

Inter-University Institute Corporation  
Research Organization of Informatics and Systems

# National Institute of Informatics

## 2009-2010

### Features of NII

**Advancing Integrated Research and Education in the Field of Informatics**

**Promoting the Cyber Science Infrastructure (CSI)**

**Creating Future Value**

**Social and Public Contribution**

**Interdisciplinary Approach to Information Processing**

**Partnership among Industry, Government and Academic Sectors**

**International Research Activities**

**Graduate Education and Human Resource Development**

As Japan's only general academic research institution seeking to create future value in the new discipline of informatics, the National Institute of Informatics (NII) seeks to advance integrated research and development activities in information-related fields, including networking, software, and content. These activities range from theoretical and methodological work to applications. As an inter-university research institute, NII promotes the creation of a state-of-the-art academic-information infrastructure (the Cyber Science Infrastructure, or CSI) that is essential to research and education within the broader academic community, with a focus on partnerships and other joint efforts with universities and research institutions throughout Japan, as well as industries and civilian organizations.

**Weaving Information into Knowledge**



# Research & Education Activities at NII

Informatics is a new academic discipline based not only on computer science and information technology, but on the human, social, and life sciences. The NII advances informatics research with the goals of creating future value; furthering social and public contributions; promoting interdisciplinary approaches to information processing; partnerships among industry, government, academic, and civilian organizations; and international research activities and operations. The NII has established four research divisions, seven research centers, the Organization for Management and Outside Collaboration on R&D, and the Collaborative Research Unit.

## Research Division

### ● Principles of Informatics Research Division

In the Principles of Informatics Research Division we seek to discover new principles, theories and methods in Informatics, and extend our goal to pioneering the frontiers to try and achieve a paradigm shift in informatics.

### ● Information Systems Architecture Science Research Division

The Information Systems Architecture Science Research Division deals with the research issues in software/hardware architectures of computers and networks, and their system implementation.

### ● Digital Content and Media Sciences Research Division

The Division conducts research on various types of contents and media such as text and video in terms of analysis, creation, compilation and application, and their processing methods from the theories to the systems.

### ● Information and Society Research Division

We remain dedicated to aiding in the creation of a society in which information is integrated into the real world, based on interdisciplinary research on information and systems technologies and on issues in the human and social sciences.

## Research Center

### ● Center for Grid Research and Development

The Center for Grid Research and Development is responsible for development and maintenance of NAREGI Version 1 grid middleware, its deployment to the Cyber Science Infrastructure, and support of grid operation.

### ● Research and Development Center for Informatics of Association

The Center seeks associative calculation mechanisms for large-scale contents, and develops practical information technology to enhance associative ability of human.

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

This Center produces top-level researchers (Top RE) and educates top-level software engineers (Top SE) by building global research organizations and promoting research, practice, and education together for advanced software engineering.

### ● Research Center for Community Knowledge

The objective of this research center is to study how “common knowledge” is formed and developed in the cyber space. More precisely, we research and develop the next generation’s knowledge & information sharing infrastructure, which is named “NetCommons.”

### ● Strategic Research Projects Incubation Center

The Center plays a role in developing potential projects and incubating them into strategic and organized projects by providing research support.

### ● Research and Development Center for Academic Networks

The Research and Development Center for Academic Networks is responsible for conducting research and development as well as construction of the cutting-edge infrastructures of the academic network and the UPKI (InterUniversity Public Key Infrastructure) for Japanese universities, both forming the core of the Cyber Science Infrastructure (CSI) by cooperating with Japanese universities and relevant organizations.

### ● Research and Development Center for Scientific Information Resources

The Center coordinates and operates with the related organizations in conducting advanced research and development about their circulation and generation, common of the academic digital content on the Cyber Science Infrastructure (CSI).

