National Institute of Advanced Industrial Science and Technology (AIST)

Organization and Outline

AIST NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (AIST)

April 2013 version

Message from the President

Toward the Realization of Growth with Innovation

－AIST promotes science, technology and innovation integrally－

Ryoji Chubachi

President

National Institute of Advanced Industrial Science and Technology (AIST)

I was appointed President of The National Institute of Advanced Industrial Science and Technology (AIST) in April, 2013. I am looking forward to working with this institute.

Japan is not endowed with natural resources such as minerals and energy. Therefore, our predecessors have developed the country with science and technology and have established the society that we have today. However, due to the long economic recession, current funds for science and technology which lead to investments for the future have not been secured sufficiently, especially in the private sectors. I realize that public research institutions are highly expected to play a key role to advance scientific and technological innovation which encourages future growth.

AIST was reorganized through the integration of 15 research institutes under the former Agency of Industrial Science and Technology in 2001. With the aims of developing industries and ensuring stable supply of energy resources, AIST has conducted R&D related to mining and industries. This institute is one of the leading public research institutions in Japan, where about10,000 staff members including about 3,000 full-time employees, part-time staff and visiting researchers are engaged in their activities. AIST has six research fields classified into environment and energy, life science and biotechnology, information technology and electronics, nanotechnology, materials and manufacturing, metrology and measurement science, and geological survey and applied geoscience. For solutions of various issues in society, we at AIST are promoting science, technology and innovation integrally not only by conducting interdisciplinary collaboration within and between the fields of AIST but also by building various collaborations with external parties.

To enable swift and flexible research activities, AIST is divided into three research units: "research institute" for continuous research, "research center" for intensive research to meet high needs, and 'research laboratory' aiming for a future research center. Each research unit pursues research efforts with its own clear goal. As of April, 2013, there are 41 research units at AIST.

In addition, in order to promote science, technology and innovation integrally, AIST, since its establishment, has implemented various pursuits such as collaboration with universities, public testing and research institutions and companies on a one-to-one basis or in consortiums, collaboration by organizing joint researches, or data base construction and sharing. In particular, reinforcing "functions of open innovation hub" by utilization of "human resources" and "research platforms" of AIST is one of our current important missions. Under this mission, we at AIST are promoting R&D, technology evaluation and standardization by industry-academia-government collaboration. Moreover, AIST has been actively participating in open and constructive collaborations of large-scale including technology research associations. By FY 2012, AIST had joined 20 technology research associations and has also been promoting "Tsukuba Innovation Arena (TIA-nano)" as a large collaboration.

It is important that comprehensive integration of science, technology and innovation utilizes Japan's regional resources and stimulates the development of our regional industries. AIST has research bases throughout the nation. Each research base focuses on specific issues based on the regional needs and conducts R&D to solve the issues. In order to cope with diverse research needs, we at AIST are making efforts to provide appropriate services to local communities through close communication and sharing of information with our research bases in different regions.

