

# NII

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

National Institute of Informatics

# 2023 Overview



# Contents

Top Message: From data platforms to knowledge platforms.....	02
Weaving Information into Knowledge.....	03
■ Research	
Research Divisions.....	05
Research Centers.....	06
List of Researchers: Principles of Informatics Research Division.....	08
Information Systems Architecture Science Research Division.....	10
Digital Content and Media Sciences Research Division.....	12
Information and Society Research Division.....	15
Executives (related to research).....	16
Service Division.....	17
Major Project Involvement.....	19
Kakenhi.....	22
Human Resource Development (Top SE/Experts in Information Science: Public-Private Collaborative Training Program).....	24
Collaborative Research Promotion.....	25
Intellectual Property.....	26
Collaboration with Industry, Government, and Academia (Advancing Practical R&D and Collaborative Activities)/Academic Consultation by Researchers.....	27
Innovation Produced by Knowledge.....	28
International Exchange.....	29
■ Graduate Program	
Informatics Program, Graduate Institute for Advanced Studies, SOKENDAI/Message from the Dean of the Department of Informatics.....	33
Research by Current Students/Student Data.....	34
Curriculum.....	35
Partnership with Graduate Schools/Research Students for Special Collaboration.....	36
■ Service	
Science Information NETwork (SINET) Available Nationwide at Ultra-High Speed with Low Latency.....	37
Concepts and Features of SINET6.....	39
GakuNin Cloud: Support for Cloud Adoption and Use.....	40
Building an Authentication Infrastructure.....	41
Supporting Information Security Framework through Inter-University Collaboration/Board for Scientific Research Digital Platform.....	42
Open Science.....	43
Supporting Research Promotion and Research Integrity/Training in Research Data Management.....	44
Support for Construction and Linkage of Institutional Repositories (JAIR Cloud)/Japan Consortium for Open Access Repository.....	45
Publishing and Communicating Scientific Information(CiNii).....	46
Database of Grants-in-Aid for Scientific Research/Catalog Information Service/Database Sharing Service for Electronic Resources.....	47
Digital Archives/Promoting Scholarly Communication/Education and Training Services.....	48
Collaboration with University Libraries/Japan Alliance of University Library Consortia for E-Resources/Future Scholarly Information Systems Committee.....	49
Operating and Maintaining the Authentication Infrastructure for the High Performance Computing Infrastructure (HPCI).....	50
■ Organization/Others	
NII Library: Contributing to Informatics Research and Education.....	50
Public Communications (NII Open House/Public Lectures/Special Classes at High Schools and Technical Colleges/Publications/Exhibitions/Digital Media).....	51
News Releases.....	52
Organization/Silicon Valley Office.....	53
Executives/Staff Numbers/Budget.....	54
Administrative Council/Advisory Board/Professors Emeriti/Inter-University Research Institute Corporations.....	55
History.....	56
Facilities and Locations (National Center of Sciences/Kashiwa Annex/International Seminar House for Advanced Studies).....	57





## Top Message

### From data platforms to knowledge platforms

**KUROHASHI, Sadao**

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



Since computers first emerged in the mid-20th century, informatics has had a far-reaching impact on society and the academic world. The invention of the World Wide Web (WWW) thirty years ago fundamentally changed how information was released and circulated, how information was revolutionizing the very structure of society. In the last decade, there have been incredible developments in deep learning: AlphaFold's prediction of protein structures has revolutionized life sciences research, while the DeepL machine translation system, trained with vast quantities of bilingual data from the web, is transforming the way we communicate. Recently, the news is full of stories about ChatGPT, the AI chatbot that can write essays of a good enough level to pass regular university exams. A future of complete coexistence between AI and humans is approaching faster than we can imagine. Meanwhile, modern society is grappling with problems including environmental issues, inequality, and regional conflicts. The human race is suffering in a world of contradictions. To tackle complex social issues, design a world where AI and humans coexist, and bring true peace of mind for everyone, it will require cooperation between different areas of academic research, including the humanities and social sciences. Preparing the groundwork to make this possible is a matter of urgency.

The importance of data is a clear trend in science and society in the 21st century. Significant scientific progress is being made by creating data from observations and measurements, and digitizing and making the data openly available for discussion and utilization. In Japan, the National Institute of Informatics (NII) has been instrumental in developing research data platforms, culminating in the latest SINET6 network.

One problem in promoting collaboration between different areas of

academic research is that experts in a particular field are amateurs when it comes to other fields, so it is not easy to get an overview of various fields and utilize data directly. In order to deepen future academic research as comprehensive knowledge to address complex social issues, it will be necessary to automate the process of interpreting data, interconnecting and systematizing knowledge, and building knowledge platforms to support the creation of new cross-disciplinary knowledge. The need for such platforms was first pointed out more than a decade ago. Now that data platforms are in place, people are starting to realize the value of making data openly available, and it is becoming possible to interpret papers and multimedia data using AI foundation models stemming from machine translation research. Thus, the time has finally come for us to focus on building a knowledge platform. However, building an AI-foundation model requires large-scale computational resources, and the growing oligopoly by some international companies is a major issue. I believe that in Japan, we need to work together as a nation to establish systems for research, development, and operation of AI-foundation models and to work on constructing knowledge platforms.

In this time of rapid social change, I have been appointed as Director-General of NII from April 2023. As an inter-university research institute and also the core organization for informatics in Japan, the NII has responded to the needs of society through our two areas of work: research and services under the leadership of previous directors. Furthermore, we engage in informatics research from basic theory to cutting-edge topics, and our work provides academic networks and research data platforms. Additionally, we aim to build step by step a knowledge platform that will form the foundation for collaboration in academic research.

# Weaving Information into Knowledge

## Informatics to Create Future Value on the Wheels of “Research” and “Service”



### 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.

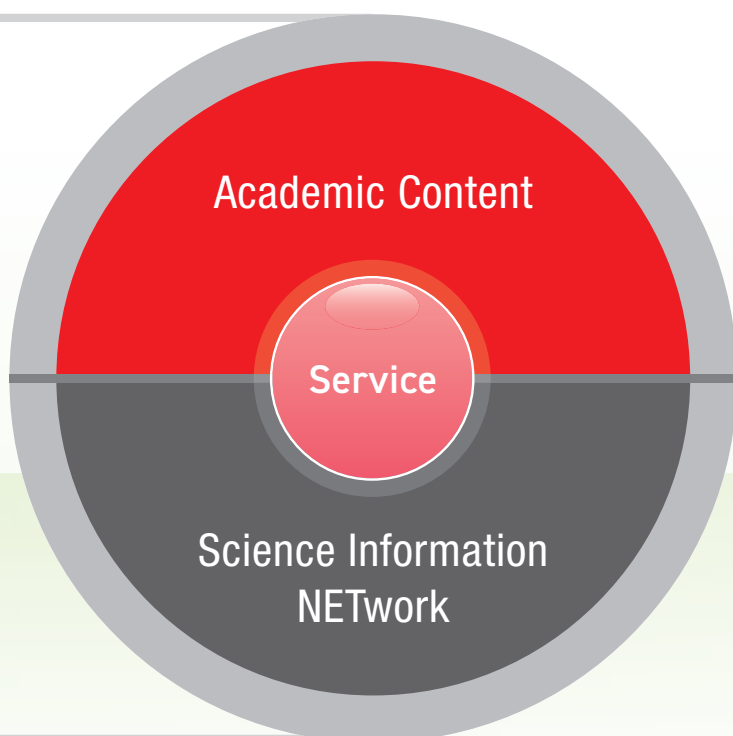
### Graduate Program

#### Fostering new leaders for an advanced information society

The graduate program at NII is carried out in three ways: (1) participating in the Graduate University for Advanced Studies, SOKENDAI, (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 an Informatics Program, offering graduate school education for Five-year and Three-year Doctoral Programs. There are six areas of education and research within the Informatics Program, so students can take lectures and receive research supervision according to the field in which they wish to specialize.



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.



## Service

### Supporting academic research infrastructure and education

In collaboration with universities, research institutions, and the entire research community, NII builds and operates the Science Information NETwork (SINET). Leveraging the SINET network's ultra-high speed, high reliability, and multifunctionality, NII provides an authentication federation platform, cloud adoption and utilization support, and academic content platforms as well as develops the NII Research Data Cloud to promote open science. Through those services, NII is working to maintain and provide the Scientific Research Digital Platform. Furthermore, NII Security Operation Collaboration Services contribute to building the framework enabling national universities and other academic institutions to respond quickly to cyber security incidents and other issues.

#### 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 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: TAKEDA, Hideaki

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, generative models, vision and language analysis, 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 1000 universities and research institutes in Japan.

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

**Vice Director:** KURIMOTO, Takashi (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/ Professor Emeritus, 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)

#### Center for Research Data Ecosystem Development

With a focus on national research data infrastructure, promotes R&D directed at the development of a research data ecosystem as a means to foster the sustainable management and utilization of research data.

**Director:** KUROHASHI, Sadao (Director-General, NII)

**Vice Director:** YASUURA, Hiroto (Vice Director-General, NII)

#### 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 (Project Professor/ Professor Emeritus, NII)

#### 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)





## Research Centers

### 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)

#### Research Center for Mathematical Trust in Software and Systems

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)

#### 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)

### Industry-Academia Collaboration

#### Center for Advanced Mobile Driven Research

Aims at the creation of an innovative next-generation common research data platform based on the accumulation of use cases and advanced application development by leveraging the high speed of a leading-edge scientific information network (SINET6) and a high-performance local 5G mobile environment.

**Director:** KUROHASHI, Sadao (Director-General, NII)

**Vice Directors:** YOSHIDA, Susumu (Professor Emeritus, Kyoto University),  
SUZUKI, Shigeki (President, YRP, Inc.)



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 for implementation of quantum processors and measurement problem of quantum mechanics.

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 guarantees and their applications to machine learning.

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.

Professor  
INOUE, Katsumi  
Ph.D. (Engineering)



**Specialties:** Artificial Intelligence; Knowledge Representation and Reasoning; Machine Learning; Logic Programming  
**Research themes:** Theories of representation, reasoning, learning, and their integrations. Understanding and explanation of the dynamics of systems and the world.

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:** Her research focuses on mathematical methods for control and optimization, with a particular emphasis on addressing uncertainty. Recently, she has been focused on developing new theoretical frameworks and mathematical tools for solving a range of problems in "networked control systems," where the dynamical systems are controlled through communication networks.

Assistant Professor  
KOBAYASHI, Taisuke  
Dr. Eng.



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

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



**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 quantum 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.

Project Professor  
NITTA, Katsumi  
Doctor of Engineering



**Specialties:** Artificial Intelligence, Legal Informatics, Human Agent Communication  
**Research themes:** Research on computer assisted negotiation and argumentation, and judgment prediction through analysis of legal precedents

Project Professor  
SATO, Taisuke  
Doctor of Engineering



**Specialties:** Artificial intelligence, probabilistic modeling, neuro-symbolic  
**Research themes:** Logic-based artificial intelligence unified with probability working in vector spaces

Professor  
SATO, Ken  
Ph.D. (Science)



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



## Principles of Informatics Research Division

Assistant Professor  
**SHIGAKI, Shunsuke**  
Ph.D. (Engineering)



**Specialties:** Intelligent Robots/Neuroethology/System Identification

**Research themes:** Establish an implementation method to develop a robot system that can behave intelligently in a real environment. Specifically, working on extracting the intelligence possessed by living organisms and reconstructing it in an engineering manner.

Associate Professor  
**SOEDA, Akihito**  
Ph.D.



**Specialties:** Quantum information theory. Quantum algorithms. Higher-order quantum information processing.

**Research themes:**

Theoretical research on quantum information. Especially on quantum algorithms to address large-scale problems while respecting the recent progresses of quantum information processing devices/systems.

Associate Professor  
**SUGIYAMA, Mahito**  
Ph.D. (Informatics)



**Specialties:** Machine learning; Data mining

**Research themes:**

Fundamental and practical methodologies of data science, data mining, and statistics, focusing on machine learning theories. Developing theories to support the reliability of information obtained from data for trustworthy AI.

Professor  
**TAKEDA, Hideaki**  
Director, Principles of Informatics Research Division  
Doctor of 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.

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 27, solved the 2th of 22 important and difficult type theory problems. Research results are being used in implementing large-scale high-quality programs.

Professor  
**UNO, Takeaki**  
Ph.D. (Science)



**Specialties:** Development of high-speed algorithms for large-scale computation in data mining and genome informatics; Analysis of computation for distributed and especially

enumeration algorithms, methods for building and accelerating industrial computation models, scheduling, facility placement, etc.

**Research themes:** Program theory (algorithms) for processing large amounts of information quickly. Efficiently finding data features. Technology to make data more easily comprehensible. Many applications including matchmaking, advertising, and intestinal bacteria.

Professor  
**YOSHIDA, Yuichi**  
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.





### 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 clouds and IoT.



### 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.



### 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.



### 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.



### Associate Professor FUJIWARA, Ikki

Ph.D. in Informatics

**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.



### 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 control of the Internet, we measure, analyze and model information flows on the Internet.



### Professor GOSHIMA, Masahiro

Ph.D. (Informatics)

**Specialties:** Processor architecture; Memory architecture; Digital circuit technology

#### **Research themes:**

Continuous speedup of computers serves as a foundation of development of information society. Over the past ten years, though the clock speeds remained constant, the effective speeds have increased by a factor of ten. Ongoing research to extend this trend for another ten or twenty years.



### 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 Assistant Professor HIRASAWA, Shoichi

Doctor of Philosophy

**Specialties:** Computer Systems, Programming Language Systems, Auto-tuning

**Research themes:** Research on optimization techniques for computer architectures, particularly to reduce routing processing delays in interconnected networks, and on optimization of whole computer systems with complex performance parameters, aiming for high performance and efficiency by means of fast searching.



### 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.



### Associate Professor ISHIKAWA, Fuyuki

Vice Director, Grace Center: Center for Global Research in Advanced Software Science and Engineering  
Ph.D. (Information Science and Technology)

**Specialties:** Software engineering; Testing; Formal methods; Autonomous and smart systems; Cyber-physical systems; Machine learning systems engineering

**Research themes:** "Smart systems and smart dependability assurance": research on automated test generation, optimization, formal verification, and debugging for both of requirements/design models and black-box simulators/implementations for leading-edge AI systems.



### Professor ISHIKAWA, Yutaka

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

**Specialties:** System software; Operating systems; Cybersecurity; Parallel and distributed processing

**Research themes:** Study on system software for cybersecurity has been focused, such as vulnerability analysis based on threat analysis, trusted execution environment built from root of trust, mandatory access control, runtime monitoring and execution enforcement.





### Professor JI, Yusheng

Director, Information Systems  
Architecture Science  
Research Division  
Ph.D. (Engineering)

**Specialties:** Resource  
management; Quality of  
service; Mobile computing

#### Research themes:

Conducting research on resource allocation, access control, and quality of service management in mobile communications and network systems for realizing high-quality, high-capacity, and highly efficient information networking.



### Associate Professor KANEKO, Megumi

Ph.D. (Engineering),  
HDR (French Habilitation for  
Directing Research at  
Professor Level)

**Specialties:** Wireless  
communications; Mobile  
networks; IoT communication  
networks; LPWA

**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.



### Assistant Professor KATO, Hiroyuki

Ph.D. (Engineering)

**Specialties:** Database  
programming languages;  
View update problem; Query  
optimization

**Research themes:** It become possible to create new value by connecting existing systems. Software foundations for the data interoperability are needed.



### Project 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 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 performance



### 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 KURIMOTO, Takashi

Vice Director, Research and  
Development Center for  
Academic Networks  
Head, SINET Promotion  
Office"  
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.



### Associate Professor SAKANE, Eisaku

Head, Academic  
Authentication Systems  
Office  
Doctor of 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.



### Associate Professor SEKIYAMA, Taro

Ph.D. (Informatics)

**Specialties:** Programming  
language theory; Type  
systems; Program verification

**Research themes:** Program verification with type systems (specifically, gradual typing for integrating static and dynamic typing, effect systems for analyzing the use of computational effects, type systems allowing the flexible use of delimited continuations) and formal methods for IoT systems.



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.

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



**Specialties:** Cybersecurity; High-reliability networks; Organizational Resilience Management, Autonomous Mobile Security

**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.

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.

Professor  
**TAKEFUSA, Atsuko**  
Head, Cloud Promotion Office  
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 clouds, thus making advanced analysis easier. Also, R&D on software that supports the development of highly efficient IoT systems, and on technologies for building a computing environment using container-based virtualization.

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  
**ANDRES, Frederic**

Ph. D., HDR (Habilitation Diriger des Recherches)



**Specialties:** Mulsemedia; Collective intelligence; Data science; Vary Large Database;

**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.

Assistant Professor  
**ASANO, Yuta**  
Doctor of 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.

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.





## Digital Content and Media Sciences Research Division

### Assistant Professor IKEHATA, Satoshi

Ph.D. (Information Science  
and Technology)

**Specialties:** Computer vision;  
Computer graphics

**Research themes:** We are working on cutting-edge 3D computer vision research using digital cameras, distance sensors, and other devices. Our goal is to develop practical 3D reconstruction techniques that can be used in various fields such as geography, architecture, medicine, and entertainment by achieving casual, industry-applicable professional 3D measurements.



### Associate Professor KANAZAWA, Teruhito

Ph.D. (Engineering)

**Specialties:** Information Access Technology, Bibliographic and Human 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 analysis of research capabilities.



### 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. Focusing on grid and SMP as key technologies, and devising databases and algorithms for them. Pursuing applications to multimedia data analytics for TV archives.



### 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:** Structured multi-dimensional image representation and distributed systems for visual communication with real-time quality control

**Research themes:** Methods for free viewpoint image reconstruction and scene refocusing. Advanced visual media using multi-dimensional signal processing based on innovative technologies for directly capturing, storing, transmitting, and displaying light ray information within the 3D spaces beyond its conventional 2D images.



### 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.



### Associate Professor KOYAMA, Shoichi

Ph.D. (Information Science  
and Technology)

**Specialties:** Acoustic Signal Processing; Physics-informed Machine Learning; Inverse Problem; Spatial Audio

**Research themes:** Sound field analysis and control and their applications. Developing new methodologies of signal processing and machine learning considering properties of the wave field and their applications to virtual reality audio, spatial active noise control, etc.



### 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.



### Assistant Professor NISHIOKA, Chifumi

Doktor der Ingenieurwissenschaften  
(Dr.-Ing.)

**Specialties:** Academic Information Distribution, Open Science, Bibliometrics

**Research themes:** Research and development on open science platforms to promote publication and sharing of academic publications, research data, and other research results. Surveys and research to verify the effectiveness of open science platforms using citation data.