## Organization for Management and Outside Collaboration on R&D

### ● Organization for Science Network Operations and Coordination

The Organization coordinates and operates the construction of Science Information Network, middleware and others as part of the core of the Cyber Science Infrastructure (CSI).

### ● Organization for Scientific Resources Operations and Coordination

The Organization coordinates and operates the management of scientific resources and the provision of services as part of the core of the Cyber Science Infrastructure (CSI).

### ● Organization for Value Creation in Informatics

Meeting future social and technological requirements through value creation in informatics, the organization is making continuous research efforts to overcome grand challenges by organizing all Japanese universities and research institutions in each research area.

## Organization for Promoting Cooperation with Society and Industry

Promoting research activities in informatics to contribute to society and the public and to reinforce government-industry-academia collaboration, and aiming at sharing research results and their values with society and industry, the organization is developing innovative model and frameworks for promoting cooperative activities.

## Grand Challenge

NII promotes studies on the following topics that may lead to breakthroughs in informatics.

- Breakthroughs algorithms
- Dependable software
- Content value creation
- Bridging the semantic gap affecting image media
- ICT governance: its social system and legal system

## Projects

### ● Cyber Science Infrastructure (CSI)

- Science Information Network SINET3  
〈Organization for Science Network Operations and Coordination〉
- Integrated middleware for CSI: NAREGI 〈Center for Grid Research and Development〉
- Next-Generation Academic Information Infrastructure  
〈Organization for Scientific Resources Operations and Coordination〉
- UPKI (Inter-University PKI) joint public key infrastructure for universities  
〈Organization for Science Network Operations and Coordination〉
- Research and Development on RESources liNKage for E-science (RENKEI Project)

### ● Informatics for future value creation

- Cyber information infrastructure for the information-explosion era 〈Jun Adachi〉
- Research into quantum computing based on coherent states and solid state quantum bits (qubits) 〈Yoshihisa Yamamoto〉
- Science Grid 〈Kenichi Miura〉
- Next-generation Informatics Research Infrastructure

### ● Next-generation software strategies

- Next-generation operating system: SSS-PC 〈Takashi Matsumoto〉
- TOP SE (Education Program for Top Software Engineers) 〈Shinichi Honiden〉
- Development of Dependable Network-on-Chip Platform 〈Tomohiro Yoneda〉

### ● Information environment / content creation

- New generation bio portal R&D 〈Asao Fujiyama〉
- Associative information access for spontaneous learning 〈Akihiko Takano〉
- Generic Engine for Transposable Association (GETA) 〈Shingo Nishioka〉
- Content integration and handling technology for digital archiving 〈Jun Adachi〉
- Thinking content - The Smartive Project 〈Shinichi Honiden〉
- Research Infrastructure for Evaluation of Information Retrieval and Access Technologies - NTCIR (NII Test Collection for IR Systems)  
〈Noriko Kando〉

### ● A solutions-seeking approach

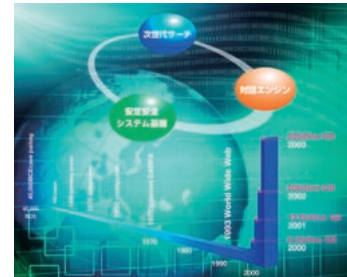
- Global health tracking system: BioCaster 〈Nigel Collier〉
- Technologies to reduce environmental impact based on IT 〈Ichiro Satoh〉

### ● Social/public contribution

- Cultural Heritage Online in Japan 〈Yuzo Marukawa〉
- IMAGINE-Federated associative search for heterogeneous information resources  
〈Akihiko Takano〉
- Information sharing system - NetCommons 〈Noriko Arai〉
- Information reliability mechanism - Infotrustics 〈Noboru Sonehara〉