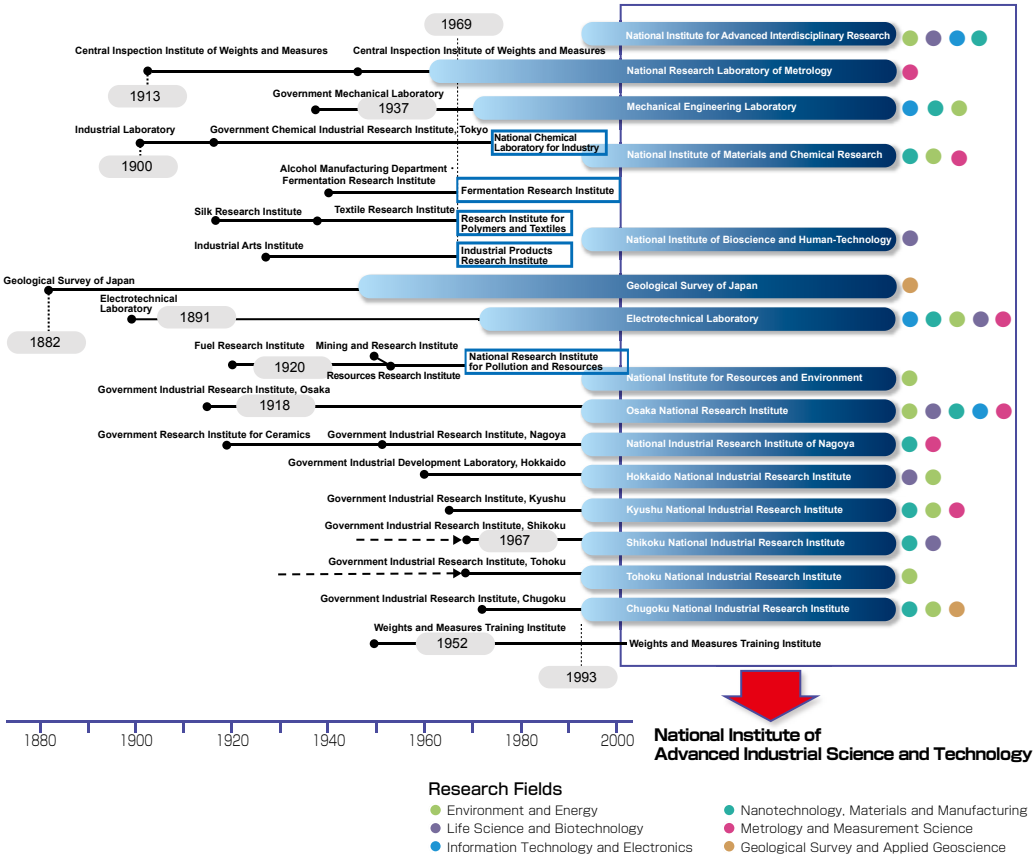
Support for recovery from the unprecedented damages caused by the Great East Japan Earthquake is also an important role of AIST as a public research institution. AIST has so far conducted radiation measurements, has been making efforts in developing decontamination technologies, and is constructing a new research base in Fukushima which is to be completed in April, 2014. This research base will be conducting R&D for renewable energy.

The integrated promotion of science, technology and innovation leads to create new economic and social values which will realize growth involving innovation. Now, it is the time when AIST, as a leading public research institution, will play a significant role to contribute to the development of Japan.

(written in April, 2013)

Brief History

The National Institute of Advanced Industrial Science and Technology (AIST) was reorganized in April 2001 as an incorporated administrative agency upon the integration of the 15 research institutes of the former Agency of Industrial Science and Technology, the former Ministry of International Trade and Industry (MITI) and the Weights and Measures Training Institute under MITI. AIST's history dates back to the Geological Survey of Japan established in 1882 under the Ministry of Agriculture and Commerce. The ministry was subsequently transformed into the Ministry of Commerce and Industry in 1925, under which the Industrial Technology Agency was established in 1948. Following the establishment of MITI in 1949, the Industrial Technology Agency was reorganized as the Agency of Industrial Science and Technology three years later, in 1952. Through a succession of name changes and reorganizations, AIST became an incorporated administrative agency after the central government reform in January 2001. Some of the founding institutions of AIST have a history of more than 100 years and have achieved many prominent records of technological development. As a public research institute, AIST is required to function as a platform for developing technologies for innovation in Japan and to play proactive roles as an organization that directly promotes such innovations in industry. While constantly stimulating new industries, AIST takes initiative as a leading research institute for innovation while placing its major emphasis on research that offers practical benefits to the world.



Noteworthy research results

1890s
Establishment of Japanese system of weights and measures (Japanese national prototype of the kilogram)

1890s
One million scale geological map

1950s
Transistor computer MARK-IV

1950s
PAN based carbon fiber

1960s
Senior Researcher Kondo announced the theory of the resistance minimum.