### Project Professor OYAMA, Keizo

Director, Center for Dataset Sharing and Collaborative Research  
Professor Emeritus, NII  
Ph.D. (Engineering)

**Specialties:** Data analysis of web user behavior and improvement of access to information; Web information retrieval technology; Full-text search technology; Digital Humanities  
**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.



### Professor PRENDINGER, Helmut

Ph.D.

**Specialties:** Artificial Intelligence, Deep Learning, Intelligent Drone

**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 deep learning. Analysis of time series.



### Professor SATO, Imari

Director, Digital Content and Media Sciences Research Division  
Ph.D. (Interdisciplinary Informatics)

**Specialties:** Physics-based object shape and reflectance modeling; Creation of spatially immersive displays for human-computer interaction

**Research themes:** The spectral absorption of objects provides innate information about material properties. We propose various shape recovery methods and internal structure analysis approaches focusing on the properties of light such as absorption, emission, and refraction: 3D modeling by PAI, shape from water, shape from chromatic aberration, and shape from fluorescence as well as a novel imaging technique of scattering characteristics of tissue in transmitted microscopy.



Professor  
SATO, Shin'ichi

Vice Director, Research  
Center for Medical Bigdata  
Doctor of 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.

**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.



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  
SUGIMOTO, Akihiro

Vice Director-General  
Ph.D. (Engineering)

**Specialties:** Sensing and  
understanding human activities in  
daily life; Real-time 3D environment  
reconstruction 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 perspectives, giving  
particular thoughts to the nature of "seeing." Especially,  
reformulating problems in computer vision from the mathematical  
engineering perspective to establish a visual information  
mathematics.



Professor  
TAKASU, Atsuhiko

Vice Director-General;  
Ph.D. (Engineering)

**Specialties:** Data  
engineering; Structural  
matching; Sequence data  
analysis

**Research themes:** Analytical  
technology for identifying and extracting underlying  
knowledge in large-scale text data and sensor data, as well  
as data management technology for efficient analysis.



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.



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.



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.



Professor  
YAMAJI, Kazutsuna

Director, Research Center for  
Open Science and Data  
Platform  
Ph.D.

**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 workflows and provide  
services to universities and research facilities in Japan.



Assistant Professor  
YU, Yi

Ph.D. (Information Science)

**Specialties:** Multimodal  
content analysis using  
artificial intelligence and deep  
learning

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





## Information and Society Research Division

### 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.



### Associate Professor BONO, Mayumi

Ph.D.

**Specialties:** Multimodal  
interaction analysis; Sign  
language corpus linguistics

**Research themes:** To  
observe the mechanisms of  
human social interaction, we  
record multimodal interactions and signed languages and  
construct corpus data. By comparing spoken and signed  
languages, we aim to reconsider communication theories  
created for spoken languages.



### Professor ECHIZEN, Isao

Director, Information and  
Society Research Division;  
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.



### Associate Professor FUNAMORI, Miho

Strategy Manager, Research  
Center for Open Science and  
Data Platform  
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.



### Assistant Professor FURUKAWA, Masako

Doctor of Philosophy in  
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.



### 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.



### Professor KANDO, Noriko

Ph.D. (Library and  
Information Science)

**Specialties:** Evaluation of  
information access  
technologies; Exploratory  
search and user interface;  
Cognitive research for  
exploratory search; Extracting  
attitudes and relations from text

**Research themes:** Search systems for cases when the  
answer cannot be anticipated, or when the user does not  
know where to start. The objective is to build a  
mechanism to gather useful information satisfying the  
underlying needs of a query.



### Associate Professor MIZUNO, Takayuki

Ph.D. (Science)

**Specialties:** 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.



### Project Assistant Professor NGUYEN, Hong Huy

Ph.D. (Informatics)

**Specialties:** Machine  
learning, biometrics

**Research themes:** Synthetic  
media such as images,  
videos, and text have both  
positive and negative effects on society. Some synthetic  
media are related to human biometrics, raising security  
and privacy concerns. Work to mitigate the downside of  
synthetic media, especially in cyberspace.



### Associate Professor NISHIZAWA, Masaki

Ph.D. (Science)

**Specialties:** Scientometrics;  
Bibliometrics; Cosmic-ray  
physics

**Research themes:** The  
relationship between press  
releases and media reports  
about academic research, and the relationship between  
industry-academia collaborative research and academic  
marketing.



### Associate Professor OKADA, Hitoshi

Ph.D. (International Public  
Policy)

**Specialties:** Critical growth  
factors of e-commerce and  
e-money; Interdisciplinary  
research on the social  
implications of blockchain  
technology

**Research themes:** Blockchain technology can be applied  
to various aspects of internet transactions. Distribution  
experiments were conducted using a system to verify the  
operational feasibility. Legal issues are analysed, and their  
application to the economy and society is considered  
interdisciplinary.



### Professor SATO, Ichiro

Ph.D. (Engineering)

**Specialties:** System  
software (OS and  
middleware) and architecture  
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)

As of April , 2023

See p.54 for the list of Executives.

Associate Professor  
**SUN, Yuan**

Head, NII Library  
M.A. (Education)



**Specialties:** Educational Measurement; Psychological statistics; Test theory; Bibliometrics

**Research themes:** Cognitive diagnostic assessment for individual learners based on learner and domain modelling, and support for personalized learning; Preprints on scholarly communication and Research evaluation

Assistant Professor  
**UEKI, Kouichirou**  
M.Sc.



**Specialties:** Development of the next generation information systems

**Research themes:** Natural information processing methods, specifically working on neural networks and genetic algorithms. Research and development for the next generation science information systems using these technologies.



Director-General  
**KUROHASHI, Sadao**

Professor, NII  
Program-Specific Professor, Kyoto University



Vice Director-General  
**KATAOKA, Hiroshi**

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;

Research

Graduate Program

Service

Organization/Others

## Service Division

### 〈 Center for Cloud Research and Development 〉

Project Associate  
Professor  
OE, Kazuichi  
Ph.D.



**Specialties:** Computer System/Analysis of workloads/Replacement Algorithm/System Software

**Research themes:** Research for computer systems that can transparently access computer resources in on-premises and multiple cloud environments. Research for hybrid memory/storage systems.

### 〈 Grace Center: Center for Goba Research in Advanced Software Science and Engineering 〉

Project Professor  
HONIDEN, Shinichi  
Director of the center  
Professor Emeritus, NII  
Doctor of Engineering



**Specialties:** Software Engineering, Agent Engineering, Self-adaptive Engineering

**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.

### 〈 Center for Strategic Cyber Resilience Research and Development 〉

Project Associate  
Professor  
HASEGAWA, Hirokazu  
Ph. D



**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 response measures 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 Development 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.



**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.



**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 Knowledge 〉

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.

### 〈 Research Center for Medical Bigdata 〉

Project Associate  
Professor  
MURAO, Kohei  
Ph.D.



**Specialties:** Medical image processing/Diagnosis support/Computer Aided Detection and Differentiation/Cloud platform configuration and operation

**Research themes:** Medical image processing for abnormality detection, differentiation, severity estimation, etc. The configuration and operation of the cloud platform for the development of medical image processing technologies.

## 〈Research Center for Open Science and Research Data Platform〉

Project Assistant  
Professor  
**ASAOKA, Makoto**  
Master



**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 Assistant  
Professor  
**HAYASHI, Masaharu**  
Doctor of Knowledge Science



**Specialties:** Research on building 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  
**MINAMIYAMA, Yasuyuki**  
Doctor of Philosophy



**Specialties:** Informatics/Web and service informatics/ Informatics/Intelligent informatics/ Humanities & social sciences/ Library/information science humanistic/social informatics

**Research themes:** Conducting research on interdisciplinary data curation to facilitate access and reuse of research data. Through analysis and formalization of data curation activities across fields, I will work to develop functions that provide highly reusable information packages in the research data management platform.

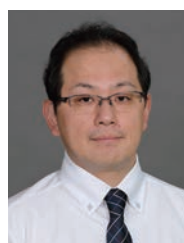
Project Assistant  
Professor  
**NAGAOKA, Chikako**  
Ph.D.



**Specialties:** Online Learning Environment, Sharing and Utilizing Learning Content, Open Education

**Research themes:** Design and development of online learning environments built around a learning management system (LMS) such as Moodle; additionally, the development of a platform to support the sharing of learning contents and the utilization of micro-credentials.

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 Associate  
Professor  
**SHIMOYAMA, Takeshi**  
Ph.D.



**Specialties:** Research Data Management Platform/ Research Data Provenance/ Information Security(Cryptanalysis)

**Research themes:** Engaged in research and development related to research data management platform GakuNin RDM, especially research integrity.

Project Professor  
**TAKAHASHI, Katsumi**  
Ph.D. in the field of Information Science and Technology



**Specialties:** Data Security, Data Privacy

**Research themes:** I am developing NII RDC Secure Analysis Functions (e.g., secure computation) for safe and secure sharing of data and research results in data-driven research. I am studying in the relationship between privacy technologies and ethical/legal issues.

Names are listed in alphabetical order (of surnames).

The titles of listed researchers include Professor, Project Professor, Associate Professor, Project Associate Professor, Assistant Professor, Project Assistant Professor, Associate, and Project Associate.

Please refer to the URLs below for information on Project Researchers and Visiting Researchers, as well as to p. 55 of this publication for information on Professors Emeritus.

\* Project Professors, Project Associate Professors, Project Assistant Professors, and Project Associates may not be listed in this publication, at their request or for other reasons.

List of Project Researchers: <https://www.nii.ac.jp/en/faculty/list/project-profs/>



## Major Project Involvement

Applications Accepted

(FY2022)

No. of applications accepted	Amount (in thousands of yen)
18	692,738

\* Large-scale projects: Grants-in-Aid for Scientific Research S or higher grade, ERATO, CREST, PRESTO, MIRAI, and other projects with an annual research budget of ¥20 million or more.

### Grant-in-Aid for Transformative Research Areas (A)

## Photonic Approximate Computing Highlighting Ultimate Nature of Light

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

This research investigates photonic approximate computing that utilizes multi-value representation capability to the extreme. With classical computers, each signal is processed one bit at a time. In contrast, this approximate computing performs multi-value processing on each wavelength, making it possible to achieve computational speeds up to 10 times the current speeds. The trade-off of using multi-value processing is that reliability and technological maturity become a challenge. This R&D work is focused on algorithms, processing systems, and architecture for approximate processing in photonic

computing. A key feature of this approximate computing is that it uses wide-band I/O, taking full advantage of co-packaged optics (CPO), a photonics-electronics convergence technology, and on-board silicon photonics-based transceivers. Ultimately, this team will be the first in the world to successfully integrate approximate computing and photonic computing, and to demonstrate a system architecture that takes advantage of the extreme performance potential of light.

### Grant-in-Aid for Scientific Research (S)

## Graph Algorithms and Optimization: Theory and Scalable Algorithms

Principal Investigator: Professor, Principles of Informatics Research Division, KAWARABAYASHI, Ken-ichi

In recent years, as what is called the “fourth paradigm” of (data-intensive) scientific discovery has emerged, information processing technology has become indispensable to almost every field of science. Given that algorithms are the driving force of high-performance processing, their study is more vital than ever. For example, current algorithmic innovations in information retrieval, privacy protection, and other areas are fueling the creation of national-scale businesses. This study utilizes mathematical tools to enrich and strengthen the

theoretical foundations of algorithms (especially graph algorithms), to try to increase the speed and scalability of algorithms.

There are three main research topics:

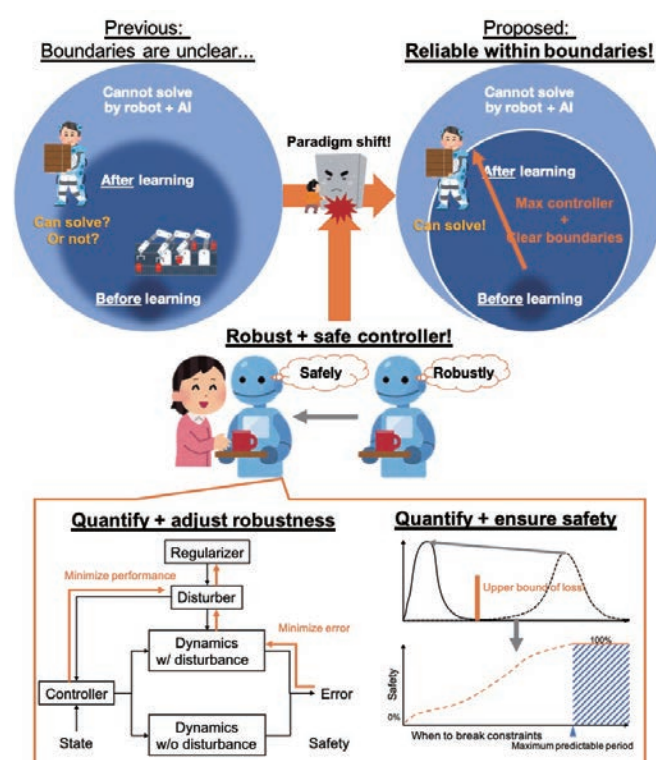
1. Structure analysis in discrete mathematics and graph algorithms
2. Online algorithm development and its application to machine learning
3. Application of algorithmic techniques to machine learning

### Japan Science and Technology Agency (JST) PRESTO: The Fundamental Technologies for Trustworthy AI

## Deep reinforcement learning to determine robustness and security performance limits

Principal Investigator: Assistant Professor, Principles of Informatics Research Division, KOBAYASHI, Taisuke

In recent years, advances in deep reinforcement learning have made it possible to move robots in a skillful manner, but the technology remains insufficiently reliable for use in controllers. Research focused on two particularly difficult challenges—robustness, or the ability of a robot to deal with worst-case scenarios, and safety, the ability to satisfy the constraints of a robot—has led to proposals of techniques for improvement, but comprehensive studies of the technology have been very limited. Nevertheless, any haphazard attempt to achieve or improve these two indicators of reliability is likely to result in errors. For example, in the scenario where a robot hands an object to a person, giving excessive consideration to the worst-case scenario can result in mistakenly assuming that the constraint condition of “not colliding with a person” cannot be strictly satisfied. In other words, current techniques for achieving robustness and safety can easily interfere with each other, resulting in a failure to achieve the desired result. Therefore, a method that comprehensively considers both is needed. This study aims at developing a technique for maximizing robustness, without interference problems causing the desired task to fail, while at the same time making safety the highest priority. Furthermore, the robustness and safety of controllers developed through deep reinforcement learning are quantitatively evaluated, to clarify the problems and the kinds of tasks that a controller can handle. More specifically, the aim is to develop learning rules and probabilistic models that can appropriately express worst-case scenarios as the tail of a probability distribution and optimal control algorithms for discovering safe suboptimal solutions in real time. The results are tested in demonstration experiments with robots.





## 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.

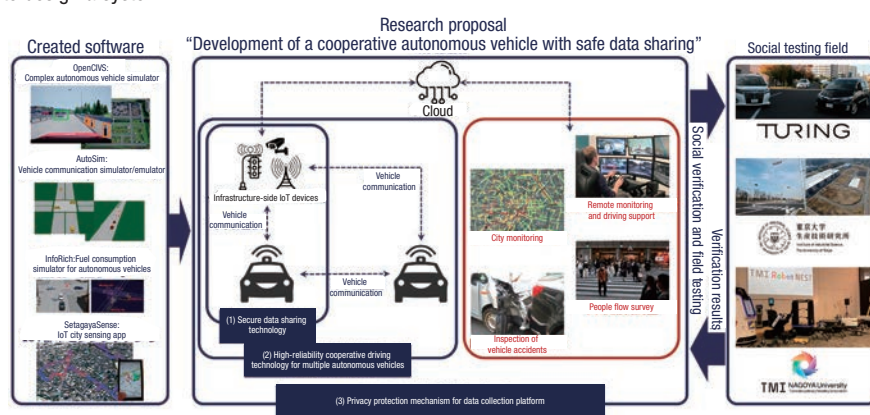


Fig. Developing a cooperative autonomous vehicle with data sharing for the creation of new urban applications

## 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/>

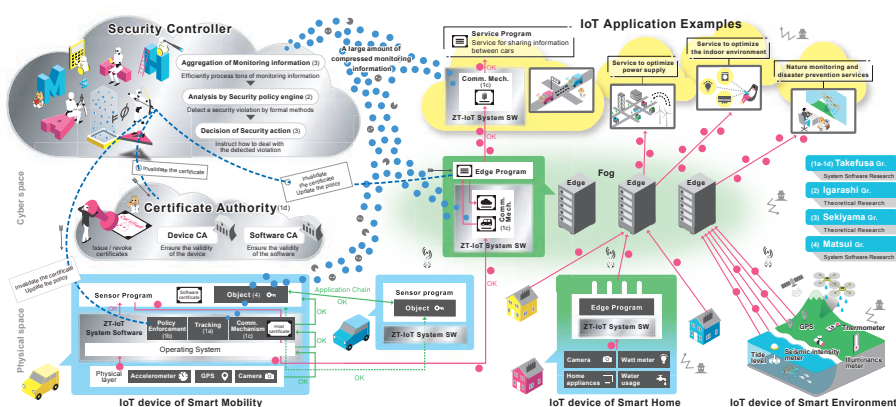


Fig: Overview of Zero Trust IoT system



## Major Project Involvement

JST CREST: [Trusted quality AI systems] Core technologies for trusted quality AI systems

### 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 straightforwardly 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.