### ● Integrated informatics

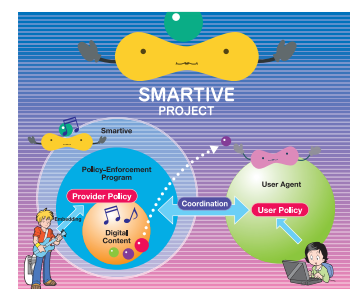
- Determining the genomic infrastructure of evolution and diversity through comparative genome analysis 〈Asao Fujiyama〉



A research project to tackle information explosion has been initiated



Jabion



Thinking contents: Smartive



NetCommons



IMAGINE

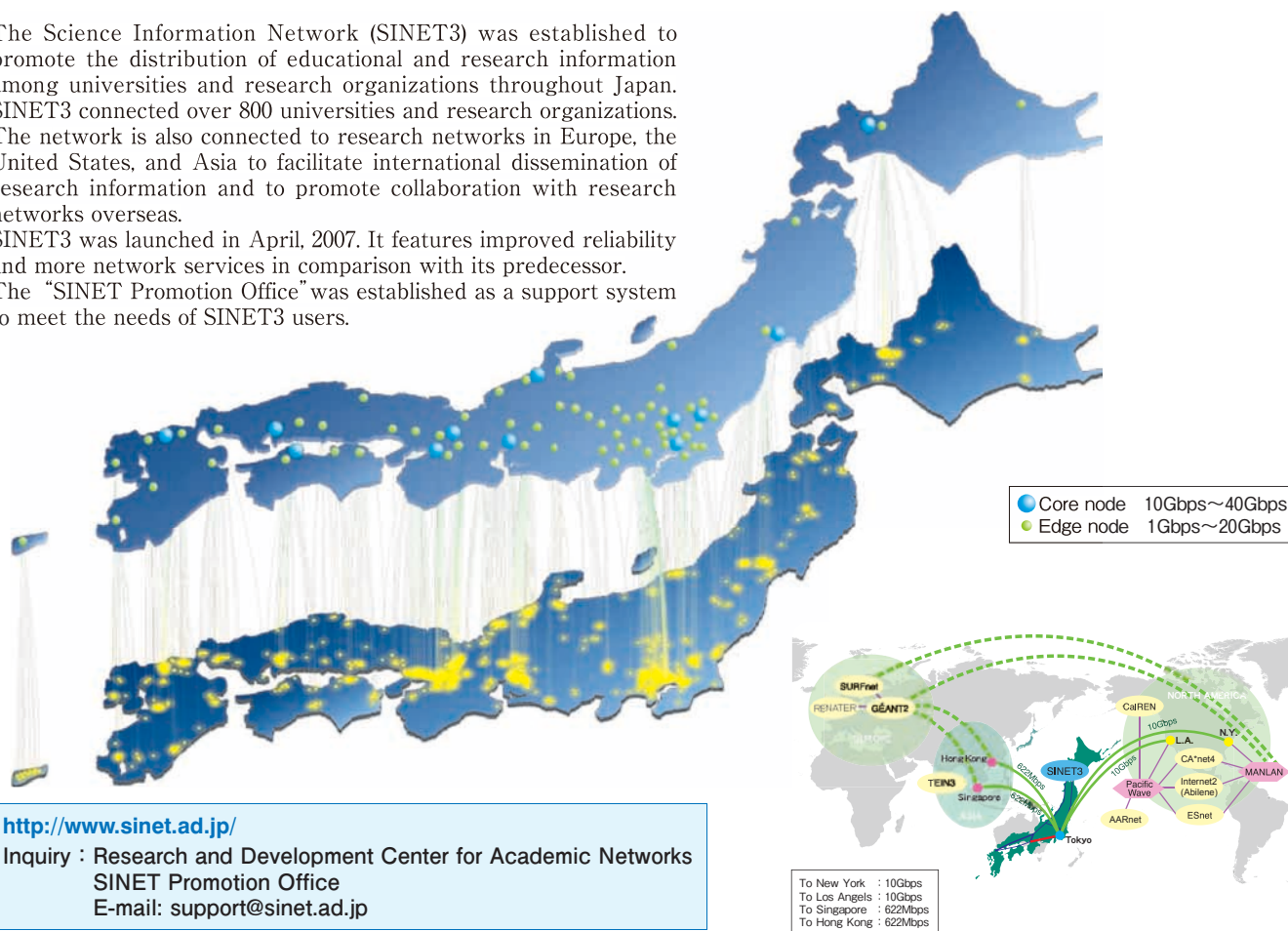
## Science Information Network (SINET3)



