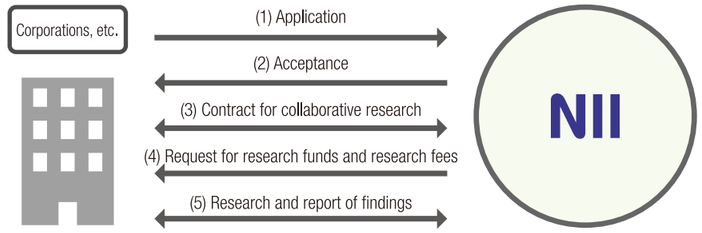
In April 2020, NII launched the Experts in Information Science program under the Global Science Campus (GSC) sponsored by the Japan Science and Technology Agency (JST), in collaboration with the Information Processing Society of Japan (IPSJ) and the Japanese Olympiad in Informatics (JOI). This is a program designed to provide junior and senior high school students and technical college students, who have excellent abilities in the field of informatics, with opportunities to come into contact with front-line research in informatics and to cultivate their knowledge and research skills within that field.
Young researchers representing Japan, such as ACT-I and ACT-X researchers, will act as mentors to provide research guidance and advice to more than 40 junior and senior high school students and technical college students from all over Japan, who were selected from the general public through NII and the Information Processing Society of Japan, as well as from among those recommended by the Japanese Committee for the International Olympiad in Informatics. In the first stage of the training process, the students will learn online about research in state-of-the-art information science. In the second stage, they will conduct research under the guidance of mentors. Even after they go on to university, we will continue to follow up with those students who have made significant achievements, such as through publishing papers and other activities. We are also considering providing opportunities for such students to conduct research for a certain period of time at overseas research institutions.



Future of the Experts in Information Science program and framework for building an ecosystem

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 Projects with Private-sector Institutions]

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.

Projects Performed (FY2021)

	No. of projects accepted	Research funds received (in thousands of yen)
FY2019	51	272,759*
FY2020	58	186,603
FY2021	56	193,051*

*Includes expenses by collaborative research units.

[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 collaborations and advancements in research subjects, mainly 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

This open collaborative research program accepts applications mainly from researchers affiliated with institutions in Japan, researchers with a wide range of affiliations can become collaborative researchers, including faculty members of universities and institutions in Japan and abroad, technical colleges, researchers at private-sector corporations, as well as graduate students. We encourage everyone to take advantage of this open collaborative research program and take a new step forward.

Applications Accepted (FY2021)

	No. of applications accepted
Strategic research proposals	23
Proposals for research project meetings	3
Open subject proposals	15
Total	41

[List of Strategic Research Themes (13 themes)]

1. Proposal for a study to overcome the crisis caused by the COVID-19 pandemic
2. Proposal for an innovative platform function and application services utilizing the Science Information NETwork (SINET5)
3. Proposal for cybersecurity analysis technology utilizing NII-SOCS data
4. Proposal for a method to introduce a research data platform at universities to move into the age of open science
5. Proposal for building a "dataset" to act as a research resource and the platform for utilizing
6. Proposal for CPS/IoT services for greater efficiency in social activities and sytem infrastructure design
7. Proposal for an innovative model and algorithm that approximates human-like semantic understanding
8. Proposal for a technology for quality assurance of a machine learning application system
9. Proposal for technologies regarding UI for artificial intelligence and Explainable AI
10. Proposal for an innovative model and algorithm toward deeper utilization of cultural properties
11. Proposal for technologies related to education and IT, and utilization of learning data
12. Proposal for core technologies for the next-generation Internet
13. Proposal for technologies and methods to promote digital innovation in educational research

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 2022)

No. of Reports		
293	Ownership: Organization	278
	Ownership: Individual	15

No. of Applications		
334	Japan	278
	Outside Japan	56

No. of Registrations		
144	Japan	111
	Outside Japan	33

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	KOIBUCHI 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	●	5590068
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	KAWARABAYASHI 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
Distance measuring method and radar device	HASHIZUME Hiromichi	●	6029287
State detection of superconducting qubits using light	NEMOTO Kae		6029070
Optical parametric oscillator, and random signal generator and Ising model calculator using the same	YAMAMOTO Yoshihisa		6029072
Word-order rearrangement device, translation device, method, and program	MIYAO Yusuke		6040946
Signal processing apparatus, method, and program	ONO Nobutaka		6005443
Spoken language evaluation device, parameter estimation device, method, and program	ONO Nobutaka		6057170
Signal processing apparatus, signal processing method, and computer program	ONO Nobutaka	●	6099032
Interactive information search device using gaze interface	KANDO Noriko	●	6099342
Face-detection prevention device	ECHIZEN Isao	●	6108562
Legal reasoning presentation method, legal reasoning presentation system, and program	SATOH Ken	●	6112542
Ising model quantum computing device and Ising model quantum computing method	UTSUNOMIYA Shoko		6143325
Word-order rearrangement device, translation device, translation model learning device, method, and program	MIYAO Yusuke		6083645
Doppler imaging signal transmitter, Doppler imaging signal receiver, Doppler imaging system, and method	HASHIZUME Hiromichi	●	6179940
Gray image encoding apparatus and decoding apparatus	CHEUNG Gene	●	6188005
Flip-flop circuit	YONEDA Tomohiro	●	6210505
Initialization method for superconducting qubits	NEMOTO Kae		6230123
Generation model creation device, estimation device, and the methods and programs thereof	ONO Nobutaka		6241790
Ising model quantum computing device, Ising model quantum parallel computing device, and Ising model quantum computing method	UTSUNOMIYA Shoko		6255087
Ising model quantum computing device	YAMAMOTO Yoshihisa		6260896
Adaptive positioning interval setting system, adaptive positioning interval setting method, behavior model calculation device, and behavior model calculation program	TAKASU Atsuhiro		6253022
Quantum key distribution system and quantum key distribution method	YAMAMOTO Yoshihisa		6257042
Audio signal processing apparatus and method	ONO Nobutaka		6278294
Computation using a network of optical parametric oscillators	UTSUNOMIYA Shoko		6300049
Saliency image generating apparatus, method, and program	SUGIMOTO Akihiro		6318451
Network system for information processing equipment	KOIBUCHI Michihiro	●	6325260
Data cache method, node device, and program	URUSHIDANI Shigeo		6319694
Natural language reasoning system, natural language reasoning method, and program	MIYAO Yusuke	●	6327799
Virtual state definition device, virtual state definition method, and virtual state definition program	URUSHIDANI Shigeo		6332802
Coupon system	AIHARA Kenro		6347383
Magnetic resonance equipment	NEMOTO Kae		6347489
Streaming distribution system	CHEUNG Gene		6367030
Light generating device and light generating method	BYRNES Timothy	●	6376697
Rehabilitation support device and method of operating rehabilitation support	INAMURA Tetsunari	●	6381097
Ising model quantum computing device	UTSUNOMIYA Shoko		6429346
Information processing apparatus and information processing method	KAWARABAYASHI Ken-ichi		6445246
Object region identification method, apparatus, and program	SATOH Shin'ichi		6448036
Sugar chain compound and method for producing sugar chain compound	SATOH Hiroko		6455857
Image processing apparatus, image processing method, and recording medium	SATO Imari		6471942
Network design apparatus and program	TAKEDA Hideaki		6475966
Biological detection device, biological detection method, and program	YAMAGISHI Junichi	●	6480124
Noise addition device and noise addition method	ECHIZEN Isao		6501228
Computer system for unsupervised speaker adaptation of DNN speech synthesis, and the method and program implemented in the computer system	YAMAGISHI Junichi	●	6505346
Virtual currency management program and method	OKADA Hitoshi		6544695
Network control device, network control method, and network control program	KURIMOTO Takashi		6550662
Information extraction apparatus, information extraction method, and information extraction program	SAKAMOTO Kazunori	●	6562276
Word rearrangement learning device, word rearrangement device, method, and program	MIYAO Yusuke		6613666
Observer detection device, method, program, and computer-readable recording medium	KONISHI Takuya		6614030
Digital holographic recording device, digital holographic reproducing device, digital holographic recording method, and digital holographic reproducing method	SATO Imari		6628103
Image processing apparatus, image processing method, and program	ZHENG Yinqiang		6671653
Image processing apparatus and method, image processing program, and projection device	SATO Imari		6757004
Sound source separation device	ONO Nobutaka		6763721
Image processing apparatus and method	BISE Ryoma	●	6799331
A control program and recording medium of the optical ultrasonic imaging method and apparatus, and ultrasonic wave imaging apparatus	BISE Ryoma	●	6799321
Computing apparatus, program and method for coupled oscillator systems	UTSUNOMIYA Shoko		6803026
In the Ising-model computing device	UTSUNOMIYA Shoko		6818320
Information transmitting apparatus, information receiving apparatus, information transmission system and program, positioning system, luminaire and lighting system	HASHIZUME Hiromichi		6847411
Network evaluation method, evaluation apparatus and program	KURIMOTO, Takashi		6875702
A control program and recording medium of the image processing apparatus and method, and image processing apparatus	KODAMA, Kazuya	●	6908277
Three apparatus, program, information processing system, and control method	KURIMOTO, Takashi		6944155
Three apparatus, program, information processing system, and control method	KURIMOTO, Takashi		6944156
In the Ising-model computing device	UTSUNOMIYA, Shoko		6980185
Shape measuring apparatus and method	SATO, Imari	●	6979701
The mobile unit's position measurement system	AIHARA, Kenro	●	7012985
Encoding apparatus, encoding method, and program	YAMAGISHI, Junichi		7019138
In the Ising-model computing device	UTSUNOMIYA, Shoko		7018620
The impact force evaluation system	MIZUNO, Takayuki	●	7040786

List of Registered Trademarks

(as of the end of March 2022)

Trademark Mode	Registration No.
NII	4811291
NII	4830960
Net Commons	4832775
Picture + SINET	4934163
NAREGI	4952143
Top SE	4943324
WebELS	4980388
Net Commons	5182361
n c net commons	5152641
neXt commons	5191260
researchmap	5261160
GRACE+ Picture	5275386
GAKUNIN	5341899
Picture (Palette)	5498318
Picture (GakuNin)	5498319
Info dog	5538785
Picture (Info dog)	5538784
Picture (CiNii)	5580217
Picture (Michael)	5600802
meQuanics	5622078
Picture (GeoNLP)	5645544
SIGVerse *	5649553
PrivacyVisor *	5653596
Eduroam	6029580
(Picture) Eduroam	6029579
(Picture) School cap and cloud	6062452
QNNcloud *	6072214
(Character) Bit-kun	6297315
(Character) Top SE	6335656

*SIGVerse (International Registration No. 1203063) and PrivacyVisor (International Registration No. 1208262) are also registered trademarks in Europe, the United States, and China.
*QNNcloud is a registered trademark in Europe and China as well.

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

Needs of businesses, local authorities, etc.