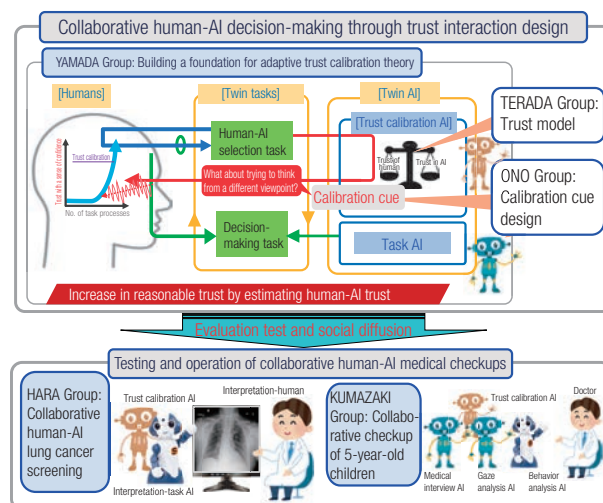


Fig: Trust interaction design and its applications

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

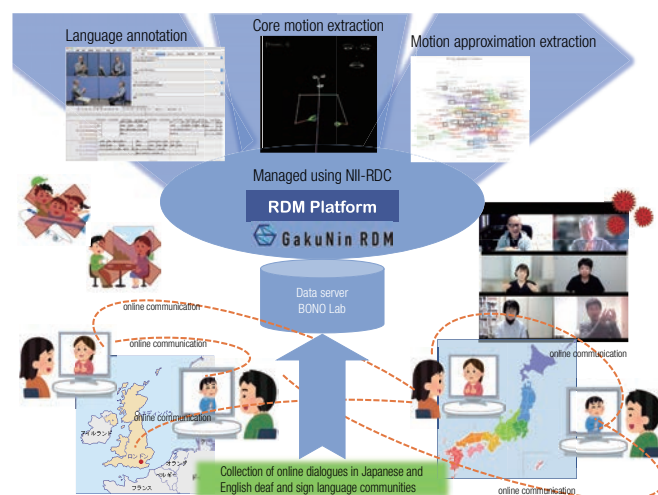
### Understanding cross-signing phenomena in video conferencing situations during and post-COVID-19

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



## 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

(FY2022)

	No. of applications accepted	Amount (in thousands of yen)
Project Leader (Principal Investigator)	73	388,186
Co-investigator (Other institutions → NII)	57	60,700

## [Model Cases of Research Funded by Kakenhi]

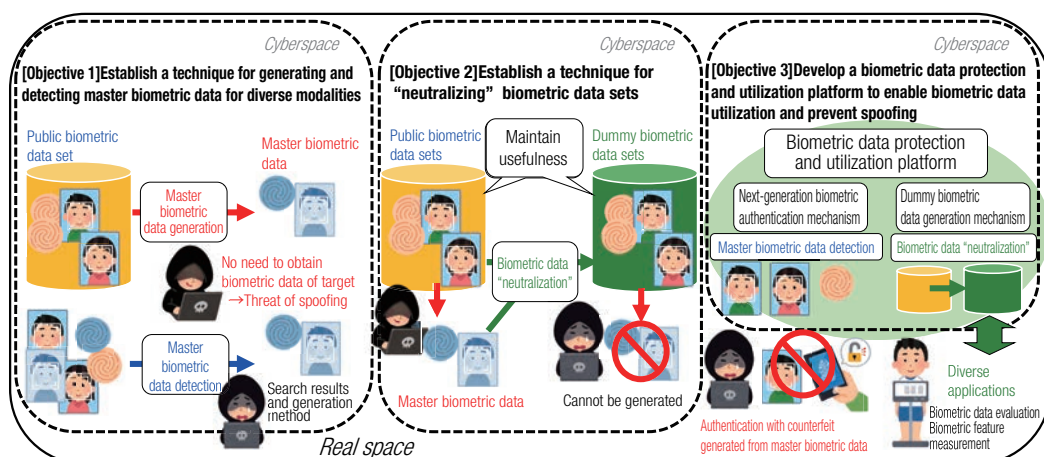
## Grant-in-Aid for Scientific Research (A)

## 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.

## Preventing the spread of fake information

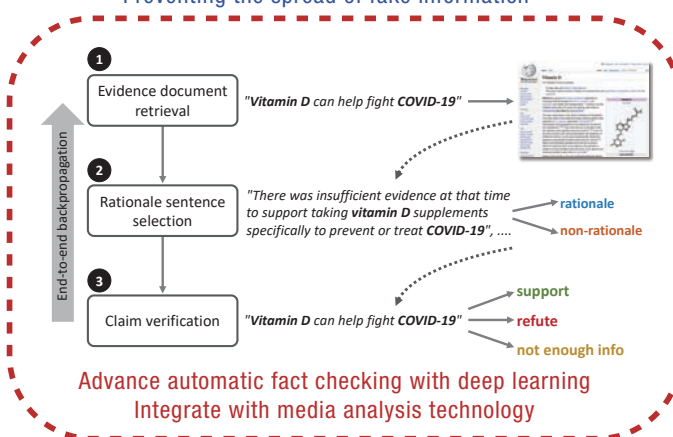


Fig: Framework for automated fact-checking based on deep learning





## Grant-in-Aid for Scientific Research (A)

## Development of ODR system by AI

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

This study aims at using AI technology to develop an efficient online dispute resolution (ODR) system for general use, by applying a previously developed civil court dispute resolution system (for legal professionals such as lawyers and judges) to each phase (diagnosis, negotiation, mediation, and evaluation) of an interactive ODR system. The study will run for three years. To begin, the work will focus on identifying technical and legal problems in the ODR, and then, based on these, examining support functions for each phase of the ODR. Finally, a prototype system that integrates the support functions of each phase will be developed, and its usefulness will be verified in trials with general users.

## 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 Early-Career Scientists

## Constructing Reading Comprehension Datasets to Evaluate Discourse-level Language Understanding

Principal Investigator: SUGAWARA, Saku  
Assistant Professor, Digital Content and Media Sciences Research Division,

In recent years, reading comprehension tasks have been widely used to evaluate natural language understanding systems. However, existing datasets have questions created based on descriptive or factual context, which makes it difficult to test the capability of understanding multiple sentences or the entire text. This study aims to address this limitation by defining types of discourse-level linguistic phenomena and inferences that are relevant to understanding the relations between sentences. By collecting passages that contain such features from various domains, our goal is to create more advanced reading comprehension datasets and develop systems that perform well on them.

## 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 Early-Career Scientists

## Type Systems for Verification of Temporal and State-dependent Properties in the Presence of Various Computational Effects

Principal Investigator: SEKIYAMA, Taro  
Associate Professor, Information Systems Architecture Science Research Division,

Ensuring high reliability of real software needs program verification for various sets of programming features, called computational effects, that address program states. This research aims to study type-based verification for two kinds of properties of computation effects: temporal properties, which state that computational effects are invoked in a certain correct order, and state-dependent properties, which state that computation effects are invoked in a certain valid state. Verifying these properties makes it possible to confirm whether programs use computational effects and maintain their states correctly.

## Grant-in-Aid for Scientific Research (B)

## Understanding Finger-Braille Interaction

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

The purpose of this study is to shed light on the transmission and comprehension mechanisms of finger-Braille communication. The project aims at creating a research environment that enables linkage analysis and analysis of speech content, by developing a technique for transcribing and building a database of finger-Braille interactions. People with deafblindness are affected by visual and auditory impairments. Finger-Braille is a means of communication used principally by persons with “blind-first deafblindness,” who first lose their sight and later their hearing. In the finger-Braille method, six fingers of the person with deafblindness (index to ring fingers of each hand), which are likened to the six keys on a Braille typewriter, are tapped directly (“Tokyo Deafblind Association” website). In this study, conversational and interactional analyses are performed on finger-Braille dialogue data that have already been recorded. To enable these analyses, it was essential to develop a method of transcribing the interaction by matching the positions of the finger-Braille strokes to the speech occurring simultaneously. The analysis results obtained with this method will be shared with the deafblind community. The possibility of extending this line of research will be examined using the method of party research.





# Human Resource Development

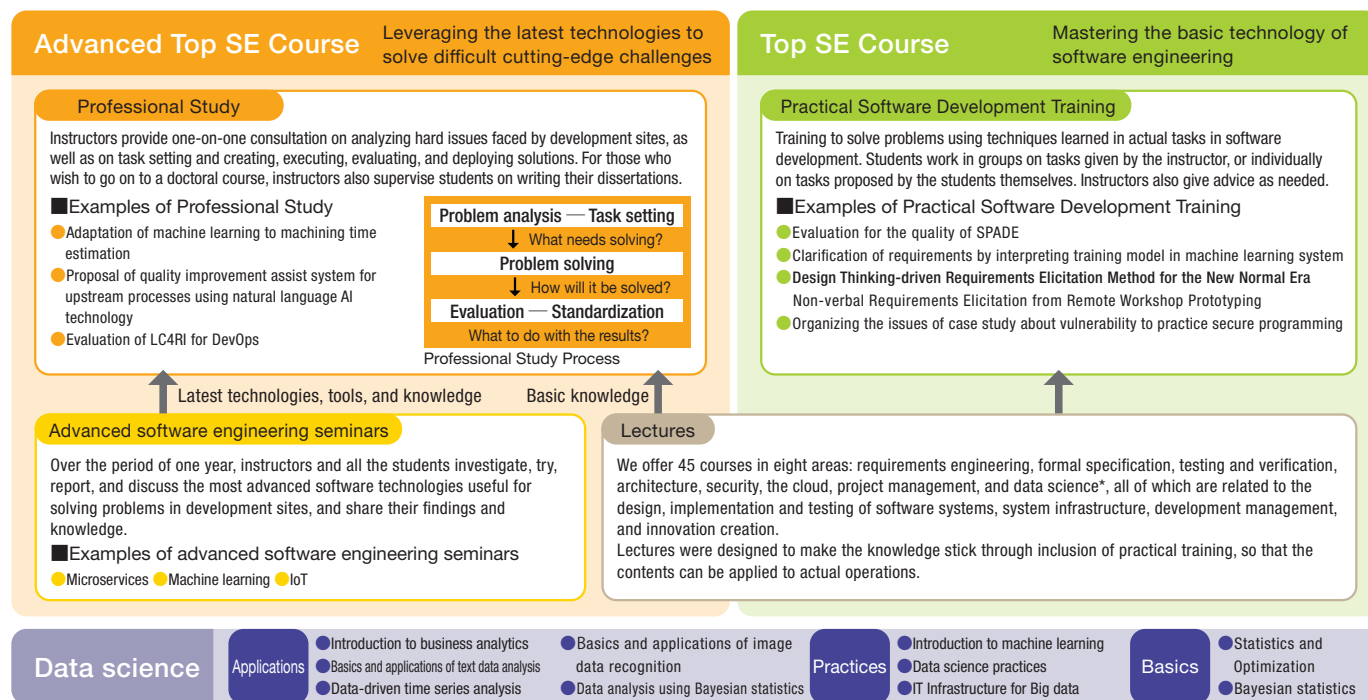
## Top SE

### 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.



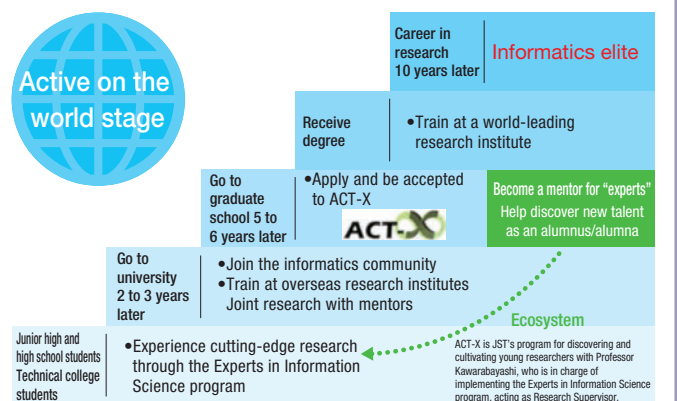
UCL students, partner company engineers, and faculty

### 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.

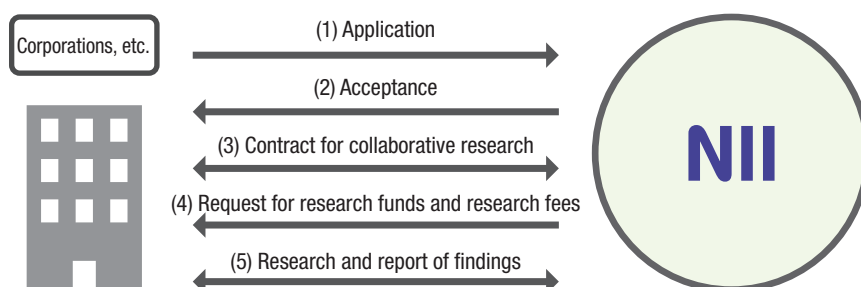


Future of the Experts in Information Science program and framework for building an ecosystem

## 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

(FY2022)

	No. of projects accepted	Research funds received (in thousands of yen)
FY2020	58	186,603
FY2021	56	193,051*
FY2022	30	198,347*

\*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

(FY2022)

	No. of applications accepted
Strategic research proposals	27
Proposals for research project meetings	4
Open subject proposals	11
Total	42

### [List of Strategic Research Themes (14 themes)]

1. Proposal for a study to overcome the crisis caused by the COVID-19 pandemic
2. Proposals for innovative core functions and applications services utilizing SINET6
3. Proposals for cybersecurity analysis technology using NII-SOCS data
4. Proposals for establishing a research data management system in universities in the era of open science
5. Proposals for infrastructure for building and utilizing "datasets" as research resources
6. Proposals for CPS/IoT services and system platform design for realizing more efficient activities in society
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. Proposals for innovative models and algorithms for more deeply utilizing cultural assets
11. Proposals for base technology for next-generation Internet
12. Proposals for technologies and methods for promoting digital innovation in education and research
13. Proposals for algorithms and programming for quantum information processing
14. Proposals for base technologies related to synthetic media for realizing a people-centric AI society



# 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 2023)

### No. of Reports

305	Ownership: Organization	290
	Ownership: Individual	15

### No. of Applications

355	Japan	291
	Outside Japan	64

### No. of Registrations

178	Japan	140
	Outside Japan	38

## List of Japanese Patents Owned

Title of invention	NII inventor	Sole application	Registration No.
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	AHARA 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
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
Quantum computing device and method for Ising model	YAMAMOTO Yoshihisa	●	5354233
Measuring device, measuring system, and measuring method	HASHIZUME Hiromichi	●	5530662
Information search/display apparatus, method, and information search/display program	SONEHARA Noboru	●	5599068
Information search/display apparatus, method, and information search/display program	SONEHARA Noboru	●	5608950
Information search/display apparatus, method, and information search/display program	SONEHARA Noboru	●	5608951
Information providing apparatus, method, and program	SONEHARA Noboru	●	5614655
Control server, control method, and control program	AOKI Michihiro	●	5682932
Doppler radar system, Doppler radar transmitter, and transmission wave optimization method	HASHIZUME Hiromichi	●	5704695
Speed/distance detection system, speed/distance detection device, and speed/distance detection method	HASHIZUME Hiromichi	●	5739822
Information processing apparatus, schedule determination method, and computer program	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
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 Atsuhiko	●	6253022
Quantum key distribution system and quantum key distribution method	YAMAMOTO Yoshihisa	●	6257042
Audio signal processing apparatus and method	ONO Nobutaka	●	6278294

Title of invention	NII inventor	Sole application	Registration No.
Computation using a network of optical parametric oscillators	UTSUNOMIYA Shoko	●	6300049
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	AHARA 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
Image processing apparatus, image processing method, and recording medium	SATO Imari	●	6471942
Biological detection device, biological detection method, and program	YAMAGISHI Junichi	●	6480124
Noise addition device and noise addition method	ECHIZEN Isao	●	6501228
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 Yingqiang	●	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, luminance and lightness 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	●	6808277
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	AHARA, 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
Information search system	KAWARABAYASHI, Ken-ichi	●	7169628
Learning apparatus, learning method, speech synthesis apparatus, speech synthesis method, and program	YAMAGISHI, Junichi	●	7109071
The biometric feature a surreptitious photographing preventing fitting unit and a surreptitious photography prevention method	ECHIZEN, Isao	●	7056833
An image padding method, image padding apparatus, and storage medium	CHEUNG, Gene	●	7154507
Radio communication system, radio terminal, a central control station, and wireless communication method	KANEKO, Megumi	●	7185231
Wireless communication control method	KANEKO, Megumi	●	7156644
Imaging apparatus and methods	SATO, Imari	●	7193851
A sample observation method and sample observation apparatus, and a microscope	SHIMANO, Mihoko	●	7161218
System for the transmission of data	HASHIZUME, Hiromichi	●	7213494
The flow visualization system, people flow visualizing device, people flow visualization method and program	AHARA, Kenro	●	7138879
Shape measuring apparatus and method	SATO, Imari	●	7117800
Encoding method, encoding apparatus, and program	CHEUNG, Gene	●	7161736
Radio communication method, radio communication system, base station apparatus, radio terminal, and radio communication program	KANEKO, Megumi	●	7219900

See all patents held by NII (in Japan) at the following URL: <https://www.nii.ac.jp/en/about/overview/chizai/>

## List of Registered Trademarks

(as of the end of March 2023)

Trademark Mode	Registration No.	Trademark Mode	Registration No.	Trademark Mode	Registration No.	Trademark Mode	Registration No.	Trademark Mode	Registration No.
NII	4811291	neXt commons	5191260	Picture (CINii)	5580217	(Picture) School cap and cloud	6062452	GakuNin LMS	6624513
NII	4830960	researchmap	5261160	Picture (Michael)	5600802	QNNcloud *	6072214	Picture(GakuNin LMS)	6624514
Net Commons	4832775	GRACE+ Picture	5275386	meQuantics	5622078	(Character) Bit-kun	6297315	GakuNin RDM	6607174
Picture + SINET	4934163	GAKUNIN	5341899	Picture (GeoNLP)	5645544	(Character) Top SE	6335656	GakuNin RDM	6607175
NAREGI	4952143	Picture (Palette)	5498318	SIGVerse *	5649553	Picture(Quantum Academy of Science and Technology)	6552929	Picture(GakuNin RDM)	6607176
Top SE	4943324	Picture (GakuNin)	5498319	PrivacyVisor *	5653596	CADDE	6597043	Picture(GakuNin RDM)	6607177
WebELS	4980388	Info dog	5538785	Eduroam	6029580	CADDE	6597044		
Net Commons	5182361	Picture (Info dog)	5538784	(Picture) Eduroam	6029579	GakuNin LMS	6624512		
n c net commons	5152641								