The Science Information Network (SINET3) was established to promote the distribution of educational and research information among universities and research organizations throughout Japan. SINET3 connected over 800 universities and research organizations. The network is also connected to research networks in Europe, the United States, and Asia to facilitate international dissemination of research information and to promote collaboration with research networks overseas.

SINET3 was launched in April, 2007. It features improved reliability and more network services in comparison with its predecessor.

The "SINET Promotion Office" was established as a support system to meet the needs of SINET3 users.



<http://www.sinet.ad.jp/>

Inquiry : Research and Development Center for Academic Networks  
SINET Promotion Office  
E-mail: support@sinet.ad.jp

## Construction of a University Public Key Infrastructure (UPKI) for use in cooperation between universities



An establishment of the University Public Key Infrastructure (UPKI) that intended to achieve an inter-university cooperation that makes use of digital content, networks at Japanese universities and other institutions in safe, convenient, and effective ways, has been proceeded from 2006 to 2008.

Based on this work, we are issuing Server Certificate that assures the web server existence of their institutions, and we also are working to establish an authentication federation to realize Single Sign-On to academic resources.

The authentication federation based on the Shibboleth technology makes it possible to achieve a Single Sign-On environment to access from on and off-campus to not only digital contents, grid computing resources, and campus wireless LAN in universities, but also commercial electronic journals or academic content.

UPKI Initiative <https://upki-portal.nii.ac.jp/>

Inquiry : Infrastructure Planning Division, Cyber Science Infrastructure Development Department  
E-mail : upki@nii.ac.jp

## NAREGI middleware and e- science community



We have developed grid middleware (NAREGI middleware) for sharing computer resources, data, and other resources held at universities and other research organizations. This middleware is now available as open source software on the Web.

Since the 2008 fiscal year, we have been engaged in a project titled Research and Development on Systems Integration and Interconnections for Realizing e-Science, an initiative promoted by the Ministry of Education, Culture, Sports, Science and Technology. As part of this project, we conduct research and development on the resource-linking technologies needed to create an e-science research community. The results of such research and development will enable the sharing and linking of computational resources, databases, and applications, linking the small-scale departmental resources operating in various environment to the large-scale resources held at information centers and overseas grids operating on different middleware.

<http://www.naregi.org/>

Inquiry : Center for Grid Research and Development (Collaborative Center for Research Grid)  
E-mail : naregi-office@grid.nii.ac.jp