Advanced technologies/seeds of innovation

Assistance with decision-making at the research conceptual phase

Need to keep abreast of the latest research and technological trends in the world, and be informed of the relevant businesses, research institutes, and researchers.

Preparation/decision on research launching

Need to decide on the timing and make preparations for research launching within the company.

Search for solutions

Outsourcing of research

Need to network with research people to complete research organization. Need to leverage outside research capabilities for research skills and know-how that cannot be covered within the company.

Overall coordination and collaboration

With research challenges across a broad span of informatics domains, need to work on overall coordination and collaboration.

Skills acquisition/human resource development

Human resource development for research

Need to develop future human resources for research and to acquire new research skills.

Human resource development for business

Need to work on acquiring the advanced technological skills necessary for future business, and developing the human resources that are lacking in business operations.

NII's Collaborative Activities with Industry, Government, and Academia

NII Shonan Meetings
Proposal of seminar topic from corporate organizer

Industry–Government–Academia Networking Seminars
Presentation of latest research findings and case examples of collaboration

Industry–Government–Academia Collaborative Workshops
Creation of matching opportunities by introducing cutting-edge research and sharing challenges

Academic Consultation
Technological suggestions, advice, and other consultations from researchers

NII Open Collaborative Research
Searching for academic partners according to research theme

Joint Research Unit
Establishment and management of a research organization with industry–academia collaboration

Comprehensive Partnerships for Joint Research
Solving diverse challenges across research domains through cooperation at the organizational level

Joint Research (including hosting researchers)
Solving problems by bringing together research resources

Commissioned Research
Supplying findings from research commissioned by corporations, etc.

Top SE
Developing top-level IT human resources

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.

We want to know the proper target value for our data

We want to know about analysis and what is technologically possible

We want to decide policies quickly

NII Academic Consultation

Knowledge Gained as Researchers

- Limits of technological possibilities from the perspective of cutting-edge research (goal-setting advice)
- Insights and expertise on new developments
- Identifying key personnel that are often overlooked (organizational advice)
- Analyzing how to carry out initiatives effectively (policy and planning advice)

NII Offerings

- Advice by way of lectures and group meetings
- Consultation on policymaking under a short-term contract
- Group consultation by multiple faculty members from different research domains is also available

Innovation Produced by Knowledge

Model Case of Collaboration with Industry, Government, and Academia

Discussion	Coordination	Research Contract	Research	Delivery of Findings	Licensing	Using the Findings
Conduct interview about corporate goals and issues. Industry–government–academia networking seminars, collaborative workshops, and other opportunities are also available.	Make proposal for industry–government–academia collaboration to meet requests.	Set conditions for joint research and other terms, and enter into research contract.	Carry out research with corporate and NII researchers collaborating.	Generate intellectual property and other deliverables (patents, computer programs, etc.).	Get license for intellectual property to leverage findings.	Company uses findings to develop products and services, as well as their own business operations.

The case above is provided as an example of industry–government–academia collaboration. There are many other possible cases.

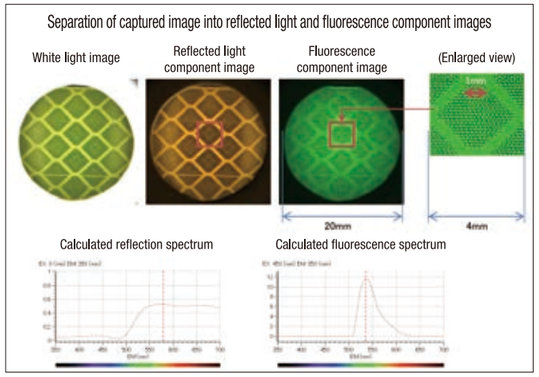
Example Case of Collaboration with Industry, Government, and Academia: NII - Hitachi High-Tech Science Corporation

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

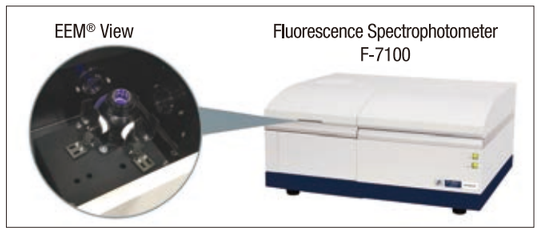
EEM® View: CMOS Camera Imaging System for Fluorescence Spectrophotometer

A new technology capable of simultaneously capturing both spectroscopic images and spectral data. The computational algorithm developed by NII Professor SATO, Imari and Associate Professor ZHENG, Yinqiang (Current affiliation: University of Tokyo) of the Digital Content and Media Sciences Research Division has made it possible to separate and visualize 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.



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.

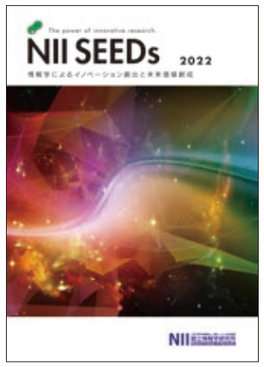


A dedicated fluorescence spectrophotometer measurement system capable of simultaneously capturing both spectroscopic images and spectral data.
*EEM® is a registered trademark of Hitachi High-Tech Science Corporation in Japan.

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 2022: Creating Innovation and Future Value through Informatics," showcases the research results of 24 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 two of our researchers and highlights their personalities, the trajectories of their careers, their thoughts on research work, and much more.



NII SEEDs FY2022 edition
(Contains a list of NII's patents in Japan)

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

International Exchange

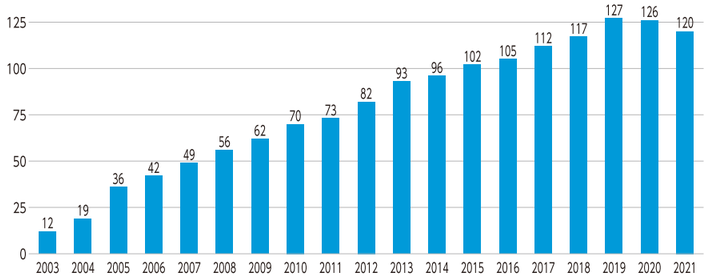
NII set up Global Liaison Office (GLO) to promote international exchange with overseas universities and research institutes. GLO handles various activities including entering into international exchange agreements through Memorandum of Understanding (MOU), running the NII International Internship Program 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 2022, we have agreements with 120 institutions in 35 countries and regions.

*See next page for the list of institutions.

MOU締結機関数



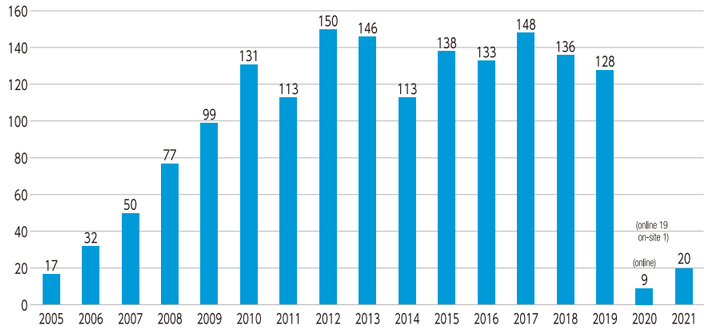
NII International Internship Program

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 1,600 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.

NII国際インターンシッププログラムの受入決定数



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.

List of International Exchange Agreements (MOU)

35 countries and regions

MOU for research cooperation: 107 institutes

(as of March 2022)

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)
Taiwan	College of Electrical Engineering and Computer Science, National Taiwan University
	National Tsing Hua University, College of Electrical Engineering and Computer Science (NTHU EECS)
Thailand	Department of Computer Engineering, Chulalongkorn University
	School of Engineering and Technology, Asian Institute of Technology
	Faculty of Science, Kasetsart University
Socialist Republic of Vietnam	International Research Institute, Multimedia Information, Communication, and Applications (MICA)
	Hanoi University of Science and Technology(HUST), School of Information and Communications Technology
	Vietnam National University of Ho Chi Min City (VNU-HCM), University of Information Technology
	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)
	Institute for Infocomm Research
India	Indraprastha Institute of Information Technology, Delhi
Commonwealth of Australia	Commonwealth Scientific and Industrial Research Organisation (CSIRO) (Data61)
	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
The Kingdom of Saudi Arabia	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
	University of Illinois at Urbana-Champaign
Canada	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
	Dublin City University
French Republic	University of Nantes (Atlanstic 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-ENSEEIHT
	National Center for Scientific Research (CNRS)
	Université Toulouse III - Paul Sabatier

Country/Region	Name of Institution
French Republic	Claude Bernard University Lyon 1
	Université Paris Saclay, Graduate School of Computer Science (Université Paris Sud)
	Université Côte d'Azur (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)
	Ecole Normale Supérieure de Lyon (ENS Lyon)
United Kingdom of Great Britain and Northern Ireland	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
	Department of Theoretical and Applied Linguistics, University of Cambridge
	Department of Computer Science & Technology, University of Cambridge
	The Alan Turing Institute
Federal Republic of Germany	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
	Department of Computer and Information Science at the University of Konstanz (ISGUK)
	The Faculty of Science at the University of Potsdam
Republic of Austria	Vienna University of Technology
Italian Republic	University of Torino, Department of Computer Science
	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 and Micro Engineering and School of Computer and Communication Sciences, Ecole Polytechnique Federale de Lausanne
	University of Zurich
Republic of Finland	Aalto University
The Kingdom of Sweden	School of Computer Science and Communications (CSC), KTH Royal Institute of Technology
Norway	Department of Information Science and Media Studies of the University of Bergen (UiB)
Czech Republic	Faculty of Electrical Engineering, Czech Technical University in Prague
The Kingdom of Spain	Universitat Politècnica de València (UPV)
	Universidad Politécnica de Madrid (UPM)
	Facultat d'Informàtica de Barcelona, Universitat Politècnica de Catalunya (UPC)
Hellenic Republic	Athena Research & Innovation Center
Netherlands	Faculty of Electrical Engineering, Mathematics and Computer Sciences of Delft University of Technology (TU Delft)
Portuguese Republic	Instituto de Engenharia de Sistemas e Computadores, Investigação e Desenvolvimento em Lisboa (INESC-ID)
	INESC Technology and Science (INESC TEC)
	University of Minho
Arab Republic of Egypt	Egypt-Japan University of Science and Technology (E-JUST)

MOU for development and operational cooperation: 13 institutes

Country/Region	Name of Institution
Asia-Pacific	Asia Pacific Oceania Network (APOnet) Collaboration
United States of America	Indiana University
	North American Coordinating Council on Japanese Library Resources
	The New Venture Fund (NVF) on behalf of the Scholarly Publishing & Academic Resources Coalition (SPARC)
Republic of Korea	Korea Education & Research Information Service (KERIS)
	Korea Institute of Science and Technology Information (KISTI)

Country/Region	Name of Institution
Federal Republic of Germany	Hochschulbibliothekszentrum 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 (GÉANT)
Europe and others	European Organization for Nuclear Research (CERN)
Asia-Pacific and Europe	Asiapacific-Europe Ring (AER) Collaboration
North America and Europe	Advanced North Atlantic (ANA) 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.