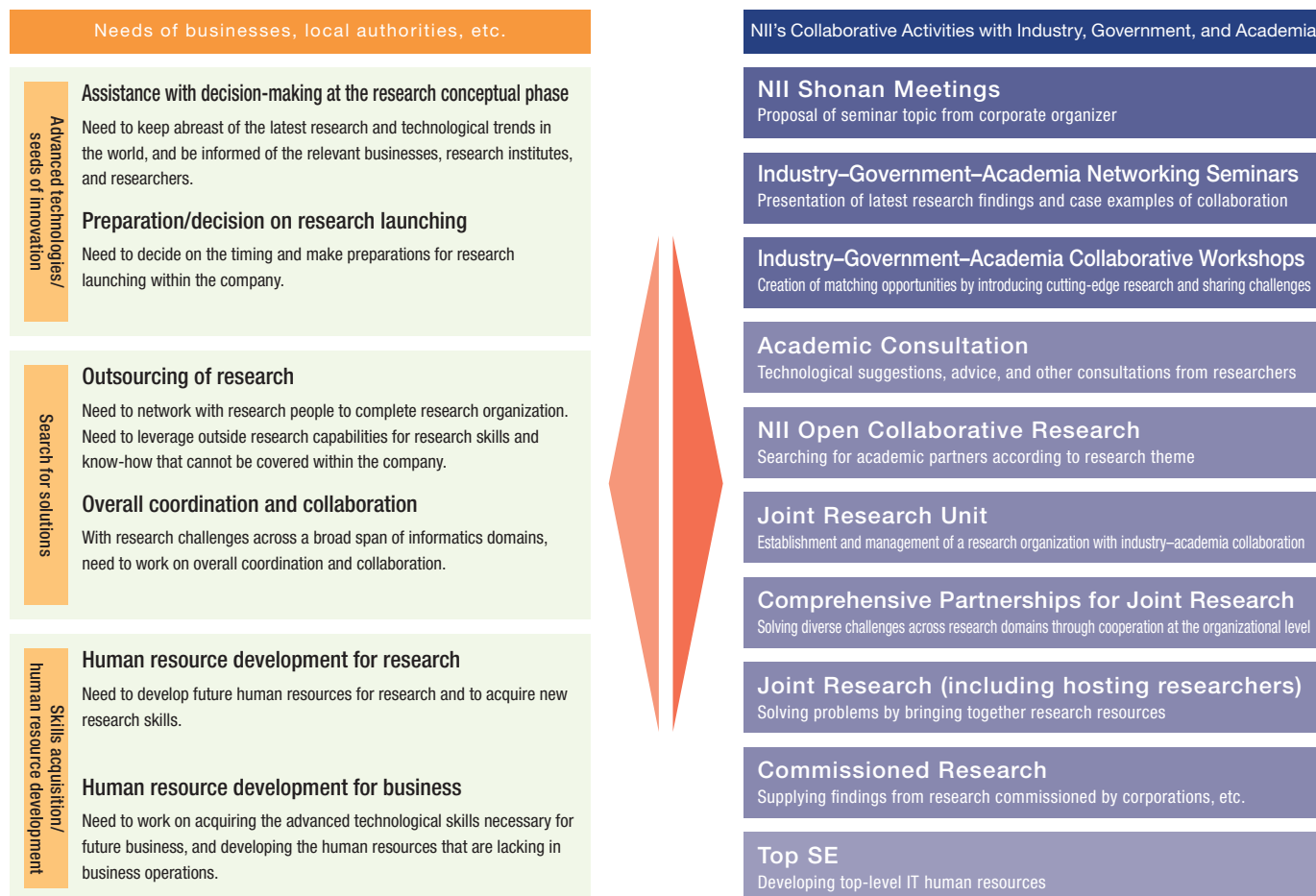
SIGVerse (International Registration No. 1203063) is a registered trademark in Europe, the United States, and China. PrivacyVisor (International Registration No. 1208262) and QNNcloud are registered trademarks in Europe and China as well.



## 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



## Academic Consultation by Researchers

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

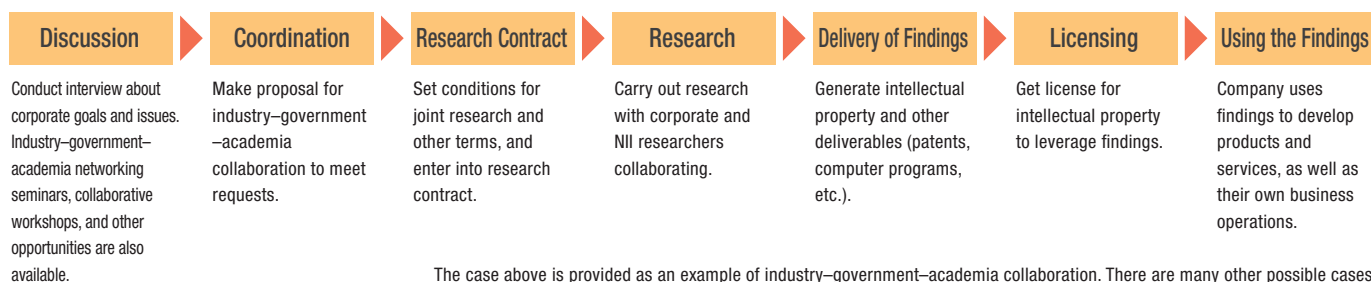






# Innovation Produced by Knowledge

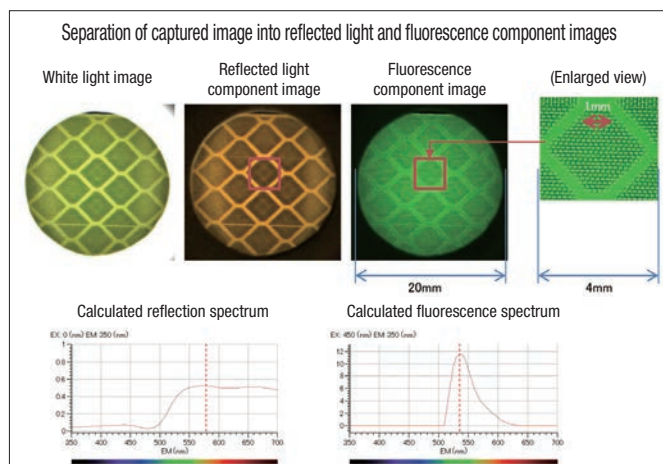
## Model Case of Collaboration with Industry, Government, and Academia



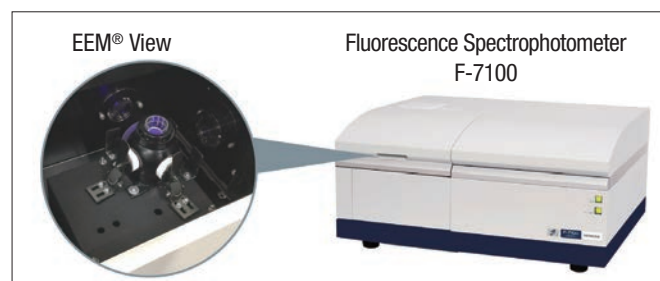
## Example Case of Collaboration with Industry, Government, and Academia: NII - Hitachi High-Tech Science Corporation Achieving visualization of separated reflected light image and fluorescence image of objects EEM® View: CMOS Camera Imaging System for Fluorescence Spectrophotometer

A new technology capable of simultaneously capturing both spectroscopic images and spectral data. The computational algorithm developed by NII Professor 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 website (in Japanese)  
<https://www.nii.ac.jp/seeds/>

## International Exchange

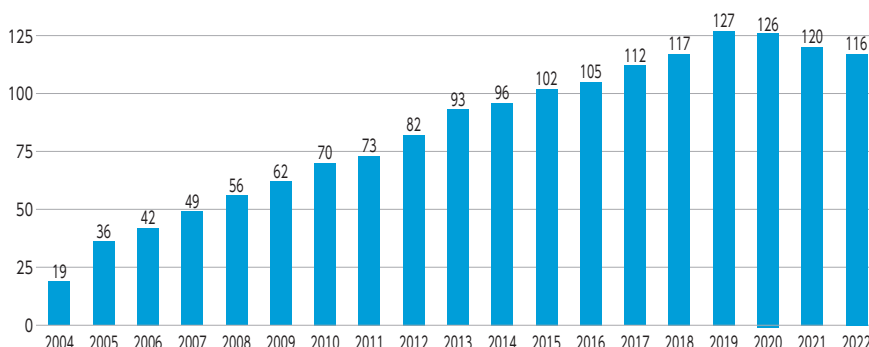
NII set up Global Liaison Office (GLO) to promote international exchange with overseas universities and research institutes. GLO handles various activities including entering into international exchange agreements through Memorandum of Understanding (MOU), running the NII International Internship Program 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 July 2023, we have agreements with 116 institutions in 35 countries and regions.

\*See next page for the list of institutions.

Number of MOU signatory institutes

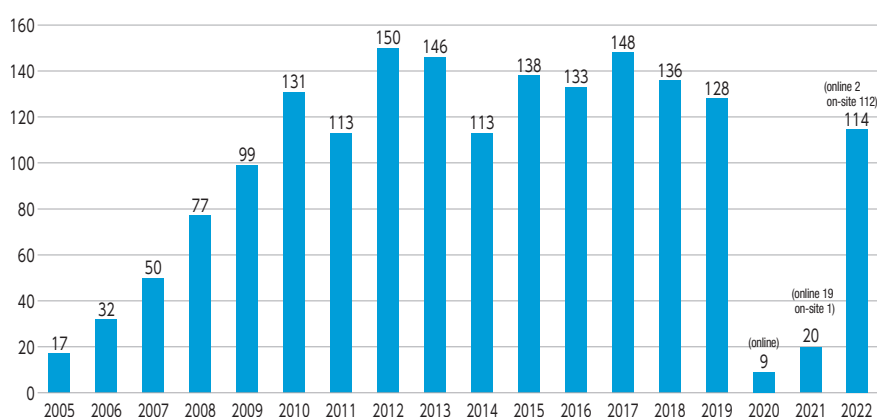


### NII International Internship Program

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 1,700 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.

Number of accepted students to the NII International Internship Program



### 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: 104institutes

(As of July 2023)

Country/Region	Name of Institution
Egypt	Egypt Japan University of Science and Technology(E-JUST)
Argentina	The Faculty of Exact and Natural Sciences of Buenos Aires University
Brazil	Pontifical Catholic University of Campinas
Canada	School of Computer Science, McGill University
	Polytechnique Montréal
	Simon Fraser University
	Department of Computing Science – Faculty of Science, College of Natural and Applied Sciences and the Department of Electrical & Computer Engineering - Faculty of Engineering College of Natural and Applied Sciences, University of Alberta
	Faculty of Mathematics, University of Waterloo
	York University
Chile	Pontificia Universidad Católica de Chile
United States of America	Language Technology Institute (LTI), Carnegie Mellon University
	International Computer Science Institute
	Indiana University, School of Informatics, Computing, and Engineering
	New Jersey Institute of Technology
	University of Illinois at Urbana Champaign
	University of Michigan-Dearborn, College of Engineering and Computer Science
	University of Southern California, Viterbi School of Engineering
China	College of Engineering, University of Washington, Seattle
	Institute of Computing Technology, Chinese Academy of Sciences
	School of Electronics Engineering and Computer Science, Peking University
	The School of Electronic Information and Electrical Engineering of Shanghai Jiao Tong University
	Tongji University
	School of Information Science and Technology, Department of Automation, Tsinghua University
India	University of Science and Technology of China (USTC)
	Indraprastha Institute of Information Technology, Delhi
Korea, Republic of	Department of Computer Science and Engineering, Seoul National University
Saudi Arabia	King Abdullah University of Science and Technology KAUST)
Singapore	Institute for Infocomm Research
	School of Computing, National University of Singapore NUS)
Taiwan	Research Center for Information Technology Innovation, Academia Sinica
	College of Electrical Engineering and Computer Science, National Taiwan University
	National Tsing Hua University, College of Electrical Engineering and Computer Science (NTHU EECS)
Thailand	School of Engineering and Technology, Asian Institute of Technology
	Department of Computer Engineering, Faculty of Engineering and Department of Mathematics and Computer Science, Faculty of Science, Chulalongkorn University
Viet Nam	Hanoi University of Science and Technology(HUST), School of Information and Communications Technology
	International Research Institute, Multimedia Information, Communication, and Applications (MICA)
	Vietnam National University - Ho Chi Minh - University of Information Science (VNU-HCM-UIT)
	Vietnam National University - Ho Chi Minh - University of Science (VNU-HCM-US)
	Vietnam National University, University of Engineering and Technology (VNU-UET)
Austria	Vienna University of Technology
Belgium	University of Namur
Czechia	Faculty of Electrical Engineering, Czech Technical University in Prague
Finland	Aalto University, School of Electrical Engineering and School of Science
	Centre de Recherche en Informatique de Lens (CRIL)
	Claude Bernard University Lyon 1
	Clermont Auvergne INP, School of Engineering ISIMA, LIMOS Laboratory (The Blaise Pascal University of Clermont-Ferrand)
	National Center for Scientific Research (CNRS)
	Ecole Normale Supérieure de Lyon ENS Lyon
	Grenoble INP
	Institut National de Recherche en Informatique et en Automatique (INRIA)
	Institut National des Sciences Appliquées de Lyon (INSA Lyon)
	Institut de Recherche en Informatique et Systèmes Aléatoires (IRISA)
	Laboratory of Digital Sciences of Nantes(LS2N), Nantes Université
	Sorbonne Université, Computer Science Laboratory of Paris 6 (LIP6)
	Toulouse INP-ENSEIHT
	Université Côte d'Azur(Université Nice Sophia Antipolis)
	Université Grenoble Alpes Université Joseph Fourier-Grenoble 1
	Université Paris Saclay, Graduate School of Computer Science(Université Paris Sud)
	Université Toulouse III - Paul Sabatier, Institut de Recherche en Informatique de Toulouse (IRIT)

Country/Region	Name of Institution
Germany	Berlin Institute of Technology (TU Berlin)
	The German Academic Exchange Service (DAAD)
	Institute of Information Systems, German Research Center for Artificial Intelligence (DFKI)
	Georg-August-Universität Göttingen, Institute of Computer Science, Center for Computational Sciences, Campus Institute Data Science, Research Department of the State and University Library
	RWTH Aachen University (Faculty of Mathematics, Computer Science and Natural Sciences)
	Saarland University
	Technische Universität Braunschweig (TU Braunschweig)
	Technical University of Munich, the Department of Informatics and the Department of Electrical Engineering and Information Technology (TUM)
	Faculty of Applied Computer Science, University of Augsburg
	The Faculty of Applied Science of the University of Freiburg
Ireland	Department of Computer and Information Science at the University of Konstanz(ISGUK)
	The Faculty of Science at the University of Potsdam
	Dublin City University
Italy	Lero - the Irish Software Research Centre
	School of Computer Science and Statistics and ADAPT Centre, Trinity College Dublin (TCD)
	Politecnico di Milano, Dipartimento di Elettronica, Informazione e Bioingegneria
Netherlands	Dipartimento di Informatica - Scienza e Ingegneria (DISI), Università di Bologna
	Università degli Studi di Ferrara (UNIFE)
Norway	University of Torino, Department of Computer Science
Portugal	Faculty of Electrical Engineering, Mathematics and Computer Sciences of Delft University of Technology(TU Delft)
Spain	The Department of Information Science and Media Studies, University of Bergen
	Instituto de Engenharia de Sistemas e Computadores, Investigação e Desenvolvimento em Lisboa (INESC-ID)
Sweden	INESC Technology and Science (INESCTEC)
	University of Minho
Switzerland	Facultat d'Informàtica de Barcelona, Universitat Politècnica de Catalunya (UPC)
	Universidad Politécnica de Madrid (UPM)
	Universitat Politècnica de València (UPV)
United Kingdom	University of Zurich
	The Alan Turing Institute
	Department of Computing at Imperial College London
	School of Computing, Newcastle University
	Faculty of Science, Technology, Engineering & Mathematics, The Open University
Australia	Department of Computer Science, Faculty of Engineering Science, University College London
	University of Bath
	Department of Computer Science, University of Bristol
	Department of Computer Science & Technology, University of Cambridge
	School of Informatics, University of Edinburgh
	School of Computer Science & Electronic Engineering, University of Essex
Australia	Department of Computer Science and The Mathematical Institute, Mathematical, Physical and Life Sciences Division,University of Oxford
	CSIRO(Data61)
	Royal Melbourne Institute of Technology
	School of Computing & Information Systems, Melbourne School of Engineering, The University of Melbourne
	The Faculty of Engineering and Information Technologies,The University of Sydney

## MOU for development and operational cooperation: 12 institutes

Country/Region	Name of Institution
Asia-Pacific	Asia Pacific Oceania Network (APOnet) Collaboration
United States of America	North American Coordinating Council on Japanese Library Resources (NCC)
Republic of Korea	The New Venture Fund (NWF) on behalf of the Scholarly Publishing & Academic Resources Coalition (SPARC)
	Korea Education & Research Information Service (KERIS)
Federal Republic of Germany	Korea Institute of Science and Technology Information (KISTI)
	Hochschulbibliothekszenrum des Landes Nordrhein-Westfalen
	German National Library of Science and Technology (TIB)
European Union (EU)	German National Library of Medicine (ZB MED)
Europe and others	Gigabit European Academic Network (GÉANT)
Asia-Pacific/EU	European Organization for Nuclear Research (CERN)
North America and Europe	Asiapacific-Europe Ring(AER) Collaboration
	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 160 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.

### Support Setup

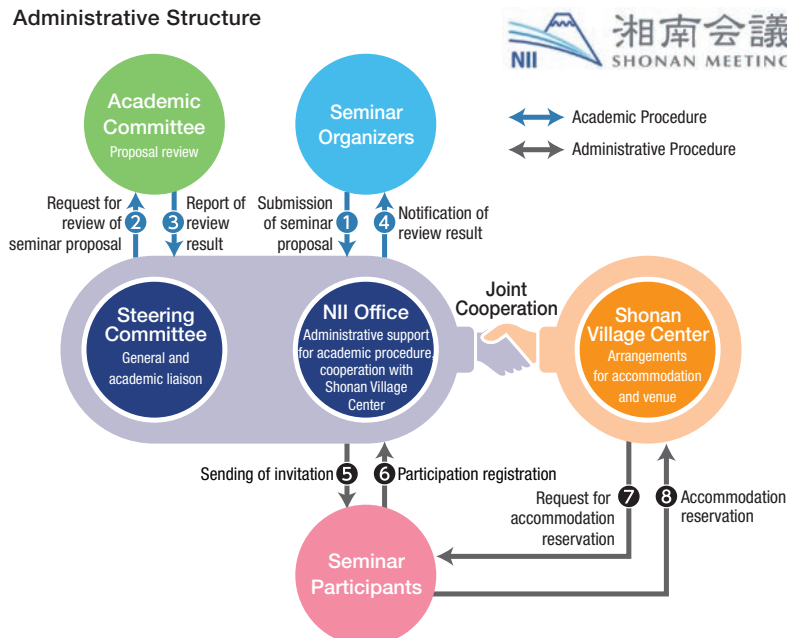
The Office of NII Shonan Meeting and Shonan Village Center staff manage various activities on behalf of seminar organizers, including sending invitations, providing information on accommodations, and preparing the venue on seminar days. The program also includes events such as historical walks through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



Shonan Village Center



### 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](mailto:shonan@nii.ac.jp)

### Agreement with the German Academic Exchange Service (DAAD)

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

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

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



### Japanese-French Laboratory for Informatics (JFLI)

The Japanese-French Laboratory for Informatics (JFLI) was founded in 2008 as a hub for informatics research exchange between France and Japan by five institutions, namely the National Center for Scientific Research (CNRS) in France, Sorbonne University (University of Paris VI), The University of Tokyo (Graduate School of Information Science and Technology), Keio University, and NII. It was turned into a Joint International Unit (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.