## Consolidation of Cyber Science Infrastructure (CSI)

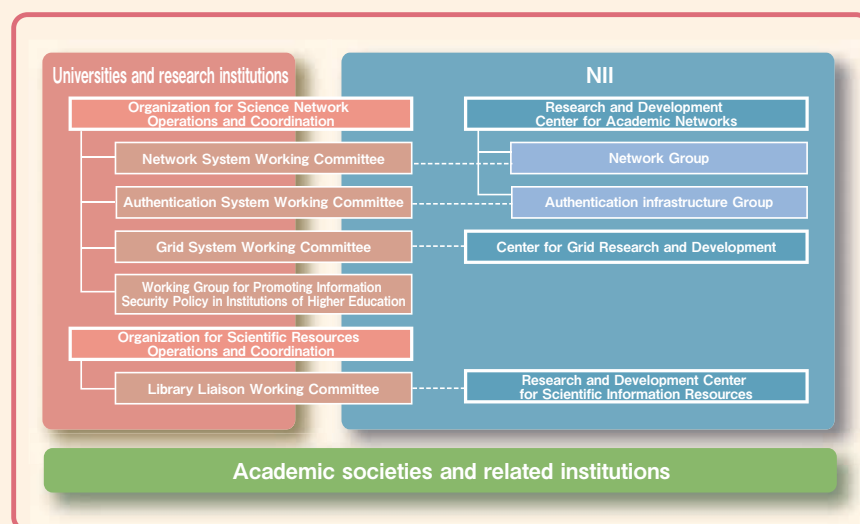
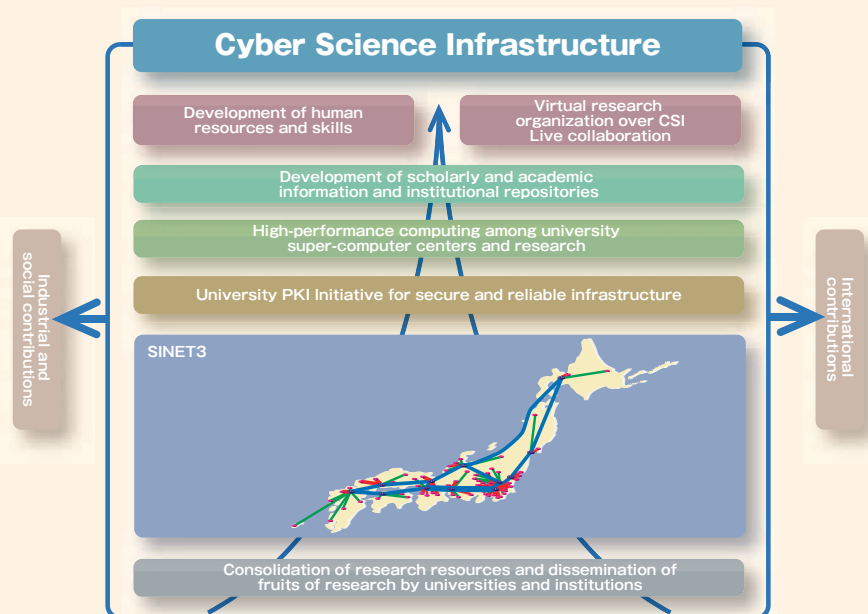
NII is promoting the consolidation of the Cyber Science Infrastructure (CSI) through cooperation with universities and other organizations.

CSI means an information environment that incorporates and utilizes various research activities and results from universities and research institutions – such as supercomputers and other distinctive scientific utilities and resources, scientific software and databases, and human resources that Japan's universities and research institutions possess – over a super high-speed network, transcending the borders of organizations or scientific fields. This infrastructure will guarantee an environment that enables the promotion of cutting-edge higher education as well as research and development of technology in universities, research institutions, and industry.

NII puts in strategic efforts to the following areas, as expanding the various development projects and operations it has implemented to date within the framework of the CSI.

1. Establishment of science information network, grid environment, and UPKI through cooperation between the NII, the university IT centers and other organizations
2. Establishment of the infrastructure for next-generation scientific resources through cooperation between the NII, university libraries, academic societies and other organizations
3. Formation of a nationwide informatics research alliance for future value creation

NII, universities and other research institutions will collaborate and cooperate closely to facilitate the above, and Japan's academic community will work as one to prepare and vigorously promote the framework for advancing CSI construction.



<http://csi.jp/>

Inquiry: Infrastructure Planning Division, Cyber Science Infrastructure Development Department E-mail: [plan@nii.ac.jp](mailto:plan@nii.ac.jp)

## Education and Training Program



NII provides a range of training programs for university and other academic personnel responsible for scientific and academic information at universities and elsewhere.

### ■User Training

User Training course provides the opportunity to learn the structure of NACSIS-CAT/ILL, its contents, data uploading methods (input standards), and operation rules.