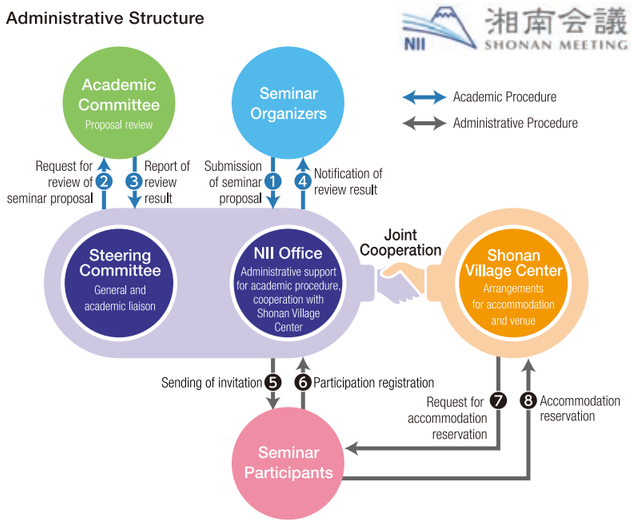
*Dagstuhl Seminar: A renowned seminar series in the field of informatics held almost every week in Dagstuhl, Germany. It is famous for its training camp style format where participants stay for about a week to hold intensive discussions on a specific topic.

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)

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

NII has a special agreement with the German Academic Exchange Service (DAAD) that allows German postdoctoral researchers to 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.

Japanese-French Laboratory for Informatics (JFLI)

https://jfli.cnrs.fr/

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 (UMI) 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 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 UMIs 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.

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

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, National Institute of Informatics joined up with The Graduate University for Advanced Studies, SOKENDAI to launch the Department of Informatics with a three-year Ph.D. course, and saw its first students graduate in March 2005. A five-year Ph.D. course 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 2022) *( ) indicates number of international students

Five-year Ph.D. course	Three-year Ph.D. course	Total
59 (30)	36 (23)	95 (53)

【Message from the Dean of the Department of Informatics】

YAMADA, Seiji

(Prof., Digital Content and Media Sciences Research Division, NII)

In the Department of Informatics, the study of informatics is divided into six fields of specialization: Foundations of Informatics, Information Infrastructure Science, Software Science, Multimedia Information Science, Intelligent Systems Science, and Information Environment Science. Thus, "informatics," which integrates all these six fields, is not limited to AI, data science, and information science, which have so much potential for enriching our society and environment in the coming years, or to conventional science and engineering; it is a comprehensive academic discipline focused on people and society, broadly spanning "humanities informatics" and "social informatics." The department pursues research and education in various phases of basic, applied, and practical research, with the aim of cultivating researchers as well as high-level specialist professionals equipped to become active leaders in the field of informatics.

Through a system of very close specialist guidance by world-leading researchers at NII, as well as academic counseling, students are individually guided according to their specific interests, objectives, and research plans. The department has also set up an advisor system in which multiple instructors working in different fields, or perhaps in the same discipline from different angles, serve as sub-advisors to provide students with advice on the content and direction of research from a wide range of perspectives. A dual degree system also allows students to receive guidance on doctoral research at overseas research and educational institutions for a certain period. The guidance program is designed so that students with an undergraduate degree can spend plenty of time on their individual research themes in a full doctoral program (5-year PhD course), while students who already have a master's degree can concentrate on expanding their previous research in a shorter program (3-year PhD course).

As well as being SOKENDAI students, Department of Informatics students get to study on a daily basis in the internationally collaborative environment of NII. They will participate in a variety of research projects, gaining experience as international researchers through personnel exchange programs with overseas partner universities and research institutions. Around half of the Japanese students are active professionals who enroll at NII to systematize work they have pursued for their companies from a research standpoint and to master state-of-the-art technologies. Another feature of the program is the high proportion of international students, with many subjects taught in English. The opportunity for cross-cultural exchanges with other students offers a valuable environment for young people who aspire to international careers. Through collaborations with other institutions and departments at SOKENDAI, the program also allows students to expand their circles of exchange and build valuable personal networks.

Research by Current Students

TSUMURA, Takahiro

Commenced doctoral program in 2019 (5-year PhD course)

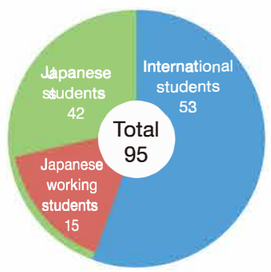
Main supervisor: Prof. YAMADA, Seiji

Human-agent interaction is a research subject that covers the interaction between humans and anthropomorphic agents and robots. In this context, my research focuses on the social advancement of agents through human-agent empathy.

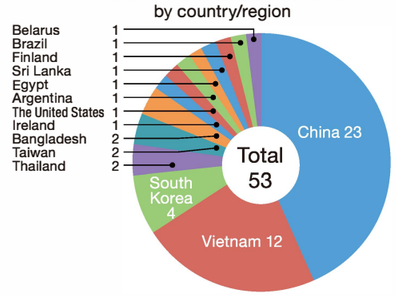
One way to relieve the anxiety and discomfort felt toward agents, which are becoming increasingly ubiquitous, is to focus on empathy to improve the impression of agents. We can use appearance, self-disclosure, tasks, and various other factors to do this. This research hopes to extend the factors that give rise to empathy between humans to human-agent relationships, to expand the human capacity for empathy, and to help agents to acquire the capacity for empathy.

Student Data (as of April 2022)

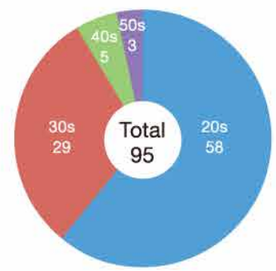
Number of students



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
AY2021	8 (5)	5 (1)	3 (3)	16 (9)
AY2020	10 (7)	5 (2)	2 (2)	17 (11)
AY2019	5 (3)	7 (4)	2 (2)	14 (9)

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 (TBD); Algorithms (UNO, Takeaki); Discrete Mathematics (KAWARABAYASHI, Ken-ichi); Mathematical Logic (TATSUTA, Makoto)
	Quantum Information Systems (TBD); 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; ISHIKAWA, Yutaka); Information and Communication Systems (JI, Yusheng; ABE, Shunji; FUKUDA, Kensuke; KANEKO, Megumi)
Software Science	Mathematical Structures in Programming (TBD); Distributed Systems (SATOH, Ichiro); Data Engineering (TAKASU, Atsuhiro); Software Engineering (ISHIKAWA, Fuyuki)
	Probabilistic Models in Informatics (KITAMOTO, Asanobu); 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, Taro); Embedded Real-Time Systems (AOKI, Shunsuke)
Multimedia Information Science	Fundamentals of Media Processing (SUGIMOTO, Akihiro; YAMAGISHI, Junichi; AIZAWA, Akiko; KATAYAMA, Norio; KODAMA, Kazuya; GOTODA, Hironobu; IKEHATA, Satoshi; MO, Hiroshi; SATOH, Shin'ichi)
	Applications of Multimedia Processing (SATO, Imari; SUGIMOTO, Akihiro; YAMAGISHI, Junichi; KODAMA, Kazuya; IKEHATA, Satoshi; MO, Hiroshi)
	Interactive Media (ARAI, Noriko; ECHIZEN, Isao; GOTODA, Hironobu; YU, Yi)
Intelligent Systems Science	Logical Foundations for Artificial Intelligence (INOUE, Katsumi); Knowledge Sharing System (TAKEDA, Hideaki); Reasoning Science (SATOH, Ken); Human–Agent Interaction (YAMADA, Seiji)
	Machine Learning (TBD); Natural Language Processing (AIZAWA, Akiko; SUGAWARA, Saku); Robot Informatics (INAMURA, Tetsunari); Deep Learning (PRENDINGER, Helmut)
	Communication Environments (BONO, Mayumi); Computational Social Science (MIZUNO, Takayuki)
	Data Mining (SUGIYAMA, Mahito)
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 (TBD)
High-Performance Computing (AIDA, Kento; ISHIKAWA, Yutaka; 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 (TBD)
Introduction to Intelligent Systems Science II (SATOH, 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 (KANEKO, Megumi; IGARASHI, Ayumi; WU, Stephen (Institute of Statistical Mathematics); JONES, Caryn (Visiting Lecturer))
Scientific Writing (KANEKO, Megumi; IGARASHI, Ayumi; WU, Stephen (Institute of Statistical Mathematics); JONES, Caryn (Visiting Lecturer)); Introduction to Information Security Infrastructure (ECHIZEN, Isao; OKADA, Hitoshi; TAKAKURA, Hiroki)
Applied Linear Algebra (SUGIMOTO, Akihiro; 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
Tokyo Institute of Technology	Graduate School of Information Science and Engineering	Since AY2002
	Interdisciplinary Graduate School of Science and Engineering	Since AY2003
	School of Engineering (undergraduate)	Since AY2016
	School of Engineering (graduate school)	
Waseda University	Graduate School of Fundamental Science and Engineering	Since AY2005
	Graduate School of Creative Science and Engineering	
	Graduate School of Advanced Science and Engineering	
Japan Advanced Institute of Science and Technology	Graduate School of Advanced Science and Technology	Since AY2008
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 (AY2021)

Utsunomiya University	Nagoya University
Chiba University	Japan Advanced Institute of Science and Technology
University of Tsukuba	Hefei University of Technology
Tokyo Institute of Technology	Peking University
University of Tokyo	Southwest Jiaotong University
Tokyo University of Science	University of Wuppertal
Tottori University	

Number of Students Accepted through Both Schemes: Partnership with Graduate Schools and Research Students for Special Collaboration (AY2021)

Master's course	Doctoral course	Total
37	35	72

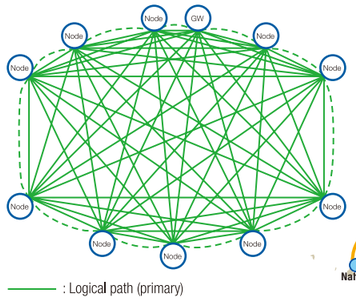
Science Information NETwork (SINET) Available Nationwide at Ultra-High Speed with Low Latency