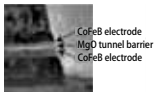
1960s
Development of production process of glucose isomerase used to produce high-fructose corn syrup

1960s
Production method of transparent conductive film (ITO film)

1980s
Nickel metal hydride batteries

2001~

Seal-type therapeutic robot "PARO"



TMR device optimal for magnetic head

Closed-type transgenic plant production system

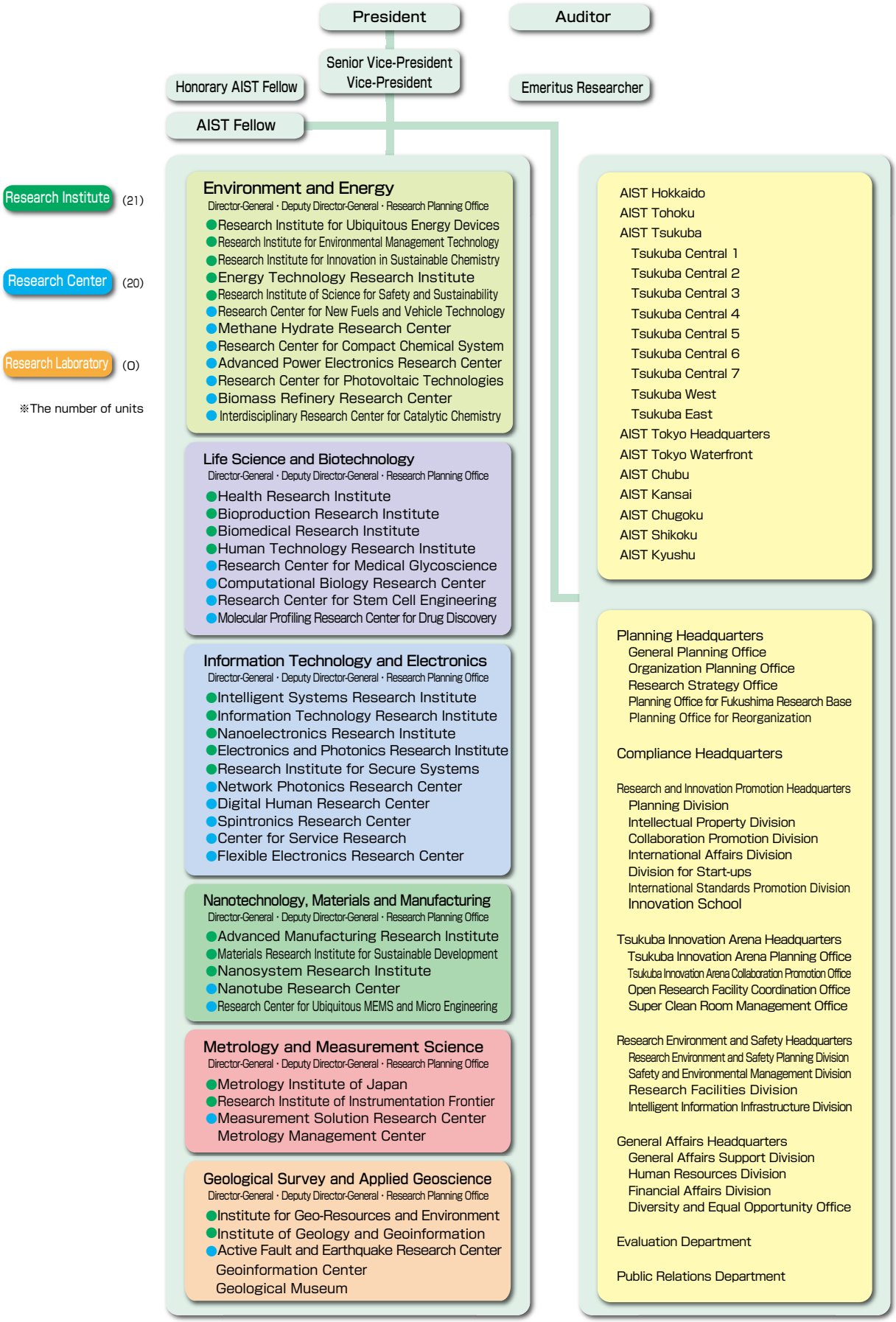
Seamless digital geological map of Japan (1:200,000)

Bio-surface active agent "Bio-surfactant"

Optical lattice clock using ytterbium becomes candidate for the definition of the second.

Organization Chart

April 1, 2013



Research Units of AIST

AIST's research is advanced by its research units. They are classified into three types: a "research center" is a temporary research unit which intensively conducts top-notch R&D to meet high social needs; a "research institute" is a continual and fundamental research unit from which novel research centers diverge and with which terminated research centers converge; a "research laboratory" is established with a swift and flexible strategic decision and acts as a precursor to a future research center. From a strategic point of view, AIST continually and flexibly reviews and reconstructs these research units.