<https://jfli.cnrs.fr/>



Sylvie Retailleau, French Minister of Higher Education and Research, with NII Director-General KUROHASHI, Sadao







## Informatics Program, Graduate Institute for Advanced Studies, SOKENDAI

### Establishment of Graduate School

The Graduate University for Advanced Studies (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.

In April 2002, NII joined up with SOKENDAI to launch a three-year doctoral program in Informatics. The first graduates of the program emerged in March 2005. In AY2006, a five-year doctoral program was launched, allowing students to directly obtain a Ph.D. in five years.

Starting in the AY2023, as SOKENDAI shifts away from a six-school system to a system of 20 programs under the Graduate Institute for Advanced Studies, “Informatics” will be offered as one of the programs.

### Content and Structure

The Informatics Program aims to cultivate young IT researchers and engineers with the capacity to serve on the international stage as 21st-century leaders. Students will be able to earn a Doctor of Philosophy (Informatics) degree, or a Doctor of Philosophy (Science) degree, depending on the content. Students receive education and research guidance in 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. Approximately 60 courses are offered.

### Features of the Program

The Informatics Program actively accepts international students from abroad, so there are lively cross-cultural exchanges between students. Around 20% of all the students already have a track record of professional work experience.



SOKENDAI (Hayama Campus)



Lecture at the Informatics Program

### Number of students in the Informatics Program

(as of April 2023) \* ( ) indicates number of international students

Five-year doctoral program	Three-year doctoral program	Total
62 (28)	30 (17)	92 (45)

### [Message from the Dean of the Informatics Program]



YAMADA, Seiji

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

The Informatics Program 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 program 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 program 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 (Five-year doctoral program), while students who already have a master’s degree can concentrate on expanding their previous research in a shorter program (Three-year doctoral program).

As well as being SOKENDAI students, Informatics Program 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 programs at SOKENDAI, the program also allows students to expand their circles of exchange and build valuable personal networks.



## Research by Current Students



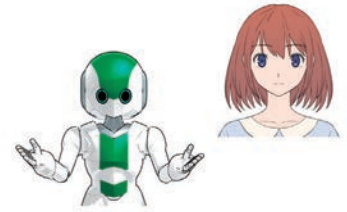
TSUMURA, Takahiro

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

Main supervisor: Prof. YAMADA, Seiji

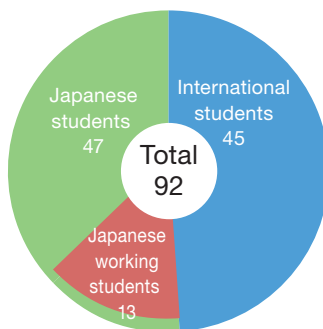
Human-agent interaction is a research subject that covers the interaction between humans and anthropomorphic agents and robots. In this context, my research focuses on the social advancement of agents through human-agent empathy.

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.

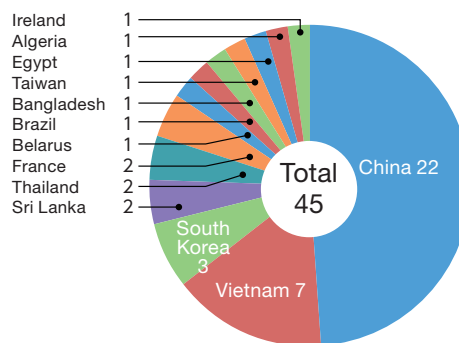


### Student Data (as of April 2023)

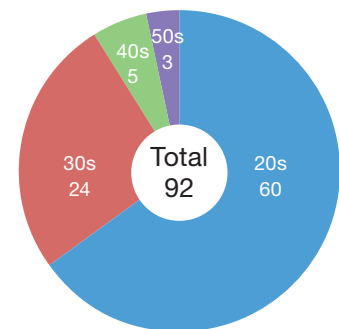
Number of students



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
AY2022	6 (4)	10 (5)	3 (3)	19 (12)
AY2021	8 (5)	5 (1)	3 (3)	16 (9)
AY2020	10 (7)	5 (2)	2 (2)	17 (11)



Graduation and Outstanding Student Award Ceremony (September 2019)





## Curriculum

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

The Informatics Program covers a wide range of interdisciplinary fields, from fundamental sciences such as mathematics, and basic studies such as computer architecture and networking, to software and media engineering, AI, information sociology, and research informatics. Since it was established, the program has offered a flexible educational system that can be tailored to meet the different needs of students, through small class sizes and research guidance. To foster capable individuals who can play an active role at the forefront of informatics, the program provides leading-edge research and educational guidance on a day-to-day basis. The academic year is divided into two semesters: first semester (April to September) and second semester

(October to March).

Completion requirements include earning the prescribed credits, conducting research under appropriate guidance, and successfully defending a doctoral dissertation summarizing the results of research. Students are required to earn at least 16 credits under the three-year Ph.D. program and 42 credits under the five-year Ph.D. program. The period of enrollment is handled flexibly, so students with outstanding research achievements may have their enrollment period shortened. Students who withdraw from the five-year program before completing their studies may be awarded a Master's degree if they meet certain requirements.

Dissertation Work in Advanced Studies etc.

Dissertation Work in Advanced Studies IA/ Dissertation Work in Advanced Studies IB/ Dissertation Work in Advanced Studies IIA/ Dissertation Work in Advanced Studies IIB/ Dissertation Work in Advanced Studies IIIA/ Dissertation Work in Advanced Studies IIIB/ Dissertation Work in Advanced Studies IVA/ Dissertation Work in Advanced Studies IVB/ Dissertation Work in Advanced Studies VA/ Dissertation Work in Advanced Studies VB

### Informatics Program

Subjects Under Research Guidance	Experiment and Seminar on Basic Knowledge in Informatics I A (All professors) / Experiment and Seminar on Basic Knowledge in Informatics I B (All professors)/ Experiment and Seminar on Basic Knowledge in Informatics II A (All professors) / Experiment and Seminar on Basic Knowledge in Informatics II B (All professors)
Foundations of Informatics	Introduction to Mathematical Logic (TATSUTA, Makoto) / Introduction to Algorithms(UNO, Takeaki) / Logic in Computer Science (TATSUTA, Makoto) / Discrete Mathematics (KAWARABAYASHI, Ken-ichi) / Computational Complexity Theory (HIRAHARA, Shuichi) / Computational Game Theory (Professors in Foundations of Informatics) / Sublinear Algorithms (YOSHIDA, Yuichi) / Algorithmic Market Design (Professors in Foundations of Informatics) / Combinatorial Optimization for Machine Learning (FUJII, Kaito) / Quantum Algorithms (SOEDA, Akihito)
Information Infrastructure Science	High-Performance Computing (AIDA, Kento; TAKEFUSA, Atsuko; KOIBUCHI, Michihiro; ISHIKAWA, Yutaka) / Information Sharing System Architecture (KURIMOTO, Takashi; TAKAKURA, Hiroki; URUSHIDANI, Shigeo) / Computer System Design (GOSHIMA, Masahiro; ISHIKAWA, Yutaka) / Information and Communication Systems (FUKUDA, Kensuke; KANEKO, Megumi; JI, Yusheng)
Software Science	Introduction to Software Science 1 (All professors in Software Science) / Introduction to Software Science 2 (All professors in Software Science) / Distributed Systems (SATO, Ichiro) / Software Engineering (ISHIKAWA, Fuyuki) / Database Theory (KATO, Hiroyuki) / Programming Languages and Theory (Professors in Software Science) / Mathematical Structures in Formal Methods (HASUO, Ichiro) / Software Verification (SEKIYAMA, Taro) / Probabilistic Models in Informatics (KITAMOTO, Asanobu) / Embedded Real-Time Systems (AOKI, Shunsuke)
Multimedia Information Science	Introduction to Multimedia Information Science (All professors in Multimedia Information Science) / Fundamentals of Media Processing (YAMAGISHI, Junichi; KODAMA, Kazuya; IKEHATA, Satoshi; MO, Hiroshi; SATOH, Shin'ichi; KATAYAMA, Norio; SUGIMOTO, Akihiro; AIZAWA, Akiko; KOYAMA, Shoichi) / Applications of Multimedia Processing (YAMAGISHI, Junichi; SUGIMOTO, Akihiro; SATO, Imari; IKEHATA, Satoshi; MO, Hiroshi; KODAMA, Kazuya) / Interactive Media (ARAI, Noriko; YU, Yi; KATAYAMA, Norio; KOYAMA, Shoichi; ASANO, Yuta)
Intelligent Systems Science	Introduction to Intelligent Systems Science 1 (AIZAWA, Akiko; YAMADA, Seiji; INOUE, Katsumi; KOBAYASHI, Taisuke; SHIGAKI, Shunsuke) / Introduction to Intelligent Systems Science 2 (BONO, Mayumi; TAKEDA, Hideaki; PRENDINGER, Helmut; MIZUNO, Takayuki; SUGIYAMA, Mahito; SUGAWARA, Saku) / Robot Informatics (SHIGAKI, Shunsuke) / Natural Language Processing(AIZAWA, Akiko; SUGAWARA, Saku) / Deep Learning (PRENDINGER, Helmut) / Communication Environments (BONO, Mayumi) / Data Mining (SUGIYAMA, Mahito) / Knowledge Sharing System (TAKEDA, Hideaki) / Computational Social Science (MIZUNO, Takayuki)
Information Environment Science	Introduction to Information Environment Science (All professors in Information Environment Science) / Practical Data Science (YAMAJI Kazutsuna) / ICT-enabled Business (OKADA, Hitoshi) / Introduction to Statistical Methods in Bibliometrics (SUN, Yuan) / Methodology of Scientometrics (NISHIZAWA, Masaki)
Others	Applied Linear Algebra (KISHIDA, Masako; SUGIMOTO, Akihiro; SATOH Shin'ichi) / Scientific Presentation (KANEKO, Megumi; WU, Stephen*Statistical Science Program; JONES, Caryn*Visiting Lecturer) / Scientific Writing (KANEKO, Megumi; WU, Stephen*Statistical Science Program; JONES, Caryn*Visiting Lecturer) / Introduction to Information Security Infrastructure(ECHIZEN, Isao; TAKAKURA, Hiroki; OKADA, Hitoshi) / Introduction to Big Data Science(Professors related to Big Data)



## 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

(AY2022)

Ochanomizu University	Sorbonne Université
Kyushu University	Southwest Jiaotong University
Chiba University	Southwest University
The University of Tokyo	Technical University of Munich
Tokyo University of Science	Technische Universität Berlin
Nagoya University	Tianjin University
Chennai Mathematical Institute	TU Delft, EEMCS Faculty
Chinese University of Hong Kong, Shenzhen	University of Delaware
Czech Technical University of Prague	University of Konstanz
Georg-August-Universität Göttingen	University of Leipzig
Hefei University of Technology	University of Passau
Indian Institute of Technology, Kharagpur	University of Würzburg
Institute for Systems and Computer Engineering, Technology and Science	University of Wuppertal
Peking University	

### Number of Students Accepted through Both Schemes:

#### Partnership with Graduate Schools and Research Students for Special Collaboration

(AY2022)

Master's course	Doctoral course	Total
43	46	89



# 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.

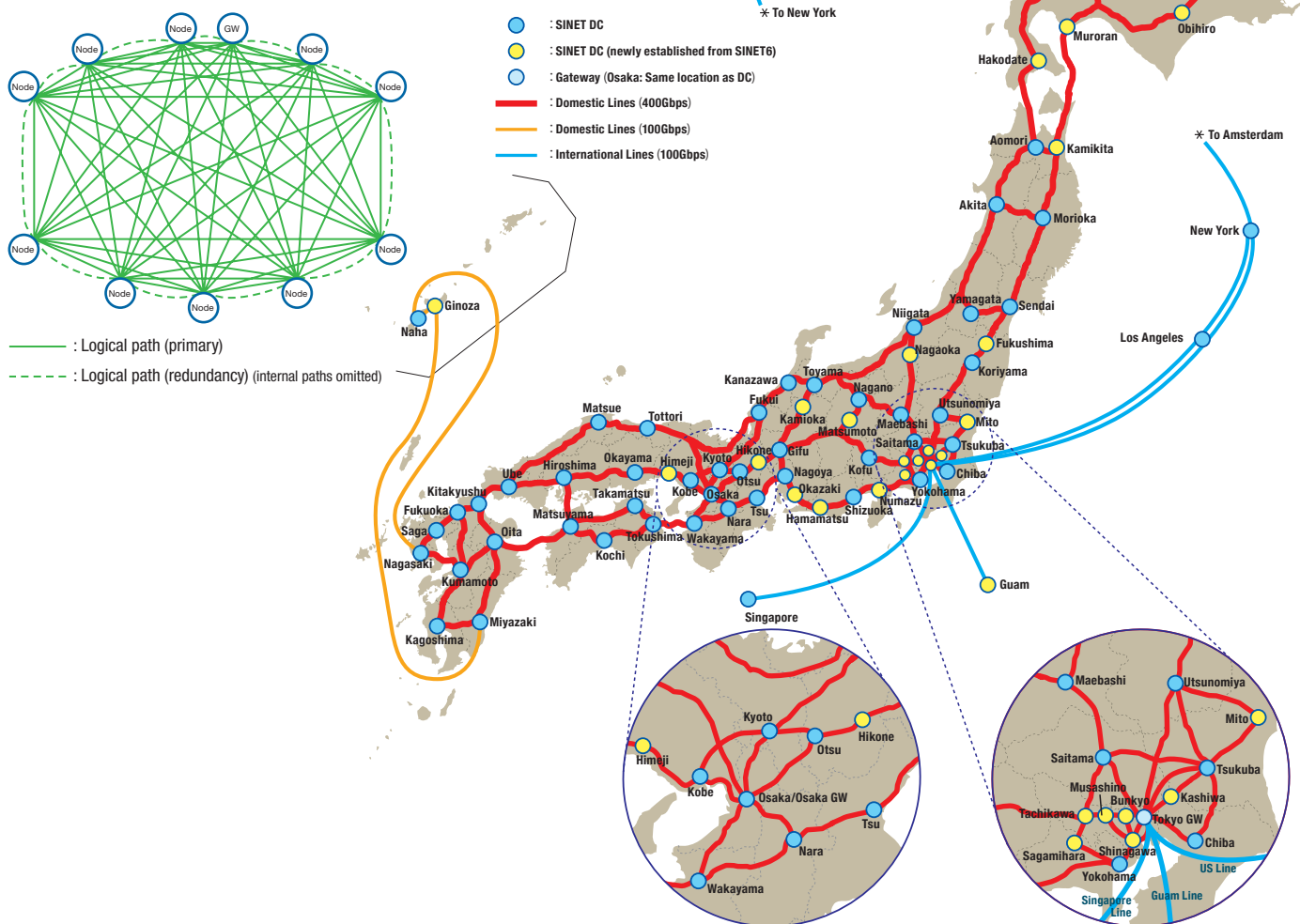
SINET organically connects cloud, security, and academic content by means of a nationwide 400-Gbps network, thereby providing more than 990 universities and other institutions with advanced scientific information infrastructure.

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.

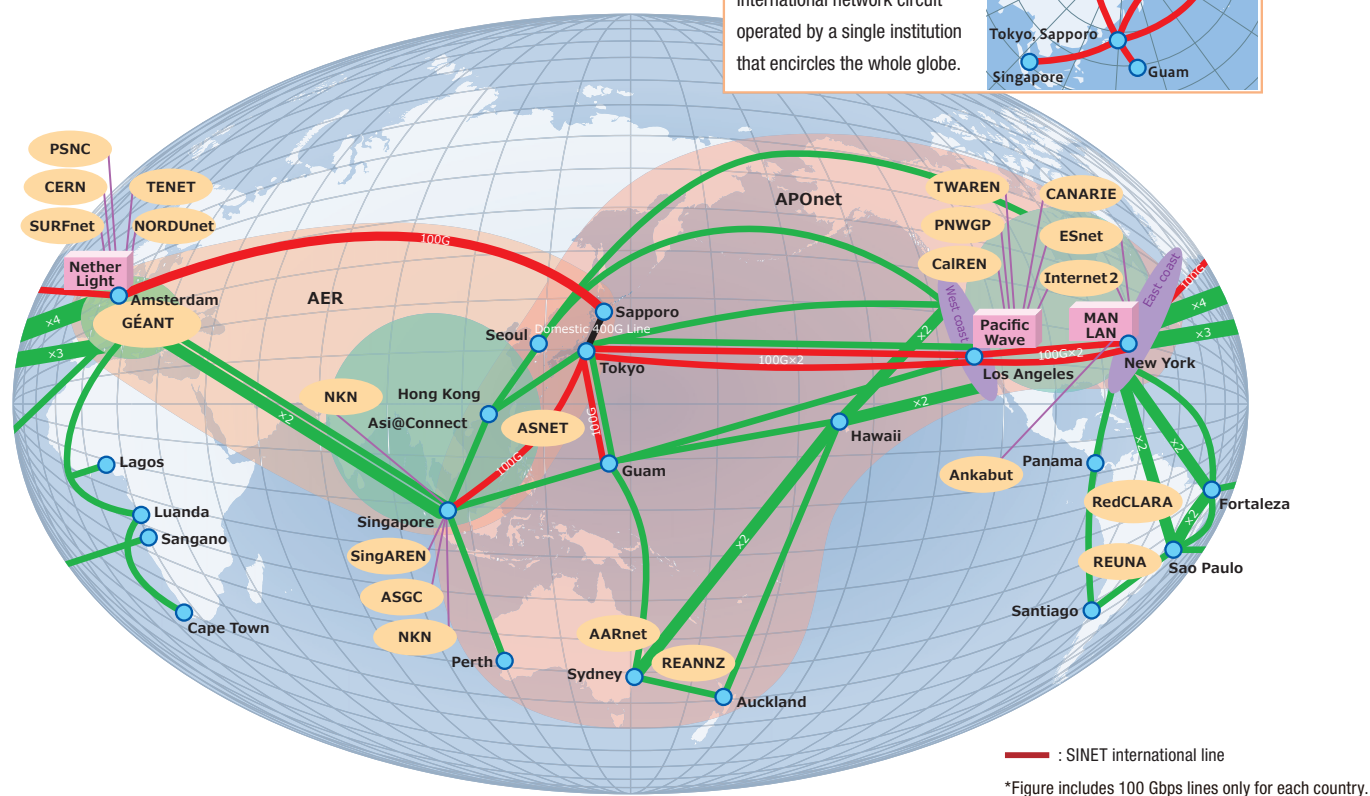
These initiatives are expected to help further strengthen Japan's international collaboration and competitiveness, and to accelerate the fusion of cyberspace (virtual space) and physical space (real space), with a view to shaping Society 5.0, the proposed vision of Japan's future society.