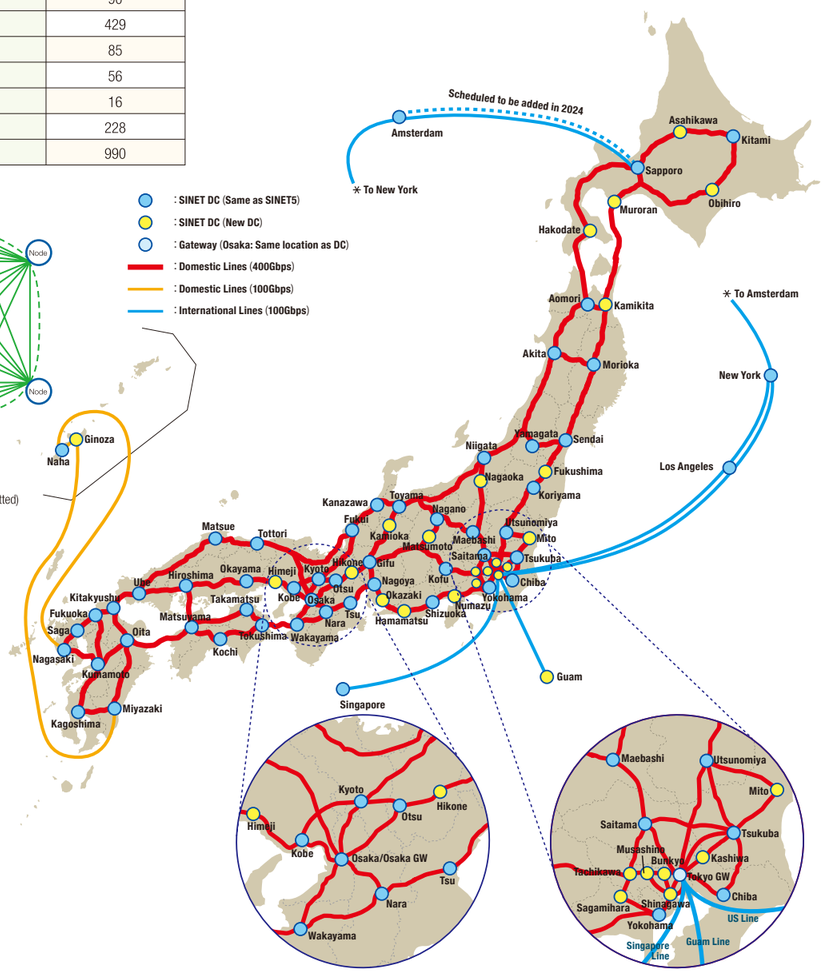
- A research infrastructure that anticipates the needs of the Society 5.0 era

The Science Information NETwork (SINET) is an information and communications network built and operated as a scientific 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.
In April 2022, NII commenced full-scale operation of SINET6, an upgrade of SINET5, the previous version of its scientific information infrastructure.
SINET organically connects cloud, security, and academic content by means of a nationwide 400-Gbps network, thereby providing more than 990 universities and other institutions with advanced scientific information infrastructure.
At the same time, NII's wide-area data collection infrastructure has evolved into Mobile SINET. To enable flexible use of university analysis resources and optional cloud resources in data collection and analysis using 5G networks, we have just begun a new empirical trial to test infrastructure functions directly connected to SINET. We continue to operate a 100-Gbps around-the-world network link, which is remarkable for a single institution, upgrading the Japan-U.S. data link to 200 Gbps. In addition to our existing line between Japan and Singapore, in Asia we launched a new 100-Gbps data line between Japan and Guam, as part of our efforts to make our international network even more robust.
These initiatives are expected to help further strengthen Japan's international collaboration and competitiveness, and to accelerate the fusion of cyberspace (virtual space) and physical space (real space), with a view to shaping Society 5.0, the proposed vision of Japan's future society.

Number of member institutions in SINET (as of March 31, 2022)

National universities	86
Public universities	90
Private universities	429
Junior colleges	85
Technical colleges	56
Inter-university research institutes	16
Others	228
Total	990





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

Interconnection with Overseas Research Networks

Connecting Japan, the U.S., and Europe in a ring, this national research and education network (NREN) is the world's first international network circuit operated by a single institution that encircles the whole globe.

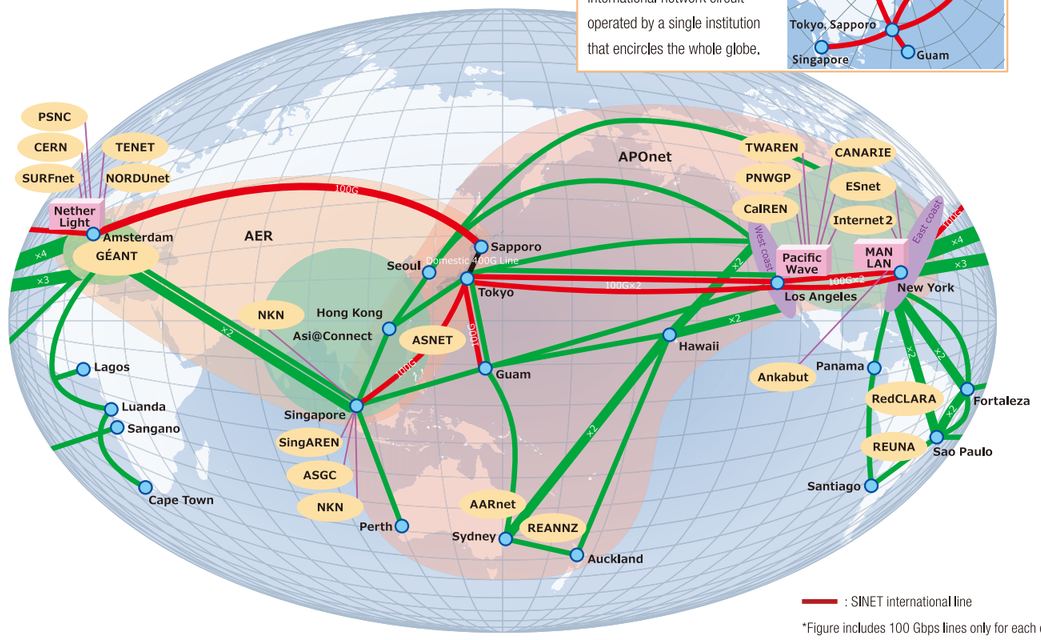


*Figure includes 100 Gbps lines only for each country.

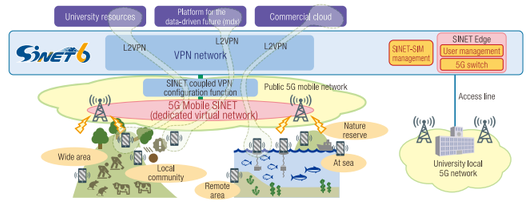
SINET6 Services

We provide new services through joint consideration and development, based on requests from universities and institutes.
SINET6 offers 400GE, 100GE, 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 (IPDual)	
	Full Route Provision	
	IP multicast (+QoS)	
	QoS per application	Rapidly increasing
	L3VPN(+QoS)	Expanding into a multicampus service
L2 Service	L2VPN/VPLS(+QoS)	Used frequently in high-capacity transmission experiments
	University LAN Virtualization	
	L2 on demand (Basic)	
	L2 on demand (International collaboration: NSI)	Used in international experiments
	L2 on demand (Cloud collaboration: REST)	
Mobile SINET	Secure mobile connection	Pilot test in progress
Redundancy of Access Line	Multihoming	
	Link aggregation	
	Redundant trunk group service	
	Data center connection redundancy service	
Stabilization of Network Operations	New DDoS mitigation	Security measure function
Next-Generation Network Functions	SINET Edge	In trial phase
Enhanced Transfer Performance	Performance measurement	
	High-speed file transfer	Achieved world's fastest at 416 Gbps between Japan and the U.S.

Mobile SINET https://www.sinet.ad.jp/wadci/

In April 2022, we started trial operation of a new wide-area data collection infrastructure, under the name of Mobile SINET. It offers a one-stop solution for data collection and processing from mobile terminals for environmental, ecological, IoT research, and other applications, with a view to the realization of Society 5.0.
To send and receive valuable research data generated in remote areas, at sea, and other locations where a wired network is unavailable, the service offers a secure communication environment connected directly to SINET over public 5G mobile networks. A new trial was launched in April 2022 in preparation for full-scale deployment of the service.
There is also a plan to expand mobile SINET by linking it to the local 5G networks operated by universities.



Concepts and Features of SINET6

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

Five Major Concepts of SINET6

(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 400 Gbps nationwide network

SINET6's state-of-the-art digital coherent technology created an overall stable 400 Gbps nationwide network.

(3) Robust and Reliable

Provides a highly robust and reliable network without interruptions or downtime

SINET6 adopts a multilayered advanced network architecture (physical layer, L2MUX 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) Internationalization

High-speed international lines directly connecting the U.S., Europe, and Asia

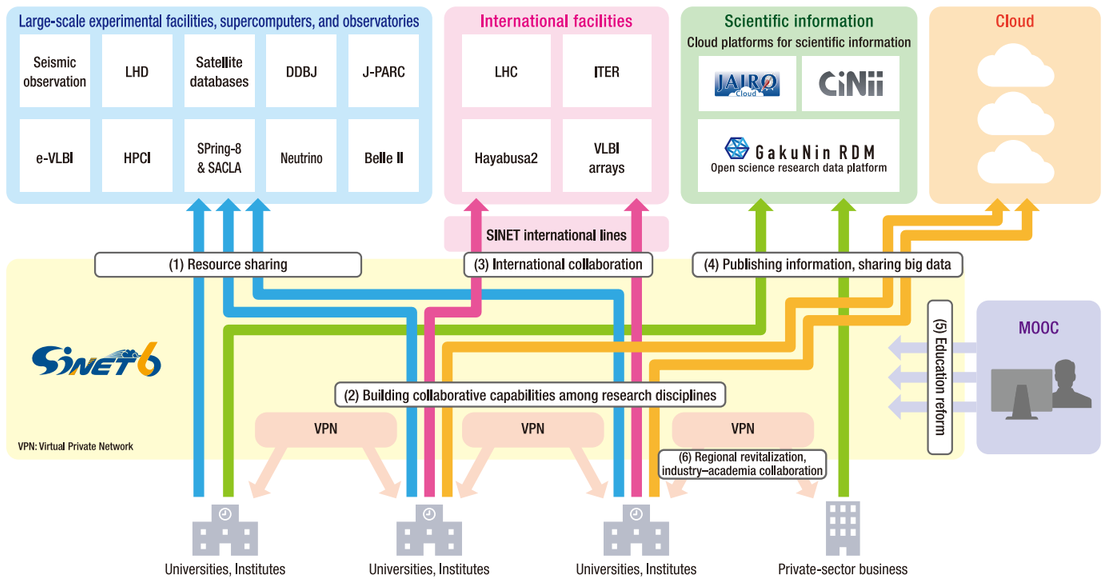
Low latency was achieved by adding a direct connection to Europe, eliminating the need to pass through the U.S. The Japan-U.S. connection was upgraded to 200 Gbps and in Asia there are now 100-Gbps connections to both Singapore and Guam. Japan, the U.S., and Europe are linked in a ring. All these network improvements further enhance support for international joint projects.

(5) Multifunctionality

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

Features of SINET6

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 scientific 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.