We have set up new positions in each six research fields: director-generals, deputy director-generals, and directors of the Research Planning Office in order to create research strategies of the field and to promote R&D in close coordination with corresponding directors of the research units. We facilitate interdisciplinary researches within and/or between research fields of AIST and coalition with private sectors and academics. We timely recruit excellent domestic and foreign researchers and endeavor to find and to address the most current issues we face today.

As the world-wide competition of innovation becomes keener, AIST's role as a hub of the public research domain has become critically important. Therefore, along with many activities promoting the nation's industrial science and technology, AIST proactively participates in "technology research associations," aiming to accomplish its primary mission of reinforcement of its open innovation hub functions.

President

April 1, 2013

Field name	Research Institute	Research Center
Environment and Energy Director-General Deputy Director-General Research Planning Office 492	Research Institute for Ubiquitous Energy Devices Research Institute for Environmental Management Technology Research Institute for Innovation in Sustainable Chemistry Energy Technology Research Institute Research Institute of Science for Safety and Sustainability	Research Center for New Fuels and Vehicle Technology Methane Hydrate Research Center Research Center for Compact Chemical System Advanced Power Electronics Research Center Research Center for Photovoltaic Technologies Biomass Refinery Research Center Interdisciplinary Research Center for Catalytic Chemistry
Life Science and Biotechnology Director-General Deputy Director-General Research Planning Office 348	Health Research Institute Bioproduction Research Institute Biomedical Research Institute Human Technology Research Institute	Research Center for Medical Glycoscience Computational Biology Research Center Research Center for Stem Cell Engineering Molecular Profiling Research Center for Drug Discovery
Information Technology and Electronics Director-General Deputy Director-General Research Planning Office 336	Intelligent Systems Research Institute Information Technology Research Institute Nanoelectronics Research Institute Electronics and Photonics Research Institute Research Institute for Secure Systems	Network Photonics Research Center Digital Human Research Center Spintronics Research Center Center for Service Research Flexible Electronics Research Center
Nanotechnology, Materials and Manufacturing Director-General Deputy Director-General Research Planning Office 301	Advanced Manufacturing Research Institute Materials Research Institute for Sustainable Development Nanosystem Research Institute	Nanotube Research Center Research Center for Ubiquitous MEMS and Micro Engineering
Metrology and Measurement Science Director-General Deputy Director-General Research Planning Office 326	Metrology Institute of Japan Research Institute of Instrumentation Frontier	Measurement Solution Research Center
Geological Survey and Applied Geoscience Director-General Deputy Director-General Research Planning Office 204	Institute for Geo-Resources and Environment Institute of Geology and Geoinformation	Active Fault and Earthquake Research Center

Note: The numbers indicate the research employees belonging to Research Units.

Research Institute (21)

A Research Institute continuously conducts research to achieve the missions and Medium-Term strategies of AIST based on scenarios defined by the research unit director and research themes defined by the initiatives of researchers.

Research Center (20)

Originating from a Research Institute or as a result of social need, a Research Center intensively conducts research for a period of three to seven years under the strong leadership of the research unit director to swiftly produce technologies and knowledge to solve specific issues.

Employees and Budget

- Researchers (foreign nationals) ····· 2,281(80)
  - [Permanent] [2,010]
  - [Fixed term] [271]
- Administrative employees (foreign nationals) ····· 657(1)

As of April 1, 2013 ; total number of employees : 2,938 (81)

- Executives (full time) ····· 13
- Visiting researchers ····· 156
- Postdoctoral researchers ····· 259
- Technical staff ····· 1,602