Number of member institutions in SINET (as of March 31, 2023)

National universities	86
Public universities	95
Private universities	438
Junior colleges	87
Technical colleges	56
Inter-university research institutes	16
Others	230
Total	1008



## Interconnection with Overseas Research Networks



## 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.

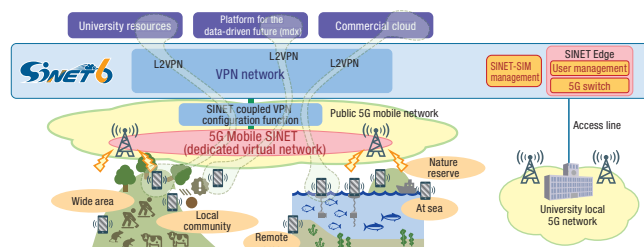
	Service	Notes
L3 Service	Internet connection (IPDual)	
	Full Route Provision	
	IP multicast (+QoS)	
	QoS per application	Rapidly increasing
	L3VPN(+QoS)	Expanding into a multicampus service
L2 Service	L2VPN/VPLS(+QoS)	Used frequently in high-capacity transmission experiments
	University LAN Virtualization	Used frequently in high-capacity transmission experiments
	L2 on demand (Basic)	Used in international experiments
	L2 on demand (International collaboration: NSI)	
	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	Scheduled new services expansion
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

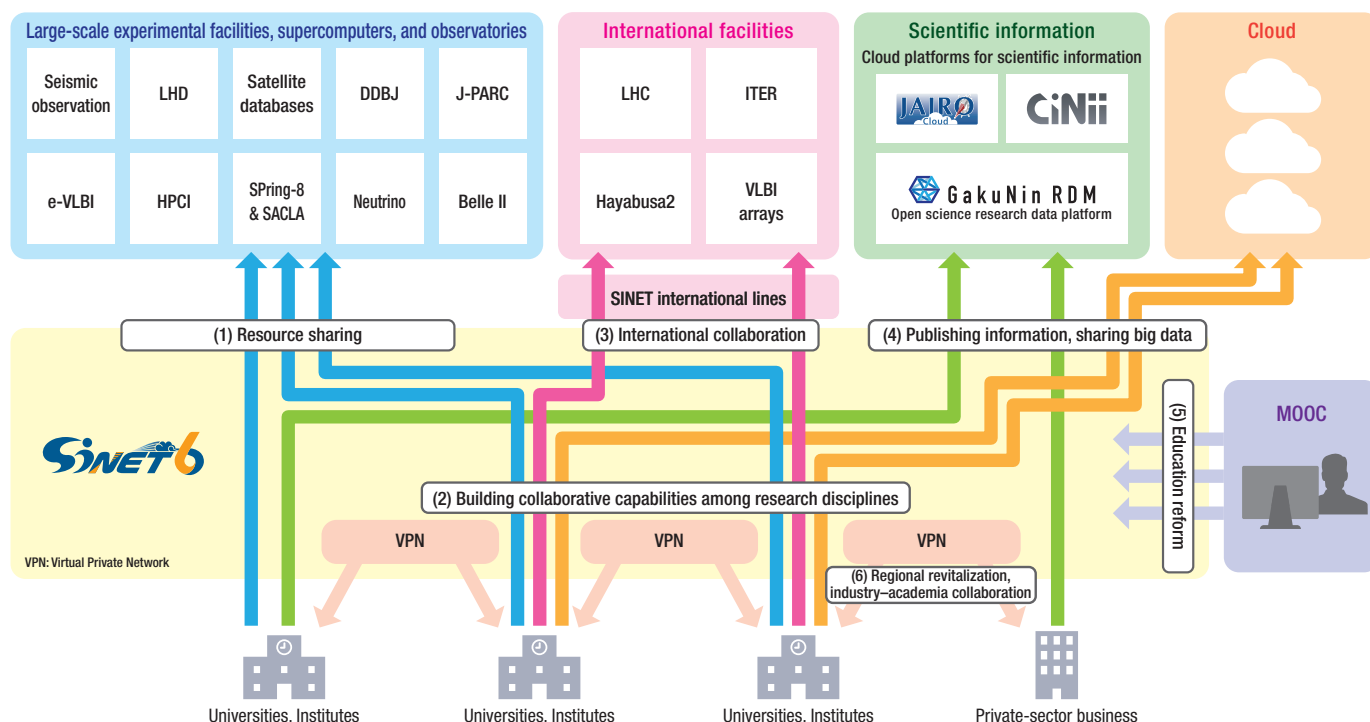
High-speed international lines directly connecting the U.S., Europe, and Asia  
Low latency was achieved by adding a direct connection to Europe, eliminating the need to pass through the U.S. The Japan-U.S. connection was upgraded to 200 Gbps and in Asia there are now 100-Gbps connections to both Singapore 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.

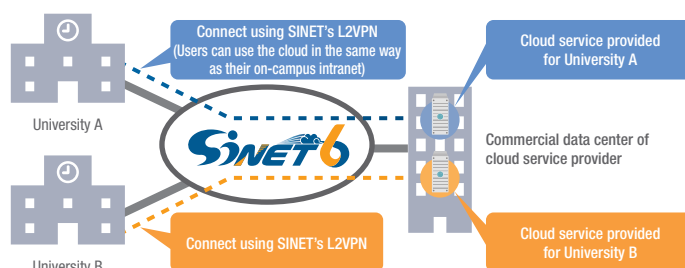


## SINET Cloud Connection Service

[https://www.sinet.ad.jp/connect\\_service/service/cloud\\_connection](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



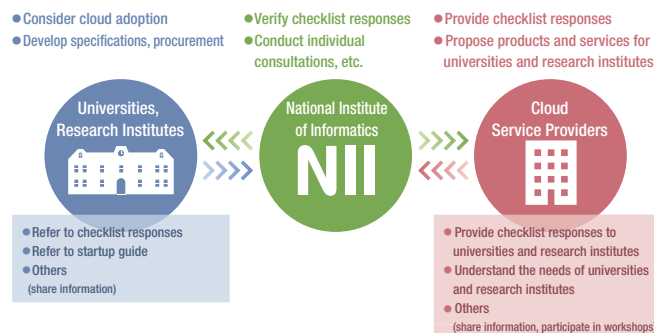
GakuNin Cloud

<https://cloud.gakunin.jp/>  
<https://www.sinetstream.net/>

To support the adoption and use of cloud computing by universities and research institutes, NII offers the GakuNin Cloud Adoption Support Service to provide relevant information. It also offers the GakuNin Cloud Gateway Service, for one-stop access to various cloud computing services, the GakuNin Cloud On-demand Configuration Service, to support the configuration of cloud computing environments, and SINETStream for developing wide-area data collection and analysis programs.

## 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.

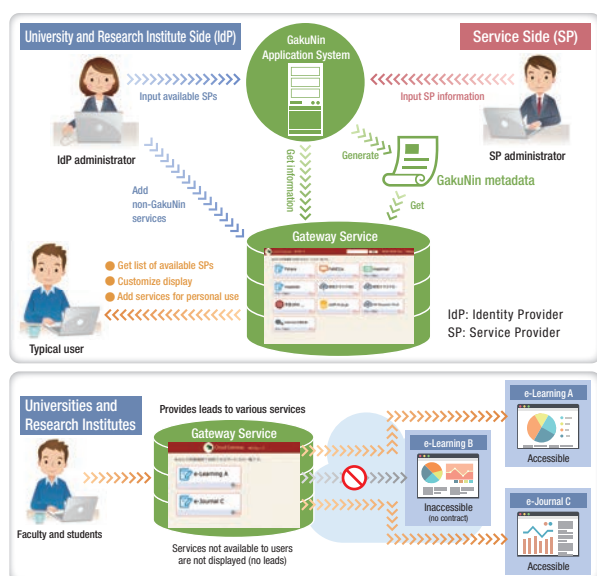


## GakuNin Cloud Gateway Service

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.

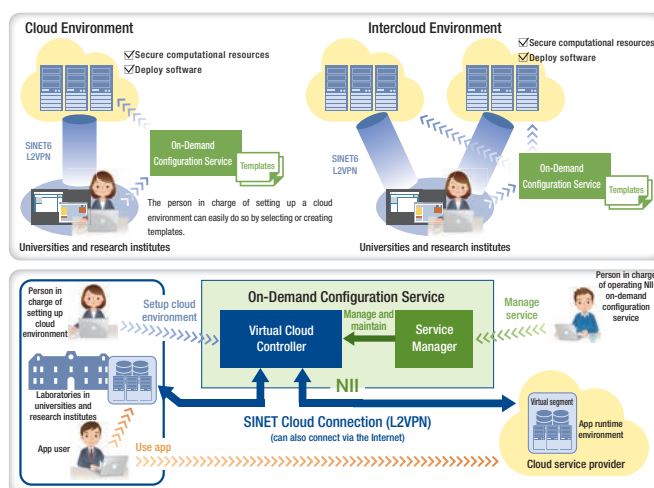
Moreover, IdP administrators at universities and research institutes can customize the list of services displayed to users, and the users themselves can add services, providing a high degree of flexibility and usability.



## 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



GakuNin

<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 2023)

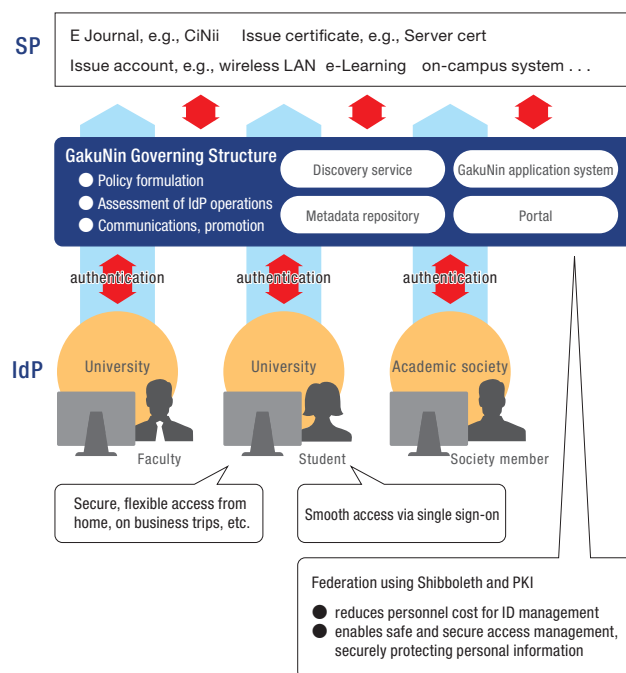
Number of organizations (IdP: Identity Providers)	284
Number of service providers (SP: Service Providers)	Total 206

#### [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/>

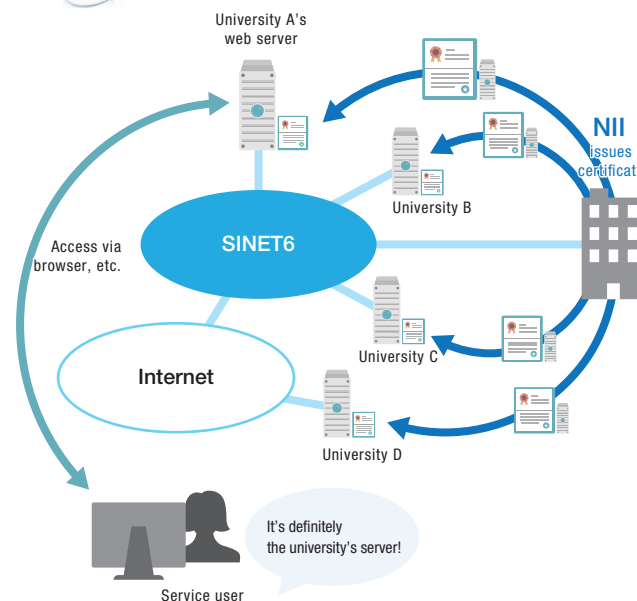
NII launched the UPKI Digital Certificate Issuance Service in January 2015 as a service for issuing digital certificates to universities and research institutes. In addition to server certificates, NII issues client certificates and code signing certificates. We also issue high-security server certificates that comply with WebTrust for Certification Authorities (WTCA), an international standard. As and when needed, we also support the latest updates to the Baseline Requirements formulated by the CA/Browser Forum. 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.

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 2023)

Number of institutions	372
Number of domains	506



## eduroam: World-wide Academic Wireless LAN Roaming Platform

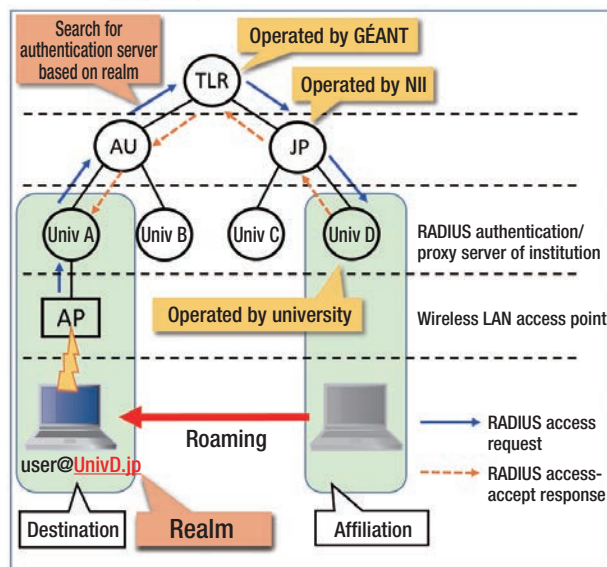


<https://www.eduroam.jp/en/>

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 2023)

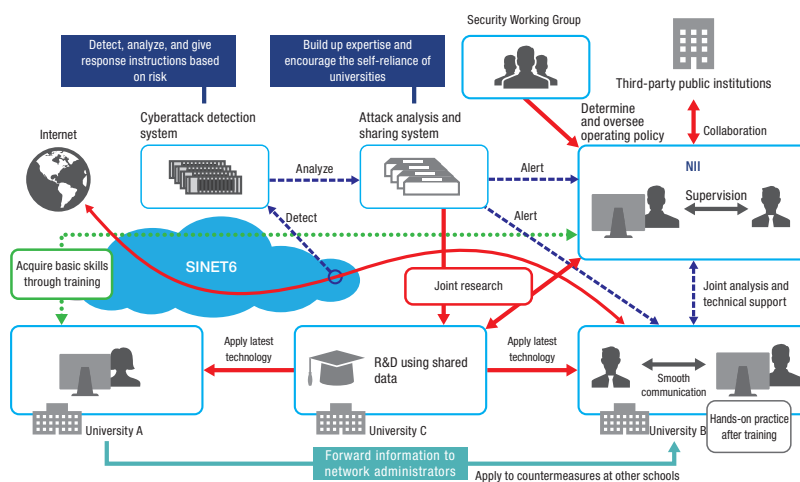
Number of participating institutions in Japan	387
---	-----



## 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.







## Open Science

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

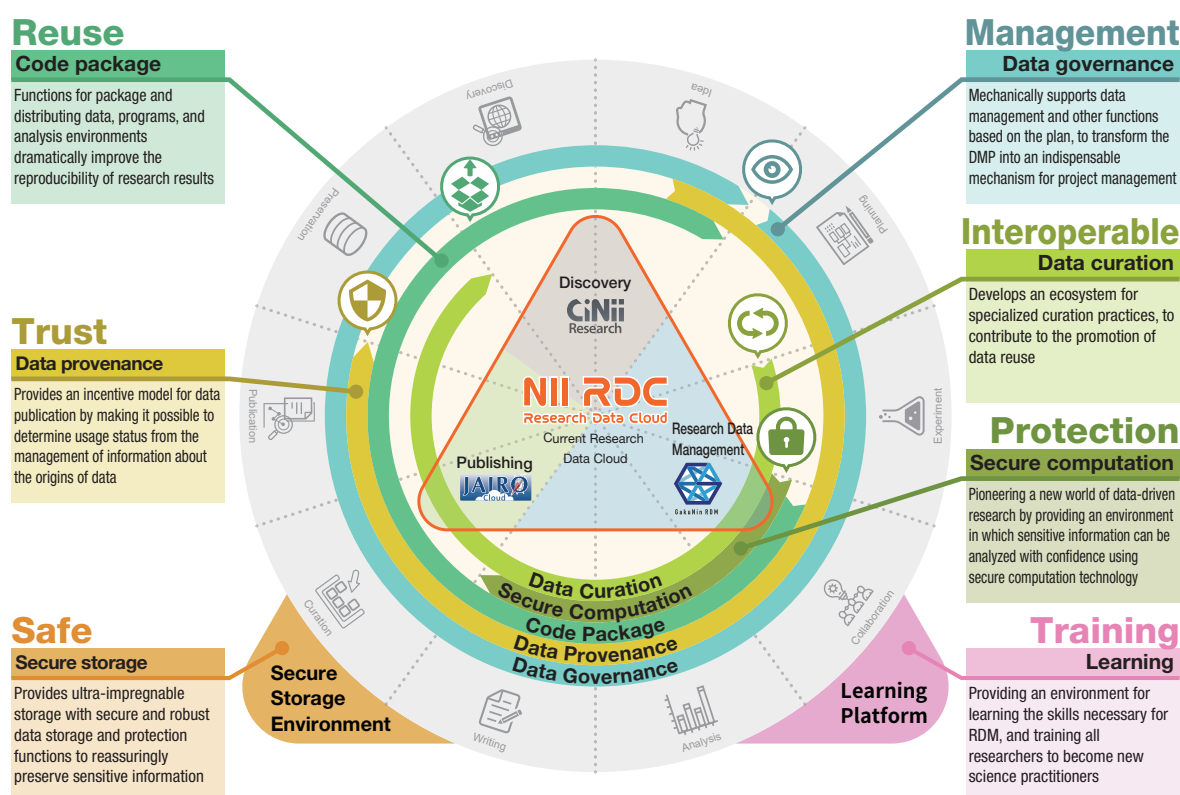
“Open science” is a way of conducting research in which papers, as well as research data, program source code, etc., are disclosed and shared over the internet. This is becoming a standard approach for contemporary research. NII has established three platforms for managing, publishing, and discovering various kinds of data generated in the process of research. Through these platforms and in cooperation with universities and research institutes across Japan, NII makes a major contribution to the development of open science in Japan.