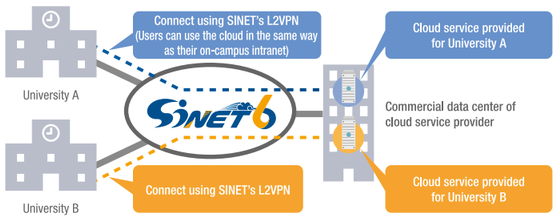


SINET Cloud Connection Service

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

GakuNin Cloud

https://cloud.gakunin.jp/

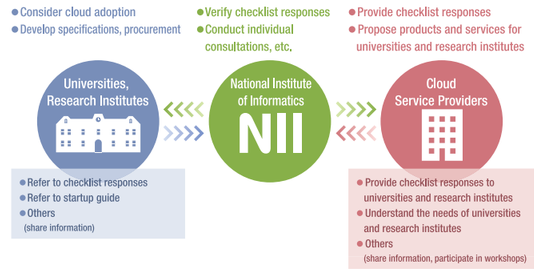
NII provides three services under the GakuNin Cloud brand to support the adoption and use of clouds in universities and research institutes. We do this with the aim of developing advanced scientific information platforms using clouds.

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.

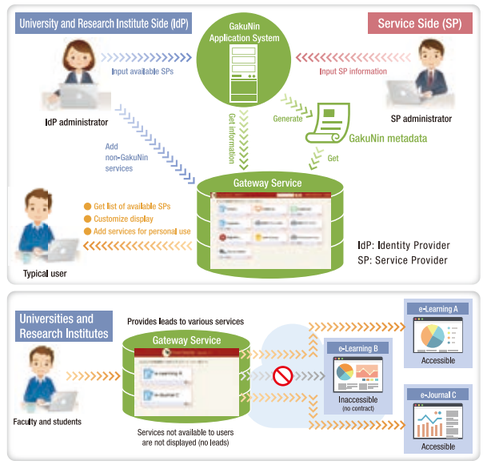
In addition, NII provides documents such as cloud startup guides and cloud use cases.



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.

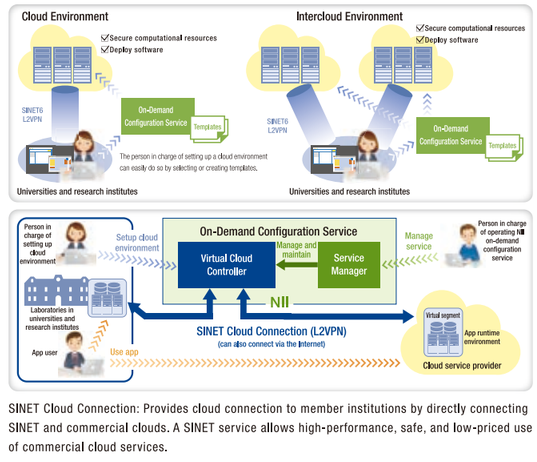
Users (faculty and students) at universities and research institutes can see the various services available at their institution by accessing the portal site via the authentication platform operated by their institution. They can then quickly and easily use these services. Moreover, IdP administrators 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 SINET6 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 SINET6, 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.

GakuNin Cloud common services

Participants in GakuNin Cloud can access individual consultations (e.g., to examine the adoption of cloud services, define requirements, review specifications, deal with issues when using cloud services), participate in user meetings, workshops, and other events exclusive to participating institutions, participate in cloud utilization surveys, and access the GakuNin Cloud common community space.

Building an Authentication Infrastructure

GakuNin: Academic Access Management Federation in Japan

https://www.gakunin.jp/en/

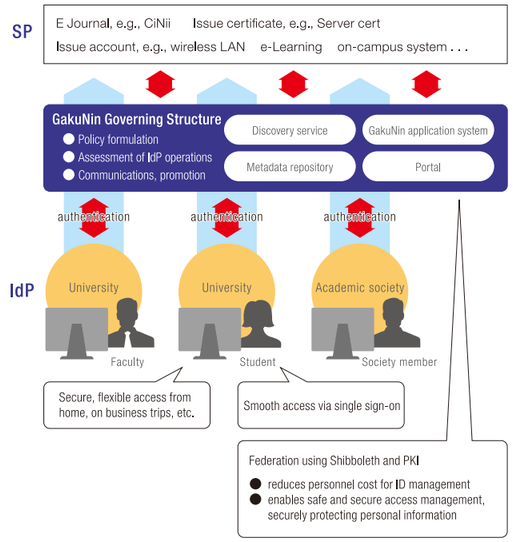
The Academic Access Management Federation in Japan, GakuNin, is a framework for utilizing the authentication platform of universities not only for on-campus services but also for collaboration with other universities and commercial services. GakuNin enables safe and secure use and provision of academic 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 2022)

Number of organizations (IdP: Identity Providers)	272
Number of service providers (SP: Service Providers)	Total 199

[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 its trustworthiness by conducting regular annual assessments of its operations. It also offers LoA1 (Level of Assurance 1) accreditation services in accordance with the U.S. federal government's Federal Identity, Credential and Access Management (FICAM) trust framework. The Steering Committee for Academic Authentication is also discussing the provision of higher assurance levels and the provision of services that utilize higher assurance levels.

At GakuNin, all related matters are planned, drafted, and managed by the Steering Committee for Academic Authentication. This committee includes five working groups, the "Operation Working Group," which examines matters relating to operations, the "Trust Working Group," which examines matters relating to trust in GakuNin, the "Library Service Working Group," which examines matters relating to GakuNin's library services, the "Next-generation Certification Collaboration Working Group," which examines ways to achieve new trust for the development and advancement of academic certification, and the "eduroam Working Group," which examines the operation of eduroam JP.

Issuing Digital Certificates: UPKI Digital Certificate Issuance Service

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

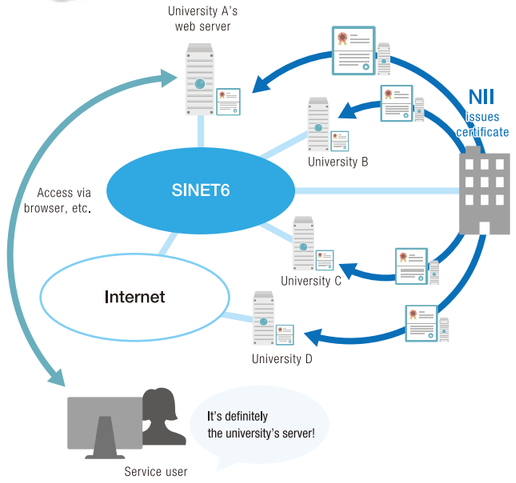
NII launched the UPKI Digital Certificate Issuance Service in January 2015 as a service for issuing digital certificates to universities and research institutes. In addition to the server certificates issued so far, NII now also issues client certificates and code signing certificates.

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 2022)

Number of institutions	371
Number of domains	500

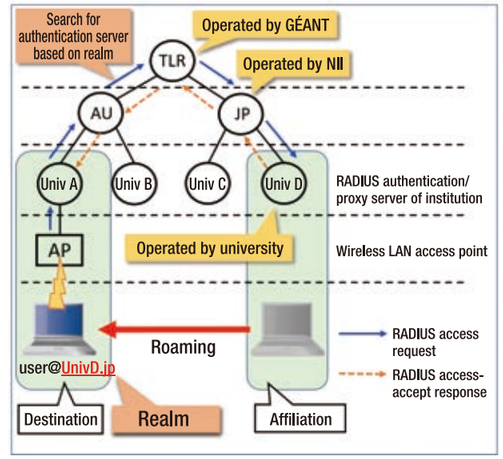
eduroam: World-wide Academic Wireless LAN Roaming Platform

https://www.eduroam.jp/en/

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 2022)

Number of participating institutions in Japan	328

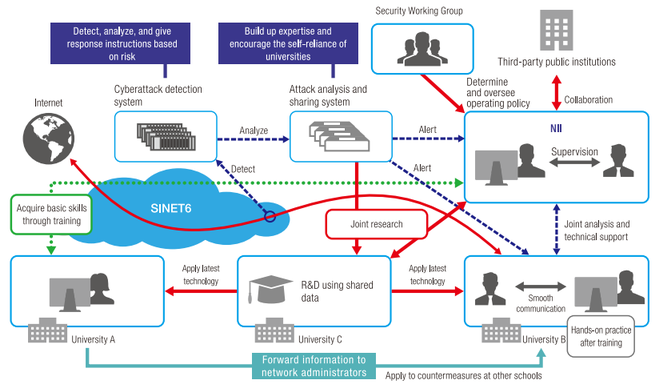


Supporting Information Security Framework through Inter-University Collaboration

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.For advancement, the Center for Cybersecurity Research and Development was reorganized into the Center for Strategic Cyber Resilience Research and Development in FY2022.

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.



Board for Scientific Research Digital Platform

The operation of Scientific Research Digital Platform, combining Science Information NETwork and Research Data Cloud, is handled by the Board for Scientific Research Digital Platform, a joint organization comprising universities and research institutes and NII, in collaboration with the information infrastructure centers of universities and research institutes and NII's five R&D centers.

Universities and Research Institutes

Nationwide Sharing Information Technology Centers

- Board for Scientific Research Digital Platform
- Steering Committee for Research Data Cloud
- Steering Committee for Network
- Steering Committee for DX/Cloud
- Steering Committee for Security
- Steering Committee for Information Security Policy at Higher Education Institutions
- Steering Committee for Academic Authentication

National Institute of Informatics

- Research and Development Center for Academic Networks
- Research Center for Knowledge Media and Content Science
- Center for Cloud Research and Development
- Center for Strategic Cyber Resilience Research and Development
- Research Center for Open Science and Data Platform
- Academic Infrastructure Division
- SINET Promotion Office
- Academic Authentication Systems Office
- Cloud Promotion Office

Open Science

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

Open Science is emerging as a new way of conducting research that promotes open 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

GakuNin RDM

A platform enables researchers and their supporters to help them manage and share research data and materials generated during research projects. GakuNin RDM (research data management) facilitates efficient management of files with collaborating researchers and features a powerful function for linking to data analysis platforms. For research integrity, the RDM platform records research trails without any burden on the researcher. The platform provides convenient management and customization features for research institutions as an RDM service.