### ■Advanced Training Programs

Advanced Training Programs provide the opportunities to learn academic information, the latest development in information communication and specialized/advanced technologies.

### ■NII Practical Training Course

NII Practical Training Course provides training in advanced academic information systems through hands-on experience at NII facilities.

### ■Support for User Training Programs Sponsored by Universities

NII supports the user training sponsored by universities and academic societies.

<http://www.nii.ac.jp/hrd/>

Inquiry: Scholarly and Academic Information Division, Cyber Science Infrastructure Development Department E-mail: [edu@nii.ac.jp](mailto:edu@nii.ac.jp)

## Next-Generation Academic Information Infrastructure

NII, in close collaboration with universities, and other institutions is attempting to generate and secure scholarly and academic information that are indispensable to the academic community, and to build an information infrastructure that will give added value to and broadly transmit these information.

### ●NII Institutional Repositories Program

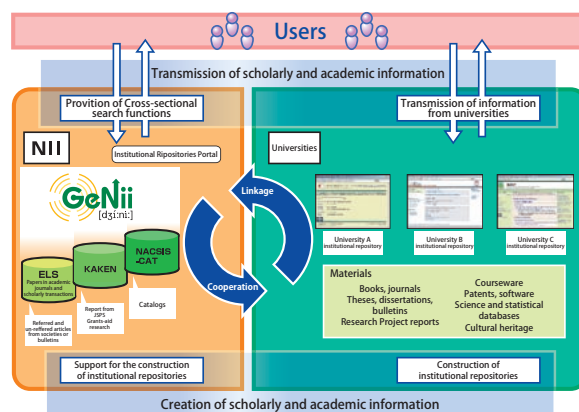
NII supports the construction of "institutional repositories" that harvest and store academic papers and other results of universities and other institutions, and transmit these both inside and outside the institutions to develop next-generation academic information infrastructure and collaborate with various institutions.

<http://www.nii.ac.jp/irp/>  
E-mail : iradm@nii.ac.jp

### ●GeNii (NII Scholarly and Academic Information Portal)

GeNii is a portal site providing comprehensive information on academic research. The site currently provides four content services: (1) academic papers (CiNii), (2) books/journals (Webcat Plus), (3) reports on Grants-in-aid research (KAKEN), (4) database repository (NII-DBR), and (5) institutional repositories (JAIRO). GeNii offers integrated search of all databases as well as individual search functions that maximize the features of each content type. Although GeNii can be accessed free of charge through the Internet without a user registration, some of the for-fee contents in CiNii require institutional/individual registration.

<http://ge.nii.ac.jp/>  
E-mail : geniadm@nii.ac.jp



### ●Catalog Information Service

#### ■NACSIS-CAT : Cataloging System

NACSIS-CAT is a system for constructing union catalog databases designed to provide at-a-glance information on academic information archived at university libraries across Japan. It serves as a useful tool for academic and research activities. The end of March, 2009, about 1,224 organizations, are participating in NACSIS-CAT.

#### ■NACSIS-ILL : Inter Library Loan System

The NACSIS-ILL system supports inter-library services for document reproduction and lending of literature to researchers. Some 1 million requests are handled.

<http://www.nii.ac.jp/CAT-ILL/>  
E-mail : <NACSIS-CAT> catadm@nii.ac.jp <NACSIS-ILL> illadm@nii.ac.jp

### ●JAIRO (Japanese Institutional Repositories Online)

JAIRO is a service providing cross-search of Institutional Repositories which makes it possible to discover educational and research outcomes (journal articles, theses or dissertations, departmental bulletin papers, research papers, etc.) disseminated from universities and academic institutions in Japan.

<http://jairo.nii.ac.jp/>  
E-mail : ir@nii.ac.jp



### ●NII Repository of Electronic Journals and Online Publications(NII-REO)

NII-REO is an electronic journal content storage and access system developed by a consortium of university libraries as a means of ensuring continuous and reliable access to journal data. The availability of each item depends on the individual conditions agreed upon with the publishers.