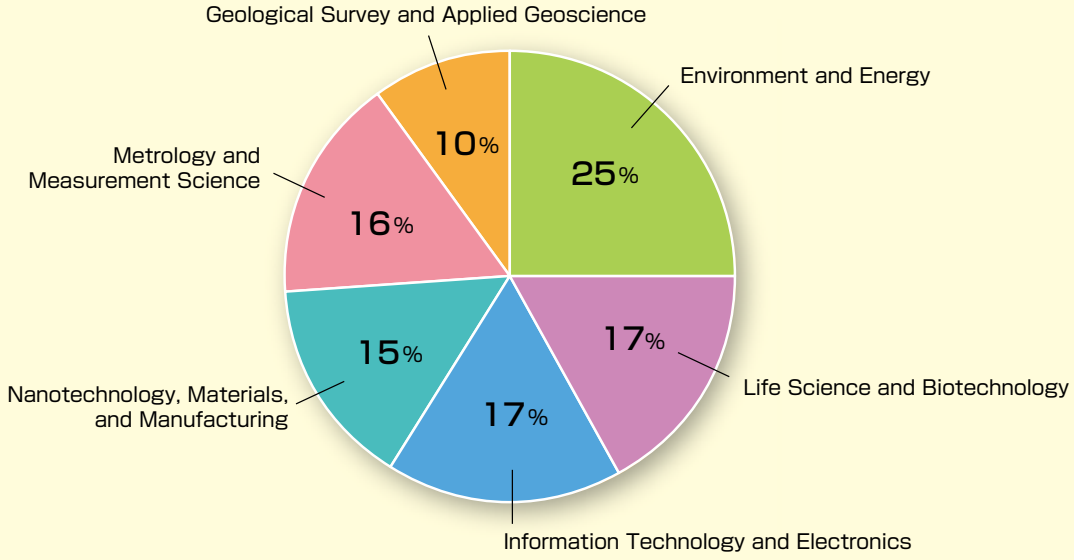
Number of researchers accepted through industry/academia/government partnerships

- Companies ····· Approx. 1,700
- Universities ····· Approx. 2,000
- Other organizations ····· Approx. 800

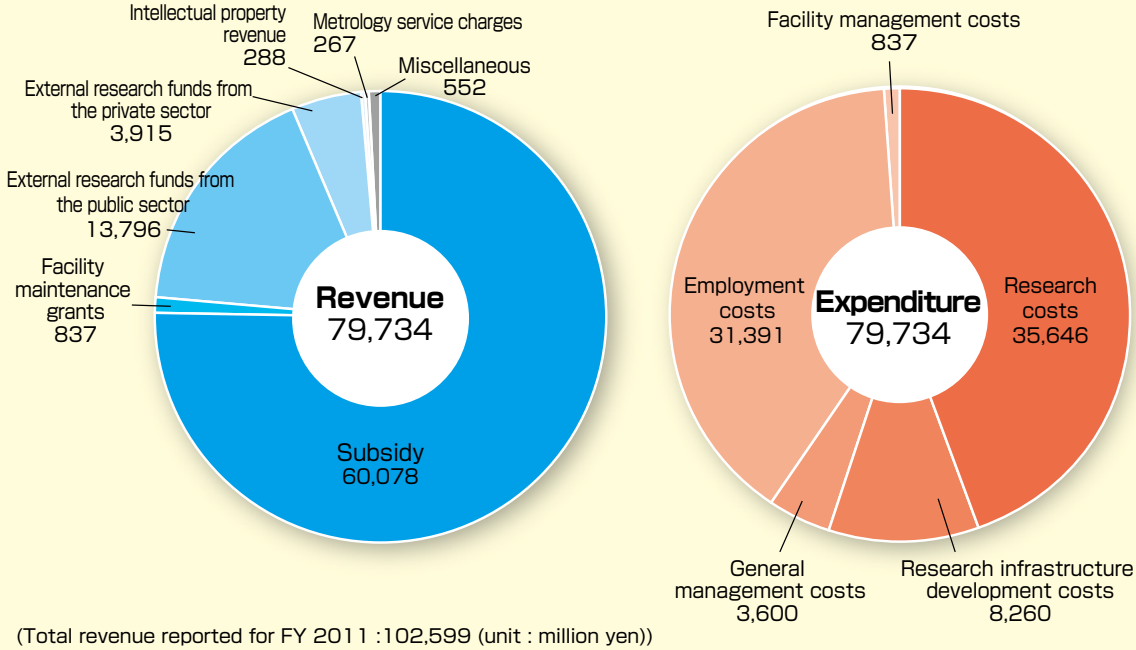
(foreign nationals : Approx. 400)

(Total number of researchers accepted in FY 2012)

Composition of researchers by research field (As of April 1, 2013)



Initial Budget for FY 2012 (unit : million yen)



(Total revenue reported for FY 2011 :102,599 (unit : million yen))

Strategy for Promoting Innovation – Reinforcing functions of an open innovation hub –

For the Japanese industry to recover its dynamism and to grow, industrial re-creation based on industrial technologies is essential. Leading the world in the creation of businesses of innovative technologies, in other words, the enhancement of industrial competitiveness through continuous creation of innovations is required.