Publishing Platform

WEKO3

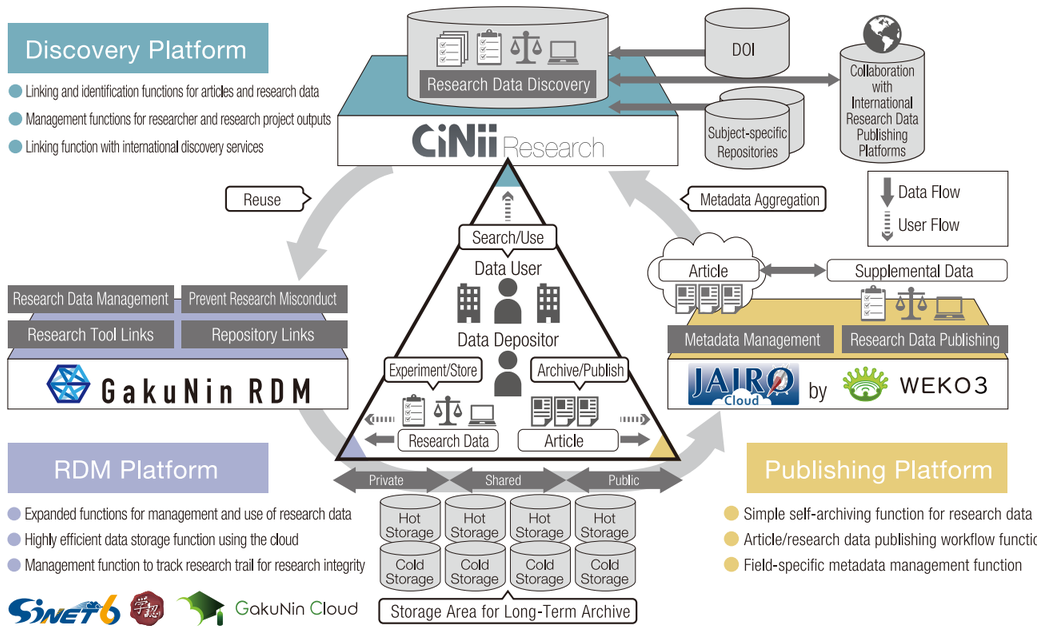
A platform enables researchers and their supporters to publish and disseminate their research papers, research data, research findings, and other data on the Internet. Researchers can publish research results from their institutions' repositories in a suitable format for publication and dissemination by simply assigning identifiers and metadata using a function linked to a management platform or a web browser. The platform is equipped with flexibility and expandability to be used as a repository for efficiently publishing documents and a wide variety of other data.

Discovery Platform

CiNii Research

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 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 make discoveries by providing the ability to navigate these complex relationships intuitively.

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.



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 830 institutions.

JAIRO Cloud: Shared Repository Service

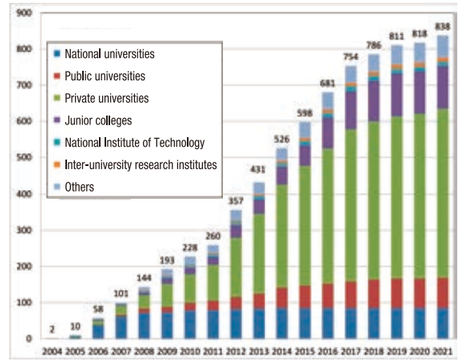
NII provides an environment for a shared repository system as a cloud service, based on the NII-developed institutional repository software WEKO (http://weko.at.nii.ac.jp/), for institutions that have difficulty constructing and operating their own repositories.

JAIRO Cloud — Japanese Institutional Repositories Online Cloud

Usage data (as of the end of March 2022)

Number of institutions using the service
681

■Number of institutions with institutional repositories in Japan



Integrated Search of Academic Information in Institutional Repositories in Japan

IRDB: Institutional Repositories Database

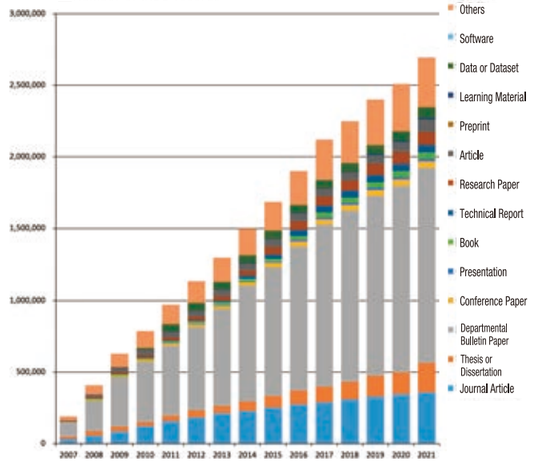
https://irdb.nii.ac.jp/en

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 2022)

Number of institutional repositories	Contents
763	3.59 million items

■Number of IRDB records



* Figures before FY2018 are JAIRO statistics
* Categories for the number of contents are based on the junii2 schema (NII Type) until FY2018, and on the JPCOAR schema from FY2019

Japan Consortium for Open Access Repository

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

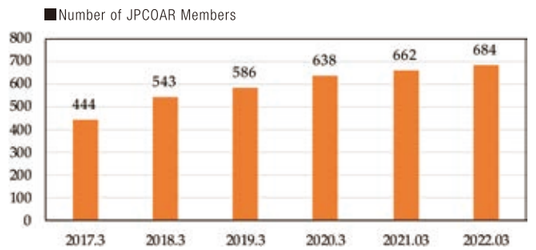
JPCOAR: Japan Consortium for Open Access Repository

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 service (JAIRO Cloud).
NII supports these activities as well as JPCOAR by providing assistance such as physical support for collaboration with university libraries.

Current members (as of the end of March 2022)

Number of members
684

■Number of JPCOAR Members



Publishing and Communicating Scientific Information

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://cir.nii.ac.jp/

CiNii is a service enabling exhaustive searches of scientific 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 Research

https://cir.nii.ac.jp/

With its simple interface, CiNii Research makes it easy to cross-search documents, as well as many kinds of research data from external collaborating institutions, institutional repositories, and even KAKEN research project information.

Status of records (as of March 31, 2022)

No. of papers	No. of research data files
34.57 million	340,000

CiNii Books: Searching for Books in University Libraries

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

Enables search of information on books and journals held by university libraries in Japan.
Contains book and author information on about 13 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 2022)

Number of bibliographic records	Number of holding records	Number of participating libraries
13.26 million	148.57 million	1,341

CiNii Dissertations: Searching for Doctoral Dissertations in Japan

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

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.

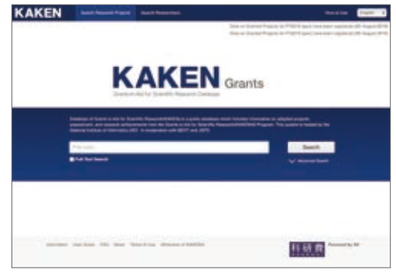
Data on coverage (as of the end of March 2022)

Number of doctoral dissertation records	Number of full texts from dissertation records
690,000	Approximately 310,000

Database of Grants-in-Aid for Scientific Research

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 2022)

Number of adopted projects
970,000

Catalog Information Service

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 2022, * indicates figure for one year, FY2021.)

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	143.95 million	1,114	419,000	50,000

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 promotes more efficient library operations through ILL document copying and other services.

Database Sharing Service for Electronic Resources

Database Sharing Service for Electronic Resources has ERDB-JP (Electronic Resources Database-Japan) and Licenses (JUSTICE): Sharing license data service for electronic resource products.

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 CC0 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 2022)

	National universities	Public universities	Private universities	Inter-university research institutes	Publishing companies	Others	Total
Partner A	40	5	22	4	2	19	92
Partner B	8	1	31	2	0	9	51
Total	48	6	53	6	2	28	143

Data registrations (as of the end of March 2022)

Number of registrations	Number of new registrations (FY2021)
21,124	60

Licenses (JUSTICE)

This service enables sharing of license data for electronic resource products submitted to the Japan Alliance of University Library Consortia for E-Resources (JUSTICE) by publishers, academic societies, and other bodies.
On April 1, 2022, trial operation of a "JUSTICE License" began. License information relating to "terms of use" and "administrative items" will be shared with JUSTICE member libraries for 57 proposals (45 publishers) for which permission to publish was obtained, out of 104 proposals (56 publishers) submitted to JUSTICE for 2022.

Digital Archives

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

NII is engaged in the following activities to store and provide digital scientific 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 2022)

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 2021)
The Making of the Modern World Part III (MOMW III)	1890-1945	Number of records: Approx. 5,000 (scheduled for registration from 2021)

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 scientific information. The coalition moved under the Academic Information Distribution Promotion Committee from FY2019, and has been 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://contents.nii.ac.jp/hrd

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.

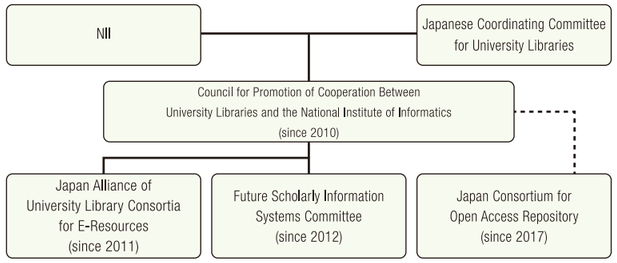
- Training courses (NACSIS-CAT/ILL self-learning/Self-learning materials on research data management)
- Specialized training courses (bibliography creation for catalog systems, information processing technology seminars)
- Comprehensive training (NII on-the-job training, comprehensive IT training for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

Collaboration with University Libraries

https://contents.nii.ac.jp/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://contents.nii.ac.jp/en/justice

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 scientific 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://contents.nii.ac.jp/korekara

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

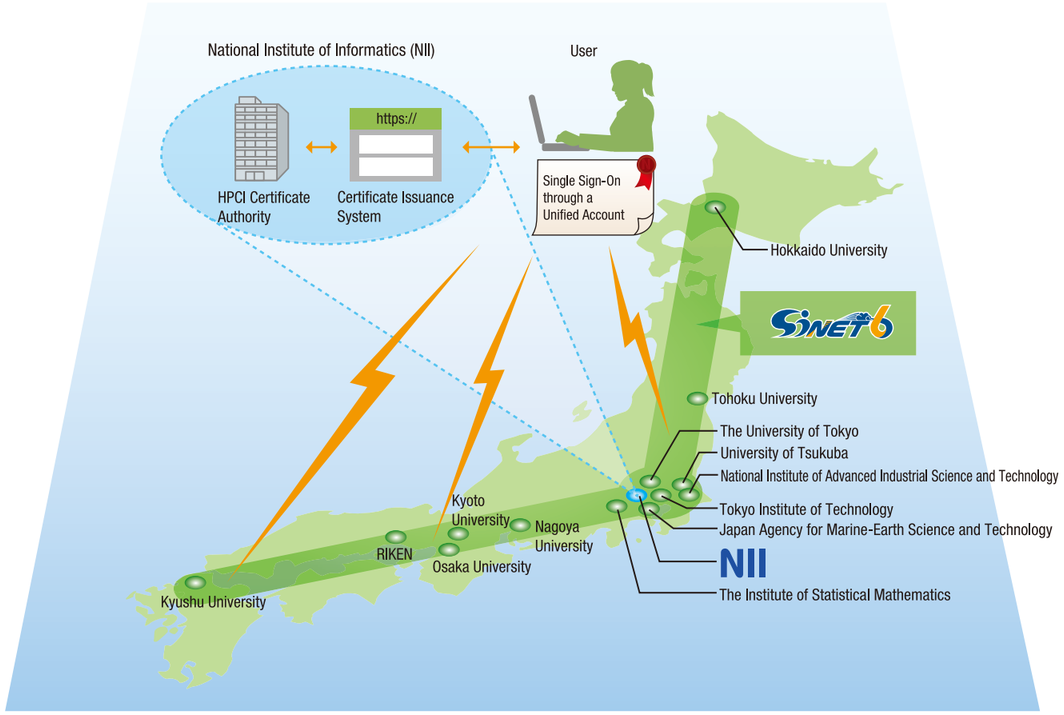
This working group performs two tasks: (1) examination of new library system networks that enable integrated discovery environments, as well as sustainable operating systems; and (2) examination of issues in joint procurement and operations of systems.