<http://reo.nii.ac.jp/>  
E-mail : reo@nii.ac.jp



### ●Online Scientific Terms (Sciterm)

With the Online Scientific Terms (Sciterm) service, the scientific terms contained in the scientific dictionaries and glossaries can be retrieved, via the Internet, free of charge.

<http://sciterm.nii.ac.jp/>  
E-mail : sciterm.nii.ac.jp



### ●Academic Society HomeVillage

The purpose of Academic Society HomeVillage is to collect scholarly research relating to Japanese academic societies and disseminate the information over the internet.

<http://wwwsoc.nii.ac.jp/>  
E-mail : wwwsoc@nii.ac.jp



Inquiry: Scholarly and Academic Information Division, Cyber Science Infrastructure Development Department  
<http://www.nii.ac.jp/content/>

# Research & Education Activities at NII

## ●Graduate Education

NII joined the Graduate University for Advanced Studies and established the Department of Informatics to provide graduate education (5-year and 3-year Ph.D. programs). The department covers six research areas: Foundations of Informatics, Information Infrastructure Science, Software Science, Multimedia Information Science, Intelligent Systems, Science, and Information Environment Science. NII also accepts excellent students from overseas. In addition, NII is cooperating in the provision of graduate education to graduate students pursuing Master's or Ph.D. degrees at many universities.

### ■Number of Students

(March 2009)

	Domestic	Outside the country	Total
The Graduate University for Advanced Studies	50	23 (10 countries)	73
Other graduate schools	42	0	42



Ceremony for Presentation of the Ph.D. Conferment Commemoration Medal

Inquiry : International Affairs and Education Support Team, Research Promotion Division  
E-mail : daigakuin@nii.ac.jp

## ●Research Cooperation / Intellectual Property

NII actively advances research with grants-in-aid for scientific research, with the private sectors and with external funds such as those for commissioned research, and also promotes contributing to society by utilizing intellectual property that is produced from research process and is managed by NII.

Inquiry : Research Support and General Affairs Team, Research Promotion Division  
E-mail : kaken@nii.ac.jp

## ●Dissemination of Research Results

NII organizes lectures and symposia and publishes books and brochures in order to disseminate research findings widely to society. An archive of event information is available on the National Institute of Informatics website.

### ◆Open House: Poster Exhibitions and Demos

[Life Style Innovation -Informatics to change society-]

### ◆Lectures and Symposia

NII International Symposium  
Karuizawa Saturday Salon  
NII Public Lectures

### ◆Publications

Progress in Informatics  
NII Technical Report  
NII Series (Maruzen Library)  
Karuizawa Doyo-Konwakai Koenshu: Chi to Bi no Harmony ("Collection of Lectures from the Karuizawa Saturday Meetings: Harmony of Intelligence and Beauty")

### ◆Brochures

NII Today  
Catalogue of NII  
Outline of NII  
Annual Report

### ◆Mail Magazine

We deliver the information such as various event guides regarding NII and up-to-date information with E-mail. Subscription charge is free. Please subscribe from the National Institute of Informatics website.  
URL: <http://www.nii.ac.jp/>



Progress in informatics



NII Open House (June, 2008)



NII Public Lecture (September, 2008)

Inquiry : Publicity and Dissemination Team, Planning and Promotion Strategy Department  
E-mail : kouhou@nii.ac.jp