### Research Data Cloud



The NII Research Data Cloud (NII RDC) is an information platform that supports open science and research integrity and promotes data-driven research. It consists of three platforms that cover the lifecycle of research data: a research data management platform (GakuNin RDM), a publishing platform (WEKO3), and a discovery platform (CiNii Research).

To promote open science in a wide range of fields, over the next few years these common platforms for management, publishing, and discovery will be upgraded in terms of the following seven aspects: data governance function, data provenance function, code package function, secure computation function, secure storage environment, data curation function, and learning platform.



### Research Data Management Platform



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



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



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.



## Supporting Research Promotion and Research Integrity

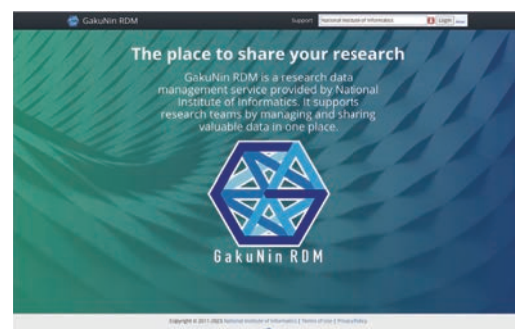
### GakuNin RDM

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

GakuNin RDM is a research data management platform for individual researchers or research groups that helps them to manage research data and related materials during the implementation of a research project. It links with existing storage and research software to enable version control of files related to research projects and access control among members in a closed space. It includes functions for recording research trails to enhance research integrity and for storing files.



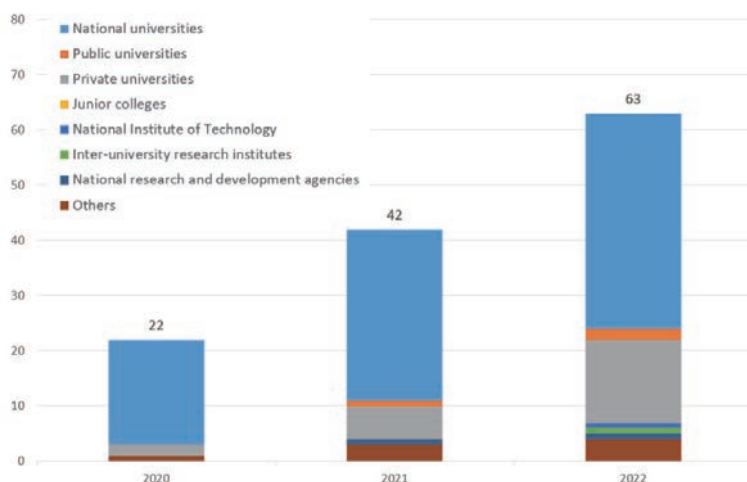
## GakuNin RDM



#### Usage data (as of March 31, 2023)

Number of institutions using the service
63

#### Number of institutions using GakuNin RDM



## Training in Research Data Management

### GakuNin LMS

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

To effectively promote open science, it is important not only to develop systems but also to train human resources in research data management (RDM). In cooperation with the Research Data Working Group of the Japan Consortium for Open Access Repository (JPCOAR), GakuNin LMS offers researchers and research supporters various learning courses featuring micro-content materials with synthesized audio and video and comprehension tests created by NII based on presentation materials on RDM developed and published by JPCOAR.

If the completion requirements are satisfied after taking a course with GakuNin LMS, a digital badge is issued. It is also possible to obtain a certificate of completion for RDM self-learning materials from NII.



## GakuNin LMS



#### Usage data (as of March 31, 2023)

Number of institutions using the service
69



## Support for Construction and Linkage of Institutional Repositories (JAIR 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.

### JAIR Cloud: Shared Repository Service

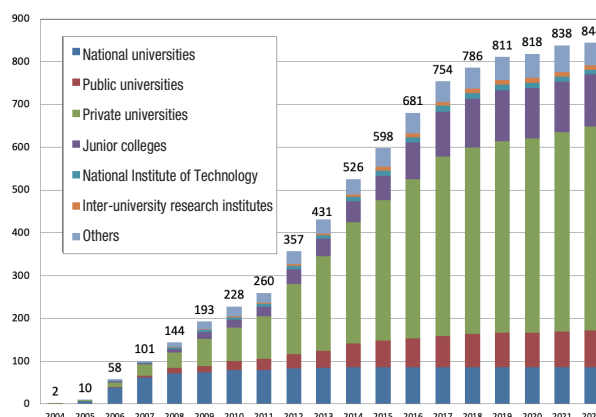
NII provides an environment for a shared repository system as a cloud service, based on the NII-developed institutional repository software WEKO (<http://weko.at.nii.ac.jp/>), for institutions that have difficulty constructing and operating their own repositories.

Usage data (as of the end of March 2023)

Number of institutions using the service
714



■ Number of institutions with institutional repositories in Japan



## Integrated Search of Academic Information in Institutional Repositories in Japan

### IRDB: Institutional Repositories Database

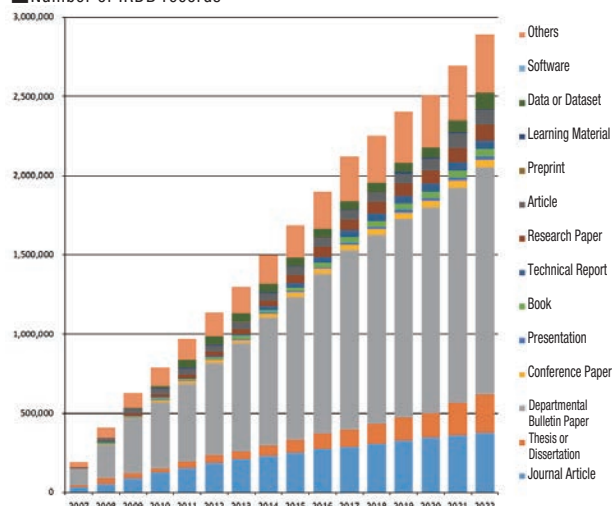
<https://irdb.nii.ac.jp/en>

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 JAIR, an institutional repository portal, which ended operations in March 2019.

Data on coverage (as of the end of March 2023)

Number of institutional repositories	Contents
770	3.9 million items

■ Number of IRDB records



\* Figures before FY2018 are JAIR 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 (JAIR Cloud).

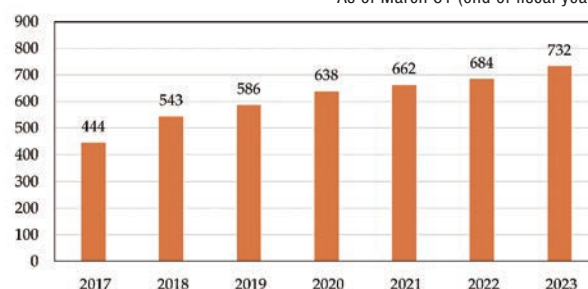
NII supports these activities as well as JPCOAR by providing assistance such as physical support for collaboration with university libraries.

Current members (as of the end of March 2023)

Number of members	732
-------------------	-----

■ Number of JPCOAR Members

\*As of March 31 (end of fiscal year)





# Publishing and Communicating Scientific Information CiNii

NII collects and structures academic research results produced by universities and research institutions and provides access to them through an easy-to-use 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.

For smartphones and tablets too, a responsive design makes searching and displaying scientific information quick and convenient.

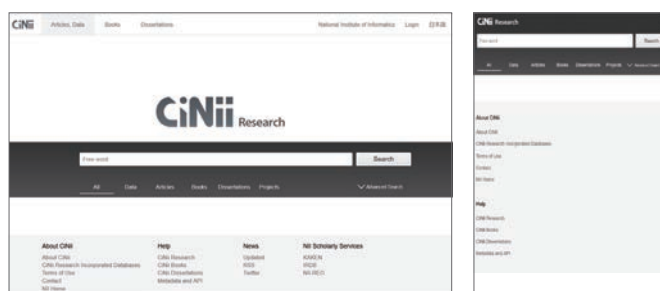
## CiNii Research

<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, 2023)

Number of papers	Number of research data files
51.56 million	520,000



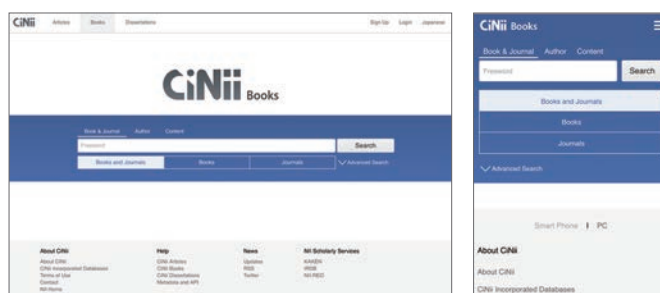
## CiNii Books: Searching for Books in University Libraries

<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 2023)

Number of bibliographic records	Number of holding records	Number of participating libraries
13.49 million	150.77 million	1,341



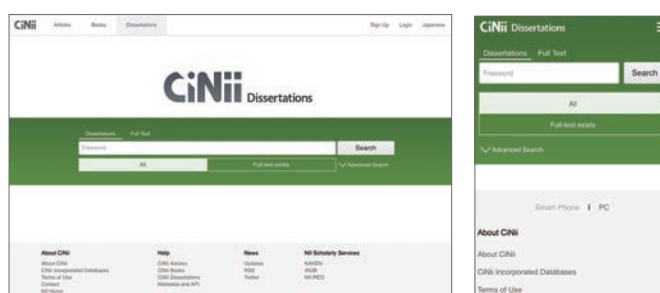
## CiNii Dissertations: Searching for Doctoral Dissertations in Japan

<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 2023)

Number of doctoral dissertation records	Number of full texts from dissertation records
700,000	Approximately 330,000







## Database of Grants-in-Aid for Scientific Research

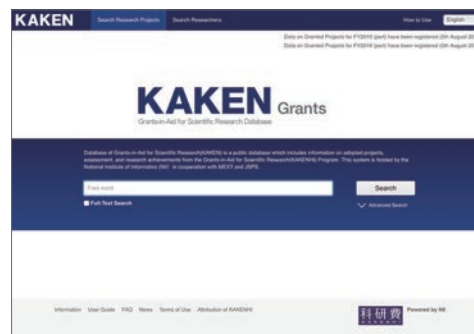
**KAKEN** 科学研究費  
助成事業データベース

**KAKEN: Database of Grants-in-Aid for Scientific Research** <https://kaken.nii.ac.jp/en/>

This database enables users to browse adopted projects, as well as reports and summaries of research conducted through funds from the Grants-in-Aid for Scientific Research implemented by the Ministry of Education, Culture, Sports, Science and Technology and the Japan Society for the Promotion of Science. It provides access to the latest research in a wide range of fields in Japan. The system developed by KAKEN is also used in the JST project database (<https://projectdb.jst.go.jp/>), which contains research projects funded by the Japan Science and Technology Agency (JST).

Data on coverage (as of the end of March 2023)

Number of adopted projects
1,000,000



## 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 2023, \* indicates figure for one year, FY2022.)

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	146,160,000	1,115	352,000	76,000

### 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 2023)

	National universities	Public universities	Private universities	Inter-university research institutes	Publishing companies	Others	Total
Partner A	42	8	42	4	2	28	126
Partner B	9	4	44	1	0	16	74
Total	51	12	86	5	2	44	200

Data registrations

(as of the end of March 2023)

Number of registrations	Number of new registrations (FY2022)
21,053	1,554

### 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.

Licenses (JUSTICE) was released for trial operation on April 1, 2022, and officially released on December 26, 2022.

Out of 104 proposals (56 publishers) submitted to JUSTICE for 2023 agreements, license information relating to "terms of use" and "administrative items" will be shared with JUSTICE member libraries for 81 proposals (47 publishers) for which permission to publish has been obtained (as of March 31, 2023).





## Digital Archives

[https://reo.nii.ac.jp/index\\_en.html](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 2023)

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. 38,000
The Making of the Modern World Part III (MOMW III)	1890-1945	Number of records: Approx. 5,500

Research

Graduate Program



## 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 promote open access and open science by addressing the latest issues relating to scientific information distribution in Japan and abroad, and by serving as a forum for exchange between scientific information stakeholders.

SPARC Japan also continues to collaborate on international initiatives (arXiv.org, CLOCKSS, SCOAP<sup>3</sup>).

Service

Organization/Others



## 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.





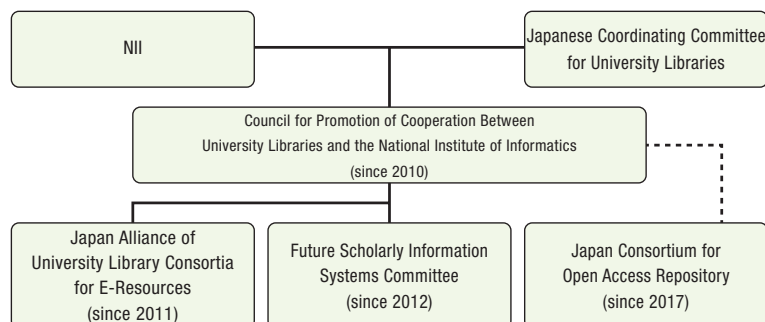
## Collaboration with University Libraries

<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.

### User Group Management Working Group

This working group manages online forums (Discord) and organizes events (e.g., workshops, seminars) to facilitate the smooth operation of online user groups. These allow the institutions using library system networks and their library staff to freely exchange information and opinions.

### Working Group for Examination System Workflows

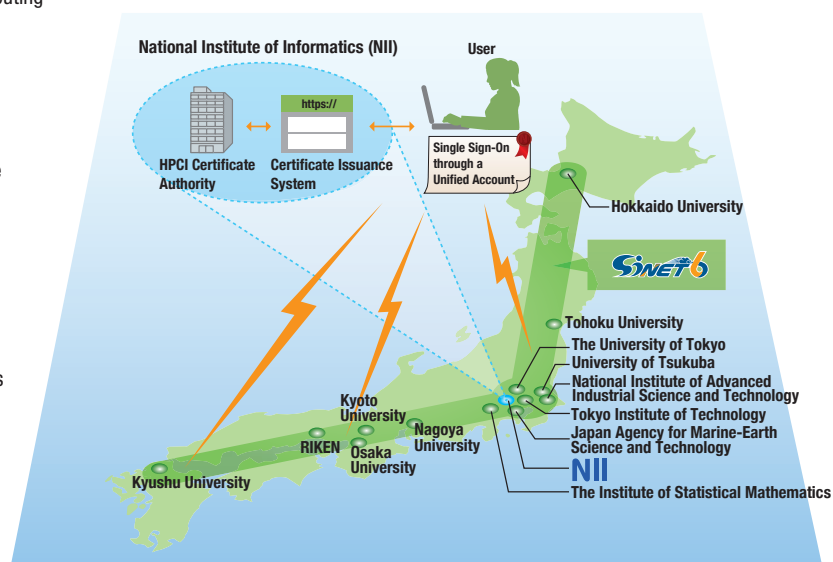
This working group performs four tasks: (1) examination of integrated discovery environments, (2) examination of data sharing of digital information resources, (3) examination of advanced metadata distribution, and (4) ERDB-JP operations work. The working group consists of university library staff and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

### Major online journals and databases

Service	Publisher
ACM Digital Library	Association for Computing Machinery
APS-ALL Package	American Physical Society
IEEE/ET Electronic Library	IEEE/ET
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

### Number of books and journal titles

(as of the end of March 2023)

Reference type	Books	Print journals	Journals (number of titles)
Japanese	15,610	10,028	56
Foreign	9,490	268	5
Total	25,100	10,296	61

### Facilities and equipment

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

Reading room





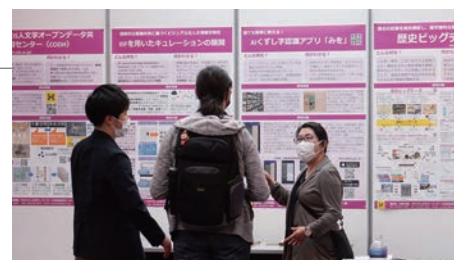
# Public Communications

## 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 and findings to the general public, as well as to interested researchers and prospective graduate school students. In FY2022, the event was held in a hybrid format, with the keynote speeches and dialogues both held before a live audience at a physical venue and livestreamed on the internet. There was also an exhibition at the physical venue and a poster session in a virtual space online. A "Computer Science Park" offered children the opportunity to experience interactive workshops in a virtual space.



Poster session at physical venue.(NII Open House 2022)

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

#### 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 FY2022 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.



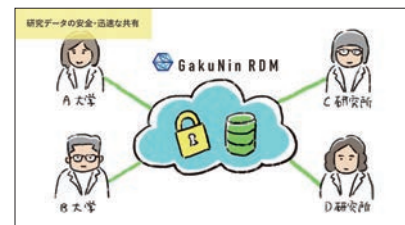
#### Karuizawa Saturday Salon

<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 FY2022.) 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 participates in various exhibitions to offer presentations of its research, projects, and services. As in the previous year, in FY2022, NII had its own virtual booth at the Library Fair & Forum, held online in November. In addition to booth presentations, it also arranged lectures and discussions in six forums on "Expectations and Prospects for Institutional Research Data Publication Services" and other topics.



Video about GakuNin RDM, a research data management support service. The video is available on the NII website.