Working Group for Examination System Workflows

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

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

HPCI connects supercomputers and storage systems installed at universities and research institutes across Japan, with the supercomputer Fugaku installed in Kobe at its core. This creates a revolutionary shared computing infrastructure that meets the diverse needs of a wide range of users, including the industrial sector. The third phase of the project began in FY2022. 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 supercomputer Fugaku, as well as universities and research institutes nationwide, NII continues its work started in the first phase of the project, operating and maintaining the authentication system that forms the core of the unified account authentication, which includes a certification 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 experimental 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 2022)

Reference type	Books	Print journals	Journals (number of titles)
Japanese	15,607	9,886	130
Foreign	9,455	768	7
Total	25,062	10,654	137

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 & Sons, Inc.
IEICE	Institute of Electronics, Information and Communication Engineers
IPSJ Digital Library	Information Processing Society of Japan

Facilities and equipment

Available service	Reading room	Stack room
Area	140 m²	151 m²
Seats	10	—
Others	Automated book lending/returning machine	
	Copier	


Reading room


Reading room

Symposium on DX at Educational Institutions—Cyber-Symposium on Online Education and Digital Transformation at Universities and Other Institutions

https://www.nii.ac.jp/event/other/decs/

Taking into consideration the situation with the COVID-19 pandemic, in late March 2020, NII began holding a series of events titled “Symposium on DX at Educational Institutions—Cyber-Symposium on Online Education and Digital Transformation at Universities and Other Institutions” at a weekly to biweekly pace. The purpose of these events was to share as much information as possible about distance education at universities and other institutions. (Please note the initially planned title of these events was “Cyber-Symposium for Information Sharing on Remote Teaching Efforts at Universities since April.”)
The lectures given at these events covered a wide range of regularly occurring, pressing issues related to remote learning at universities and other institutions, as well as to digital transformation of education. This included discussions on precedents of distance education and exchange of information, interpretation of Copyright Law and recent amendments, actual relevant cases at overseas universities, methods of practice at medical and engineering schools, online support for students, and hybrid lessons that included face-to-face teaching.
Most participants are connected to university and higher education. As of the 48th webinar, held two years after the inception of the symposium, a total of approximately 56,000 people had participated, listening to more than 400 lectures. The archived videos attracted over 300,000 views. Thus, the symposium was highly successful in sharing information on running classes and applying digital transformation at universities and other institutions during the COVID-19 crisis.

Public Communications

Promoting public awareness of NII's research and projects

To share the latest research findings in informatics with society at large and to help people understand its projects and services more deeply, NII opens its laboratories to the public, offers public lectures, runs on-site classes for high school and technical college students, participates in exhibitions, and publishes public relations materials.
To disseminate information in a timely manner, NII also makes use of digital online media such as the NII website, email newsletters, and social media platforms (Twitter and Facebook).

NII Open House

NII holds an annual "Open House" to offer presentations of its wide-ranging research activities, findings, and other initiatives to the general public, as well as interested researchers and prospective graduate students. In FY2021, the event was held online, with live streams of keynote speeches and dialogues, and a poster session held in a virtual space. In the "Computer Science Park," children were able to participate in interactive workshops in a virtual space.

Children experience "computational thinking" without using a computer in the "Beginner's Science Park" for elementary school students.

公開講座　一般の方を対象とした公開講座を無料で実施しています。

■Public lectures: "Frontiers of Informatics"

https://www.nii.ac.jp/event/shimin/

Free lectures by NII researchers were offered to the public on various topics related to informatics in order to explain the frontiers of informatics. The six lectures delivered in FY2021 were made available online for on-demand viewing. Videos, materials, and Q&As from past lectures are also available on the NII website.

In this program, researchers explain their specialized topics of study for the public in an easy-to-understand way.

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 foster their interest in informatics. (The events were canceled in FY2021.)

■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. (The events were all canceled in FY2021.) 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 Japanese website.

Exhibitions

NII takes part in various exhibitions to offer information about its research findings, projects, and services. At the 2021 Library Fair & Forum, held online in November, NII had its own virtual booth, which it used to make presentations on forum themes such as "Management and Search Platforms from the Perspective of Institutional Repositories," and services connected with university libraries.


A scene from a lecturer's discussion at the NII Forum "Finding, Collecting, and Using Academic Information" at the 2021 Library Fair & Forum.

Publications

■NII Series (Japanese)

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, *NII's latest publication is "Big Data Opens the Door to Medical AI" released in October 2021.*

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

■Public Information Magazines

- *NII Today* (Japanese/English) https://www.nii.ac.jp/en/about/publications/today/
- Overview of National Institute of Informatics (Japanese/English)
- Summary of National Institute of Informatics (Japanese/English)
- Annual Report of the National Institute of Informatics
- NII SEEDs
- Getting to Know NII (Info Dog "Bit-kun")

Digital Media (Japanese except Website)

■Website (English) https://www.nii.ac.jp/en/
Visit the website for details of events and publications.

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

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

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

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

News Releases

(April 1, 2021 to April 1, 2022)

Release date	Title
Apr. 12 2021	Development of technology to automatically find simulation settings that are difficult to test —Automatic searching of settings for "diverse situations" encountered in autonomous vehicle operation
Apr. 13	RIKEN and NII sign collaboration and cooperation agreement
Apr. 27	New host-switch graph category is set up with more specific requirements! "Graph Golf" competition to discover network configurations for future supercomputers is revived
May 25	Learning "programmatic thinking" at the NII Open House! —"Computer Science Park" to be held online and at satellite sites in Toyohashi, Himeji, and Hamamatsu on June 19
May 26	Method for automatically converting control software to enable safe operation even with sensors subject to measurement errors —Ensuring safe real-world operation even for designs based on the ideal assumption of "zero errors"
May 31	Online conversation about challenges in digital transformation ("DX") of elementary and secondary schools by Prof. HORITA, Tatsuya of Tohoku University and the NII Director —Keynote event of the NII Open House on data-driven education and the GIGA School Program
Jun. 16	A series of presentations on COVID-19 research with informatics at the NII Open House —NII Open House to be held online Friday June 18 and Saturday June 19
Jun. 17	First renewal of academic information system for university libraries in 36 years A cataloging and location information service for digitalized academic materials is being rolled out in stages starting in 2022
Jul. 1	New Global Research Center for Synthetic Media for studying AI video and audio —The center is pursuing research on AI video generation, fake media detection, and media reliability assurance
Jul. 13	"Guerrilla rainstorm" forecasting with "Fugaku" —Real-time demonstration trial with forecasts updated every 30 seconds starts in the Tokyo metropolitan area
Jul. 16	Japan Data Catalog for the Humanities and Social Sciences (JDCat) is launched Enables data searching in the humanities and social science data for use in research, education, and policymaking
Sep. 22	Development of the SYNTHETIQ synthetic video detector, a program for automatically determining fake facial videos generated by AI —Promoting research on AI video generation, fake media detection, and media reliability assurance
Oct. 20	Development of technology to automatically and efficiently discover a reliable gas turbine system design —Focused on logical specifications in black box optimization, applied to the design process for real products of companies
Nov. 4	Using deep neural networks to solve control system optimization problems Building a new approach to discrete-time stochastic optimal control problems in constrained nonlinear systems
Nov. 15	Development of technology to detect critical problems in autonomous vehicle operation using simulation —Efficient automatic searching of potential problems by exploring whether problems will occur
Nov. 17	Japan Data Catalog for the Humanities and Social Sciences (JDCat) starts full-scale operation Enables data cross-searching in the humanities and social sciences
Nov. 24	Discovery of the indirect network with the smallest theoretical diameter in "Graph Golf," a competition to find graphs leading to the efficient design of supercomputers —Effective also in configurations where network switches are used for indirect connections between CPUs
Jan. 14 2022	NII starts making medical datasets of Japan System Techniques available to academic researchers
Feb. 14	Promoting R&D on 5G data offloading using next-generation public wireless network technology (Passpoint) —A new research project commissioned in FY2021 as part of NICT's "Beyond 5G R&D Promotion Project" commences
Feb. 28	Demonstration for social implementation of a distributed inter-disciplinary data collaboration infrastructure technology for R&D on "cyberspace infrastructure technology utilizing big data and AI" under the "Cross-ministerial Strategic Innovation Promotion Program" (SIP) Second Phase of the Cabinet Office commences
Mar. 15	Storyboards from the anime "Little Witch Academia" to be used for research —Studio TRIGGER and NII start providing production materials from the anime for use by academic researchers
Apr. 1	Society 5.0-compliant academic research platform launches on April 1 —SINET6, the 400-Gbps network that connects all of Japan, and the research data platform NII-RDC are integrated to facilitate greater utilization, distribution, and management of research data in Japan

Organization

- Director-General
  - Assistant Director-General
  - Administrative Council
  - Advisory Board
  - Vice Director-General
  - Research Strategy Office (incl. URA)
    - Global Liaison Office
  - Support Office for Women Researchers
  - Silicon Valley Office (JETRO Joint Project)
  - Research Divisions
    - Principles of Informatics Research Division
    - Information Systems Architecture Science Research Division
    - Digital Content and Media Sciences Research Division
    - Information and Society Research Division
  - Research Centers
    - Services and Operations
      - Research and Development Center for Academic Networks
      - Research Center for Knowledge Media and Content Science
      - GRACE Center: Center for Global Research in Advanced Software Science and Engineering
      - Research Center for Community Knowledge
      - Center for Cloud Research and Development
      - Center for Dataset Sharing and Collaborative Research
      - Center for Strategic Cyber Resilience Research and Development
      - Research Center for Open Science and Data Platform
    - Major Research Projects
      - Global Research Center for Quantum Information Science
      - Global Research Center for Cyber-Physical Systems
      - Global Research Center for Big Data Mathematics
      - Research Center for Mathematical Trust in Software and Systems
      - Research Center for Medical Bigdata
      - Global Research Center for Synthetic Media
    - Collaboration with Industry, Government, and Academia
      - Center for Robust Intelligence and Social Technology
  - Office for Inter-Organizational Collaboration on R&D
    - Board for Scientific Research Digital Platform
    - Organization for Scientific Resources Operations and Coordination
  - Cyber Science Infrastructure Development Department
    - Academic Infrastructure Division
      - Coordination, Infrastructure & Liaison Team; SINET Team; Cloud Promotion Team; NII-SOCS Team; LAN and CSIRT Team
      - SINET Promotion Office; Academic Authentication Systems Office; Cloud Promotion Office
    - Scholarly and Academic Information Division
      - Library Support Team; Academic Content Team; Research Data Cloud Team; Content System Development Office
    - Library Liaison Cooperation Office
    - Advanced ICT Center
  - General Affairs Department
    - Planning Division
      - Planning Team; International Affairs and Education Support Team; Publicity Team
      - Office for Social Collaboration
        - Collaboration Support Team; Big Project and Intellectual Property Team
    - General Affairs Division
      - General Affairs Team; Personnel Affairs Team
    - Budget and Accounts Division
      - Finance and Accounting Team; Procurement Team
  - NII Library