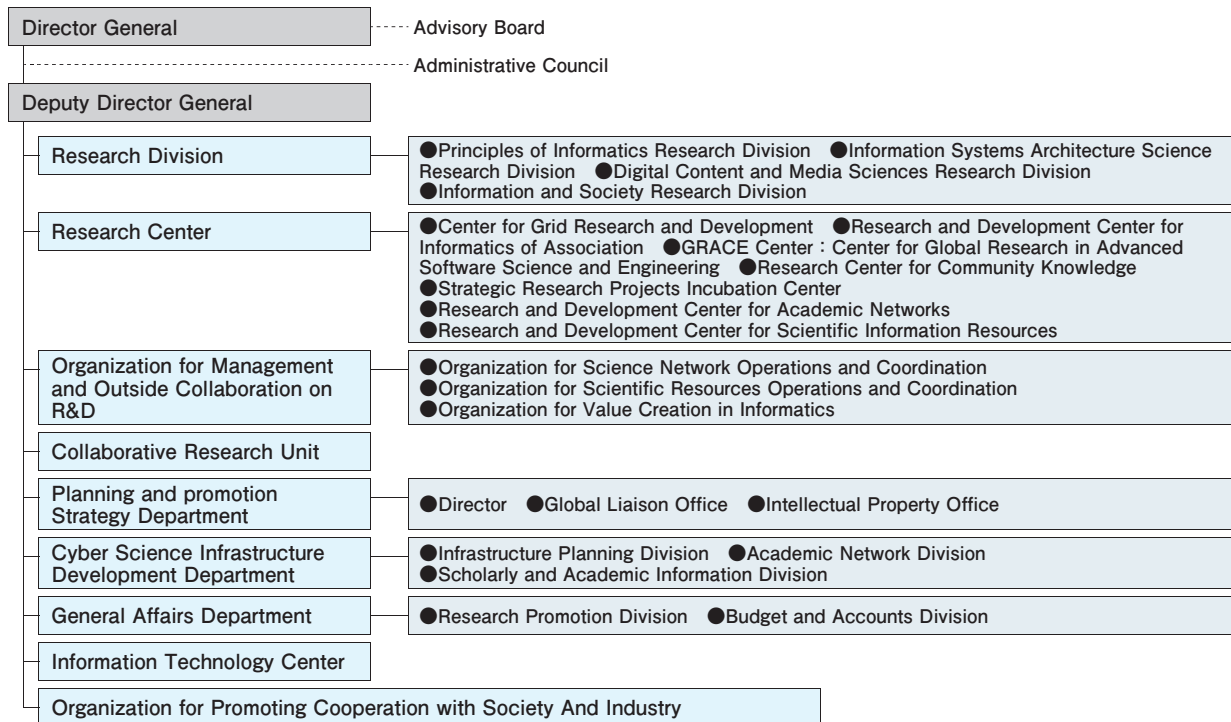
## ●International Activities

NII actively promotes international exchange agreements (MOUs, memoranda of understanding) with overseas universities and research institutes, and holds various exchange activities in the form of joint research projects, and other interactions between researchers and students. To support these exchange activities, NII provides various programs such as the International Internship Program and MOU Grants. NII promotes collaborations with overseas universities and institutes in various fields of research.

NII has also established and currently operates a management base for the Japanese-French Laboratory for Informatics (JFLI) as part of its efforts to promote informatics research and information sharing among researchers.

Inquiry : Planning Team, Planning and Promotion Strategy Department  
E-mail : kokusai@nii.ac.jp

# Organization



# Facilities

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

NII is located in the National Center of Sciences at Hitotsubashi, Tokyo. This building has some meeting rooms including, Hitotsubashi Memorial Hall, which are used for international meetings and workshops organized by national universities and academic societies.

## ●Chiba Annex (Inage-ku, Chiba City)

The Chiba Annex is located in the Chiba Experiment Station of the Institute of Industrial Science of the University of Tokyo as a facility for computer systems and networking equipment, which are used to operate science information system and provide science information services.

## ●International Seminar House for Advanced Studies — Inose lodge — (Karuizawa, Nagano Prefecture)

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

Uses

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



**NII** Inter-University Research Institute Corporation /  
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<http://www.nii.ac.jp/>

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