### 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 FY2022.)

### 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.

#### 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)



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

- 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](https://twitter.com/NII_Bit)
- **Facebook** <https://www.facebook.com/jouhouken>

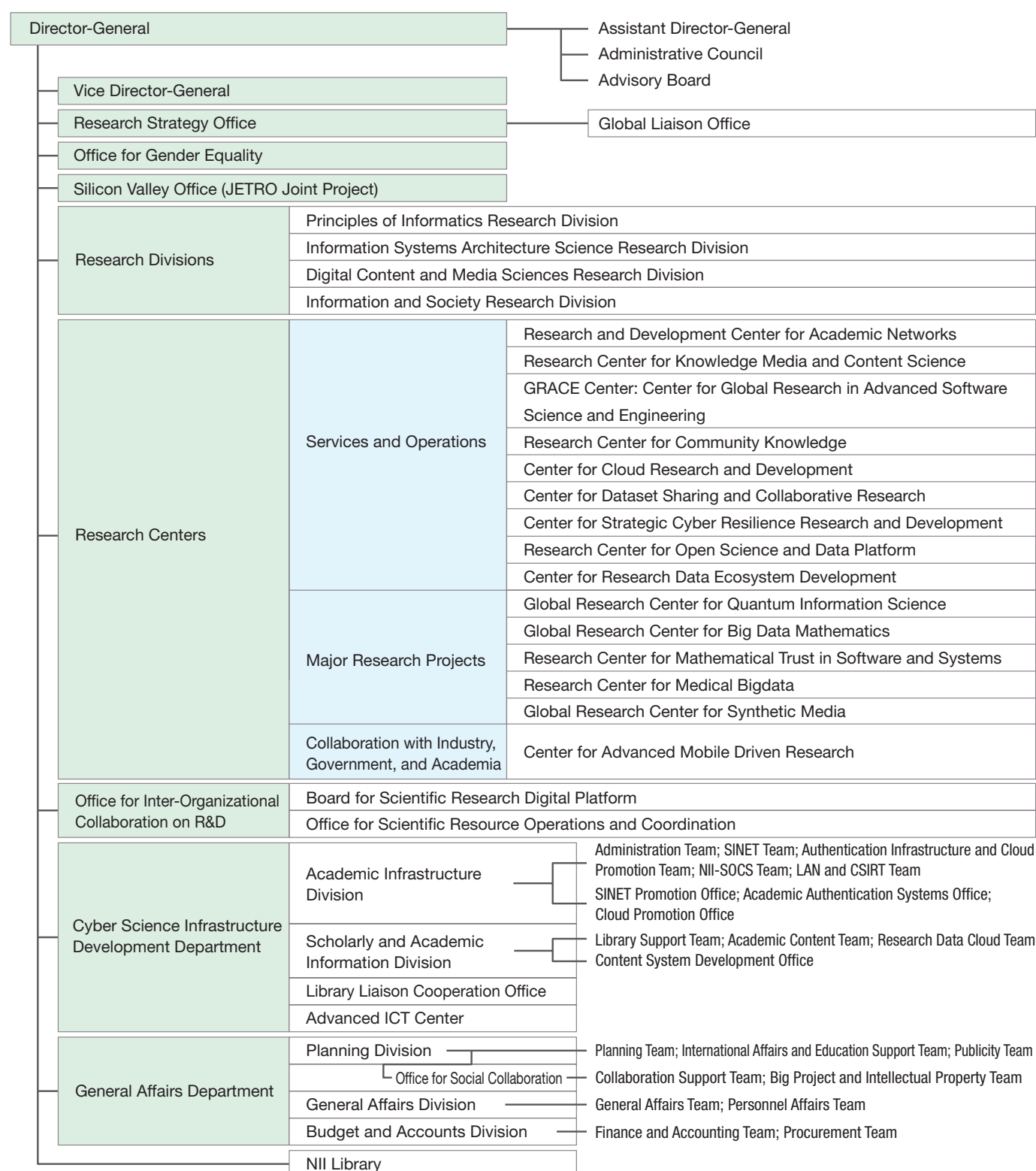
# News Releases

April 1, 2022 to March 31, 2023

Release date	Title	
Apr. 1 2022	Society 5.0-compliant scientific research platform to launch on April 1 (2022) —Integration of SINET6 (400 Gbps nationwide) and NII Research Data Cloud (NII-RDC) to promote utilization, distribution, and management of research data in Japan	
Apr. 8	Award for Science and Technology (Promotion Category) by the Minister of Education, Culture, Sports, Science and Technology for contribution to AI-based automated diagnostic research powered by medical big data cloud platform —Won jointly by Profs. SATO, Shinichi and AIDA, Kento of NII; Prof. MORI, Kensaku of Nagoya University; and Prof. HARADA, Tatsuya of The University of Tokyo	
Apr. 18	CiNii Research enables discovery of rich academic information linked to articles —CiNii Articles is integrated into CiNii Research	
May 13	“NII Weeks 2022” to be held over two weeks from May 30 (Mon.) to June 10 (Fri.)! —NII Open Forum, NII Open House, and Japan Open Science Summit will offer wide-ranging presentations about NII’s activities	
May 16	Award for Science and Technology (Science and Technology Promotion Category) by the Minister of Education, Culture, Sports, Science and Technology to R&D on researchmap, a research information infrastructure service —Won jointly by Prof. ARAI, Noriko and Project Associate MASUKAWA, Ryuji of NII, and MIYASHITA, Hiroshi of UNIADDEX, Ltd.	
May 17	Learn to think like a programmer at NII Open House! —Computer Science Parks to be held in at online venue, plus in Tokyo, Hamamatsu, and Himeji on June 4	
May 24	NAGAI, Ryoza, President of Jichi Medical University, to give lecture on data science in response to the COVID-19 pandemic and to hold a conversation with NII Director-General KITSUREGAWA, Masaru —Keynote speech on opening day of NII Open House, June 3 (Fri.)	
Jul. 7	A new method for mathematically verifying the safety of self-driving vehicles —Accelerating social acceptance of automated driving technology by efficiently deriving logical safety rules	
Jul. 27	An overall picture of personal information protection rules for research in the era of big data —Data management platform handbook for open science is published	
Aug. 12	Development of AI to support pathological diagnosis of gastric biopsies —Supporting pathologists, who are in short supply, helps to ensure cancer treatment	
Aug. 18	NII starts providing word-of-mouth data on approximately 160,000 products and services, free of charge, for academic research	
Aug. 31	Mercari online flea market app starts providing listing data to universities and other organizations free of charge —Aiming to help shape a recycling-oriented society through research and analysis of consumer behavior and psychology in secondary retail markets	
Sep. 15	In addition to the usual LINE stickers of NII’s official mascot “Bit-kun,” this year’s line of LINE emojis will also be on sale	
Oct. 26	World’s first AI kuzushiji recognition app “miwo” wins a 2022 Good Design Award —Contributing to kuzushiji education and surveys of local historical materials using antique documents	
Oct. 31	Number of institutions subscribed to SINET (a platform that supports scientific research in Japan) reaches 1,000	
Nov. 1	COVID-19 pneumonia CT imaging surveillance system is developed —ICT platform enables R&D for rapid response to pandemic	
Nov. 8	Center for Advanced Mobile Driven Research is set up at NII —An innovative value creation platform based on a high-performance 5G mobile environment	
Nov. 24	NII starts providing travelogue data posted by users of the <i>Chikyu no Arukikata</i> travel website free of charge for academic research	
Dec. 23	Analyzing changes in people’s topics and interests in connection to COVID-19 vaccines —Deciphering data from more than 100 million “tweets” (Twitter posts)	
Jan. 10 2023	AI for estimating biological age from fundus images is publicly released —As a basis for development of new biomarkers related to eye diseases	
Jan. 13	SYNTHETIQ VISION, a program for automatically detecting AI-generated fake facial images, is used for detecting “deep fake” celebrity videos —First practical example of automatic detection of authenticity of fake facial images in Japan	
Jan. 23	NII and NTT launch trial of a secure computation system for universities —World’s first “secret computation AI software capable of learning and reasoning using key algorithms in the four major AI categories”	
Mar. 17	Development of technology to effectively and efficiently reduce the risk of misidentification by image identification AI —Verification of effectiveness for automated driving systems based on safety benchmarks	
Mar. 29	RIKEN, NII, and NTT collaborate to promote utilization of large-scale research data by IOWN	
Mar. 30	New catalog information service for universities and other institutions (NACSIS-CAT/ILL) System takes one more step toward international distribution of metadata	

The titles, affiliations, etc., listed above are current at the time of publication of the news release.

# Organization



## 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 KUROHASHI, Sadao

Acting Director-General/  
Vice Director-General AIZAWA, Akiko

Vice Director-General SUGIMOTO, Akihiro

Vice Director-General URUSHIDANI, Shigeo

Vice Director-General KATAOKA, Hiroshi

Vice Director-General TAKASU, Atsuhiko

Vice Director-General/  
(Chief Cyber Science Infrastructure Director) YASUURA, Hiroto

Director, Principles of Informatics Research Division

TAKEDA, Hideaki

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 TAKANO, Shinji

◇ Scholarly and Academic Information Division  
Manager YOSHIDA, Yukinae

◇ Library Liaison Cooperation Office  
Head YAMAZAKI, Hiroko

◇ Advanced ICT Center  
Head FUKUDA, Kensuke

### ■ General Affairs Department

General Manager HIRATSUKA, Shoji

◇ Planning Division  
Manager MOCHIDA, Shigenobu

◇ General Affairs Division  
Manager AOYAMA, Fumihiko

◇ Budget and Accounts Division  
Manager TAHARA, Yuji

### ■ NII Library

Head SUN, Yuan



## Staff Numbers

(as of May 2023)

Category	Director-General	Vice Director-General	Assistant Director-General	Professor	Associate Professor	Lecturer	Assistant Professor	Subtotal	Administrative Staff	Total
Full-time staff	1	5	0	29	23		14	72	68	140
Project professor, etc.		1		12	9		13	35		35
Special term/fixed-term/short-term staff										291

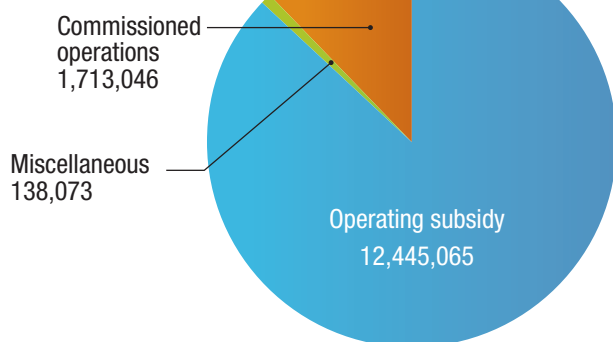


## Budget

(FY2023)

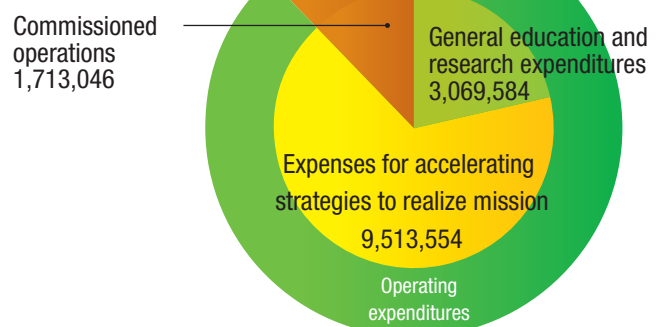
### ■ Income

14,296,184 (unit: thousand yen)



### ■ Expenditure

14,296,184 (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
KOYAMA, Teruo	April 1, 2015
MIYAZAWA, Akira	April 1, 2015

Name	Award date
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
KITSUREGAWA, Masaru	April 1, 2023
YONEDA, Tomohiro	April 1, 2023
OYAMA, Keizo	April 1, 2023

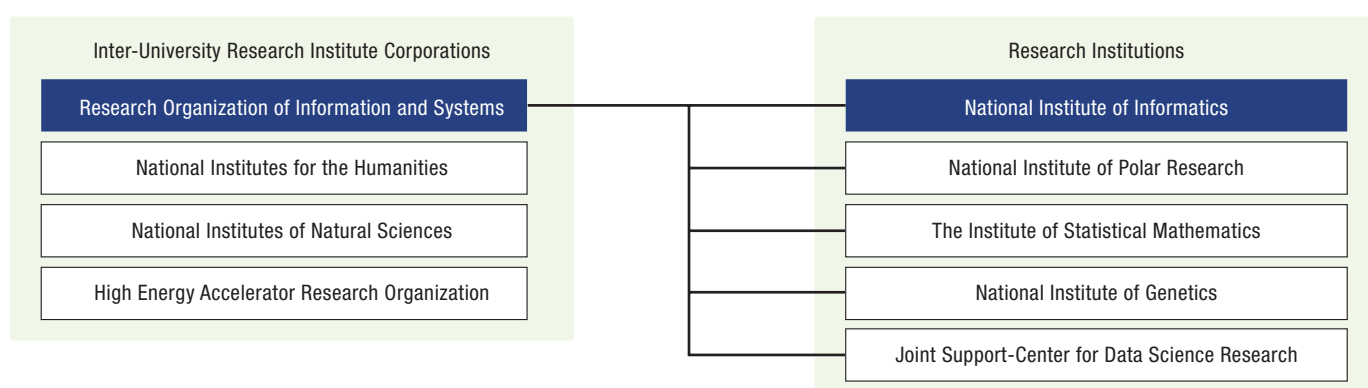


## Inter-University Research Institute Corporations

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.
February 2021	GakuNin RDM is officially launched.
March	JAIRO Cloud (WEKO3) prior migration is completed.
June	GakuNin LMS is officially launched.
November	Japan Data Catalog for the Humanities and Social Sciences (JDCat) is launched.
April 2022	Science Information Network (SINET6) is launched.
April	Scientific Research Digital Platform begins full-scale operation.
January 2023	New catalog information service (NACSIS-CAT/ILL) starts operating.

Research

Graduate Program

Service

Organization/Others

## Facilities and Locations



### National Center of Sciences (Chiyoda-ku, Tokyo)

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

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

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

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

#### National Institute of Informatics

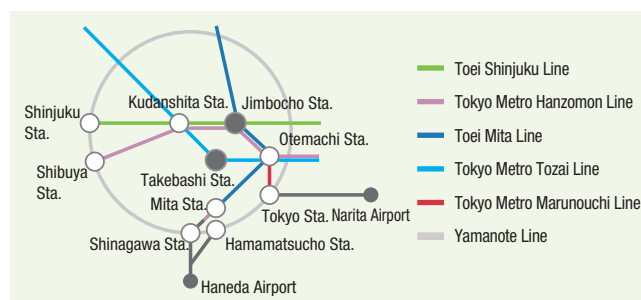
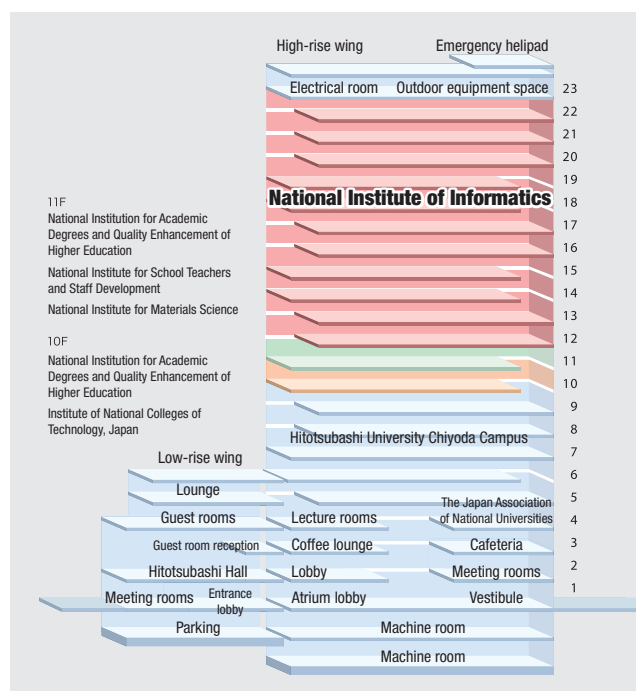
National Center of Sciences Bldg.

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

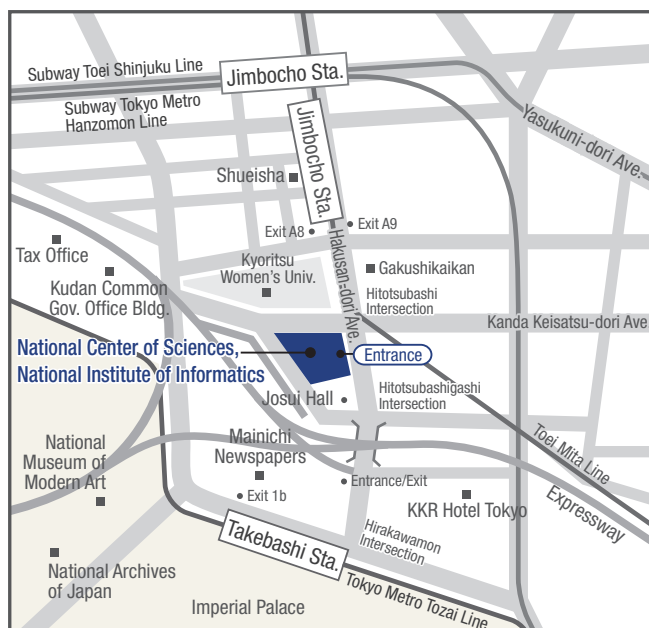
Tel: +81-3-4212-2000 (exchange)

■ Site area: 6,842 m<sup>2</sup> (occupied by NII: 3,036 m<sup>2</sup>)

■ Floor space: 40,585 m<sup>2</sup> (occupied by NII: 18,145 m<sup>2</sup>)



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 m<sup>2</sup>, NII occupies 3,886 m<sup>2</sup> 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



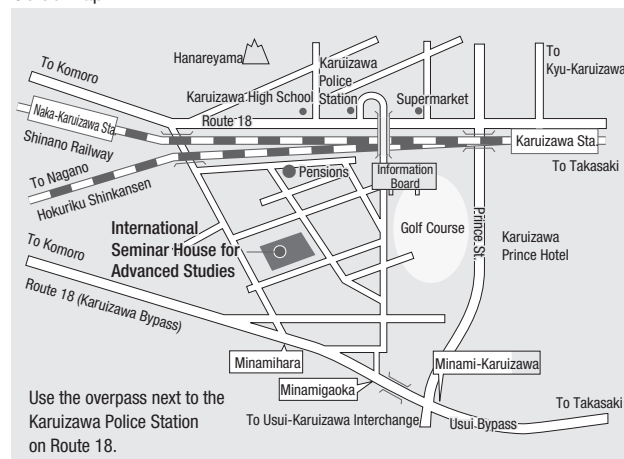
Exterior of Seminar House

### 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 m<sup>2</sup> ■ Floor space: 667 m<sup>2</sup>

#### Guide Map





## 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, Authentication Infrastructure and 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.45)	Scholarly and Academic Information Division, Institutional Repository Desk	ir@nii.ac.jp
CiNii (p.46)	Scholarly and Academic Information Division, CiNii Desk	ciniiadm@nii.ac.jp
Catalog Information Service (NACSIS-CAT/ILL) (p.47)	Scholarly and Academic Information Division, CAT/ILL Desk	catadm@nii.ac.jp
SPARC Japan (p.48)	Scholarly and Academic Information Division, SPARC Desk	sparc@nii.ac.jp
Education and Training Services (p.48)	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, 2023



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

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