Silicon Valley Office (JETRO Joint Project)

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	AIZAWA, Akiko
Vice Director-General	YONEDA, Tomohiro	Vice Director-General	TAKASU, Atsuhiro	ViceDirector-General/ Chief Cyber Science Infrastructure Director	YASUURA, Hiroto
Assistant Director-General	OYAMA, Keizo	Assistant Director-General	SUGIMOTO, Akihiro		

Director, Principles of Informatics Research Division	UNO, Takeaki	Director, Information Systems Architecture Science Research Division	JI, Yusheng
Director, Digital Content and Media Sciences Research Division	SATO, Imari	Director, Information and Society Research Division	ECHIZEN, Isao
GLO Acting Director	PLANAS, Emmanuel		

■Cyber Science Infrastructure Development Department

General Manager	AIDA, Kento	Deputy General Manager	TAKEYA, Kimie		
◇Academic Infrastructure Division Manager	SATO, Suguru	◇Scholarly and Academic Information Division Manager	YOSHIDA, Yukinae	◇Library Liaison Cooperation Office Head	YAMAZAKI, Hiroko
◇Advanced ICT Center Head	ABE, Shunji				

■General Affairs Department

General Manager	NISHIJIMA, Manabu				
◇Planning Division Manager	GOHARA, Masayoshi	◇General Affairs Division Manager	AOYAMA, Fumihiko	◇Budget and Accounts Division Manager	SATO, Yoshiro

■NII Library

Head SUN, Yuan

Staff Numbers

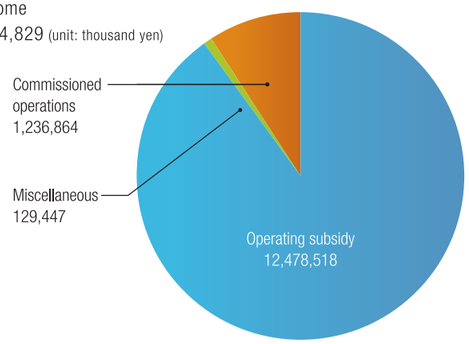
(as of May 2022)

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	26	24		17	75	63	138
Project professor, etc.		1		12	15		14	42		42
Special term/fixed-term/short-term staff										301

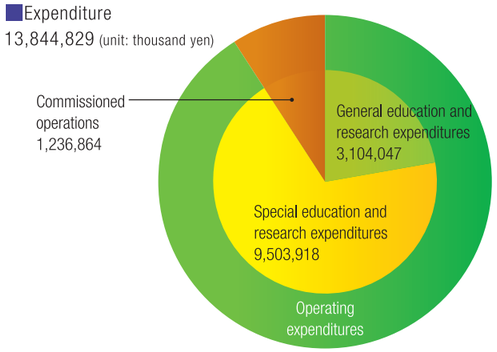
Budget

(FY2022)

■Income
13,844,829 (unit: thousand yen)



■Expenditure
13,844,829 (unit: thousand yen)



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

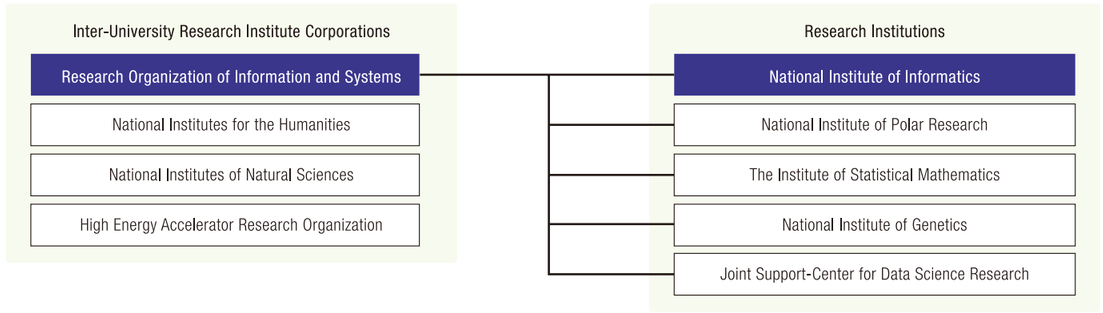
National Institute of Informatics (NII)

Name	Award date
SAWA, Takamitsu	April 1, 2002
NAITO, Eisuke	July 2, 2002
HATORI, Mitsutoshi	November 19, 2004
ONO, Kinji	November 19, 2004
YAMAMOTO, Takeo	April 1, 2005
SUEMATSU, Yasuharu	April 1, 2005
UENO, Haruki	April 1, 2007
MARUYAMA, Katsumi	April 1, 2010
NEGISHI, Masamitsu	April 1, 2010
MIURA, Kenichi	April 1, 2011
ASANO, Shoichiro	April 1, 2013

Name	Award date
KOYAMA, Teruo	April 1, 2015
MIYAZAWA, Akira	April 1, 2015
YAMADA, Shigeki	April 1, 2015
YAMAMOTO, Yoshihisa	April 1, 2015
SONEHARA, Noboru	April 1, 2017
ADACHI, Jun	April 1, 2018
HONIDEN, Shinichi	April 1, 2018
NAKAJIMA, Shin	April 1, 2021
HAYAMI, Ken	April 1, 2021
TAKANO, Akihiko	April 1, 2022
HASHIZUME, Hiromichi	April 1, 2022

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

Month/year	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 GeNii (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.
December 2018	Operation of Wide-area Data Collection Infrastructure (Mobile SINET) is launched.
March 2019	World’s first round-the-globe ultra-high-speed 100 Gbps academic communications network is built.
December	NII begins operating 400 Gbps Tokyo-Osaka link of SINET5.
October 2020	Kashiwa Annex is established in Kashiwa City, Chiba Pref.
November 2021	Japan Data Catalog for the Humanities and Social Sciences (JDCat) is launched.
April 2022	Science Information NETwork (SINET6) is launched.

Facilities and Locations

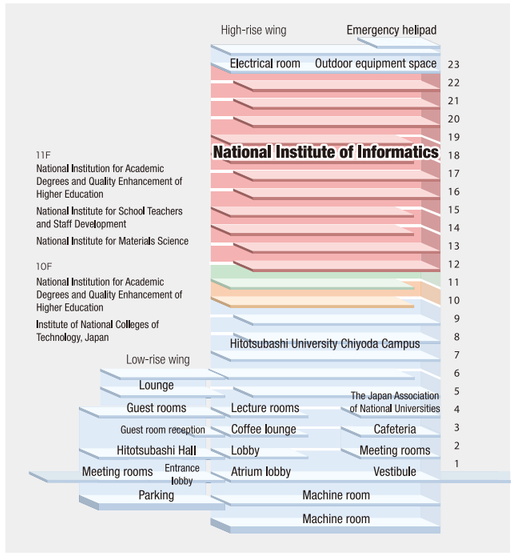
National Center of Sciences (Chiyoda-ku, Tokyo)

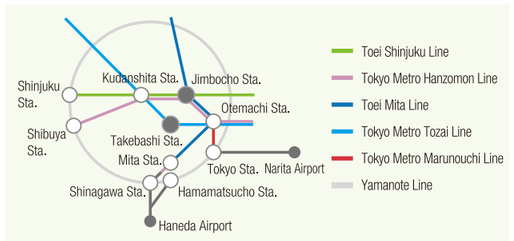
https://www.nii.ac.jp/en/

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 Institution 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.

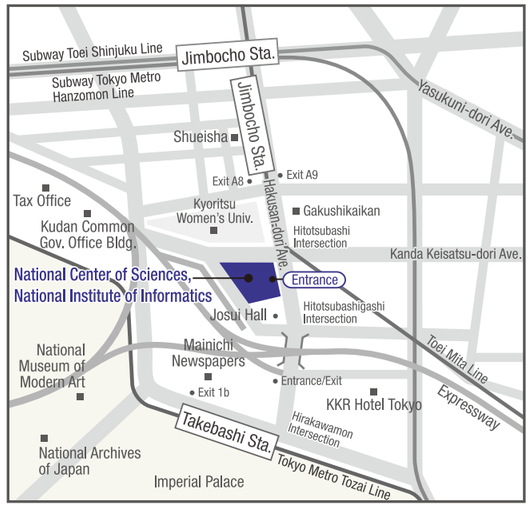
National Institute of Informatics

National Center of Sciences Bldg.
2-1-2 Hitotsubashi, Chiyoda-ku, Tokyo, 101-8430 Japan
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



Kashiwa Annex (Kashiwa City, Chiba Prefecture)

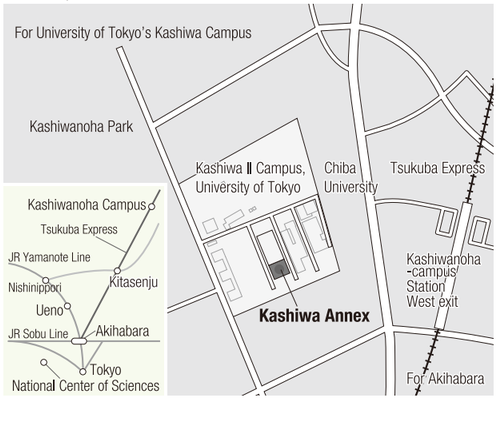
The Annex was completed in October 2020 on the University of Tokyo's Kashiwa II Campus as a facility to house equipment for various academic information services provided by NII, including the Science Information NETwork (SINET), and to serve as a center for NII's research and development.
The facility is to be used for seeking further improvement in research results by establishing it as part of the University of Tokyo's research complex for joint studies and collaborations.

Exterior of Kashiwa Annex

Kashiwa Annex

6-2-3 Kashiwanoha, Kashiwa City, Chiba, 277-0882 Japan
Tel: +81-4-7135-1640 (switchboard)
Of the building's total floor space of 10,672 ㎡, NII occupies 3,886 ㎡ for its exclusive use

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 completed in May 1997 on land donated by Dr. INOSE, Hiroshi, the first Director-General of NII. His wish was to create an ideal place for interdisciplinary and international studies 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-machi, Kitasaku-gun, Nagano, 389-0111 Japan
Tel. +81-267-41-1083; Fax +81-267-41-1075
■Site area: 3,339 m² ■Floor space: 667 m²

Guide Map