On the other hand, shifting production overseas is inevitable for Japanese enterprises due to market reduction in Japan and rapid growth of market size in emergent countries. Moreover, it is getting more and more difficult for private companies to do basic research and development independently. Under these circumstances it is necessary for a governmental research institute to try to establish hubs for R&D, standardizations and human resource developments, for example, which promote innovations inside the country in order to maintain domestic employment both in quality and in quantity.

Being one of the largest public research institutions in Japan, AIST plays a central role as the open innovation hub for government-industry-academia collaboration by utilizing its human resources in various research fields, leading-edge infrastructures, accumulated research findings, systems for technology fusions and personnel training, and regional research bases and their networks.

On this account, AIST promotes appealing research projects for industry by gathering a variety of personnel, organizations and institutes, and an effective utilization of international networks.

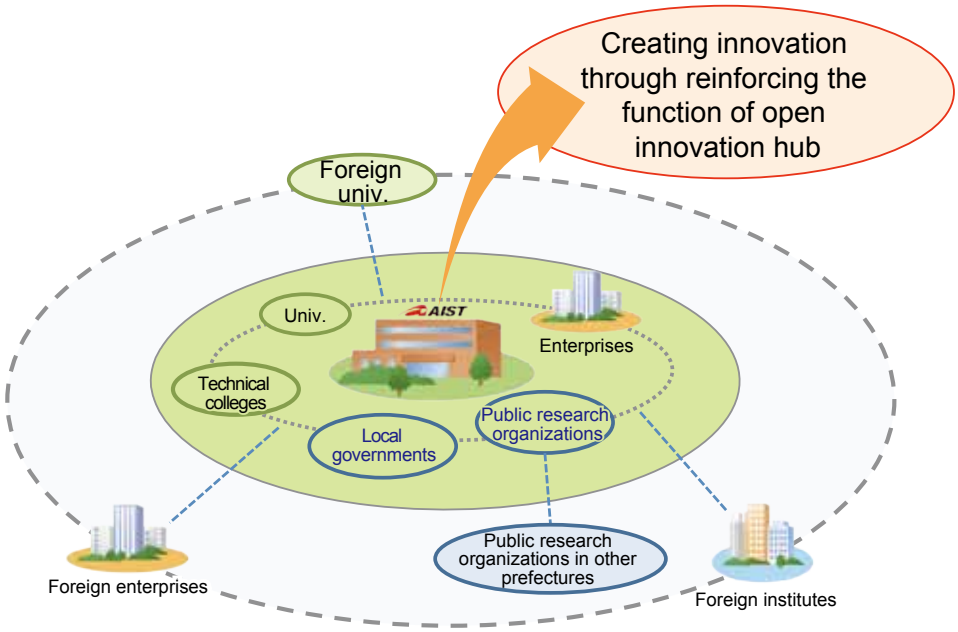
Furthermore, AIST continuously promotes the accumulation of research findings, upgrading of leading-edge infrastructures, and training of personnel, and enhances the support system for research development and industrialization from mid-and long-term perspectives.

In concrete terms, we try to deliver on our strategy in 3 stages for reforcing functions of an open innovation hub, and promote green innovation, life science-based innovation etc.

Stage 1: creating promising seeds
- Development of function of utilizing research achievements
- Gathering and development of talents

Stage 2: developing outstanding technology
- Enhancement of collaboration with industry
- Promotion of open innovation in regions
- Reinforcement of hub function by internationalization

Stage 3: establishing paths to the market
- Preparation of strongholds
- Enhancement of networks with industry



For inquiries and consultation about industry-academia-government collaboration and technology licensing, please contact the following:

■ Planning Division
Research and Innovation Promotion Headquarters
FAX : 029−862−6130
(from outside Japan: +81−29−862−6130)

Contributing to Regional Revitalization — For Creation of Regional Innovation —

Locations of regional research bases and directions of research focus

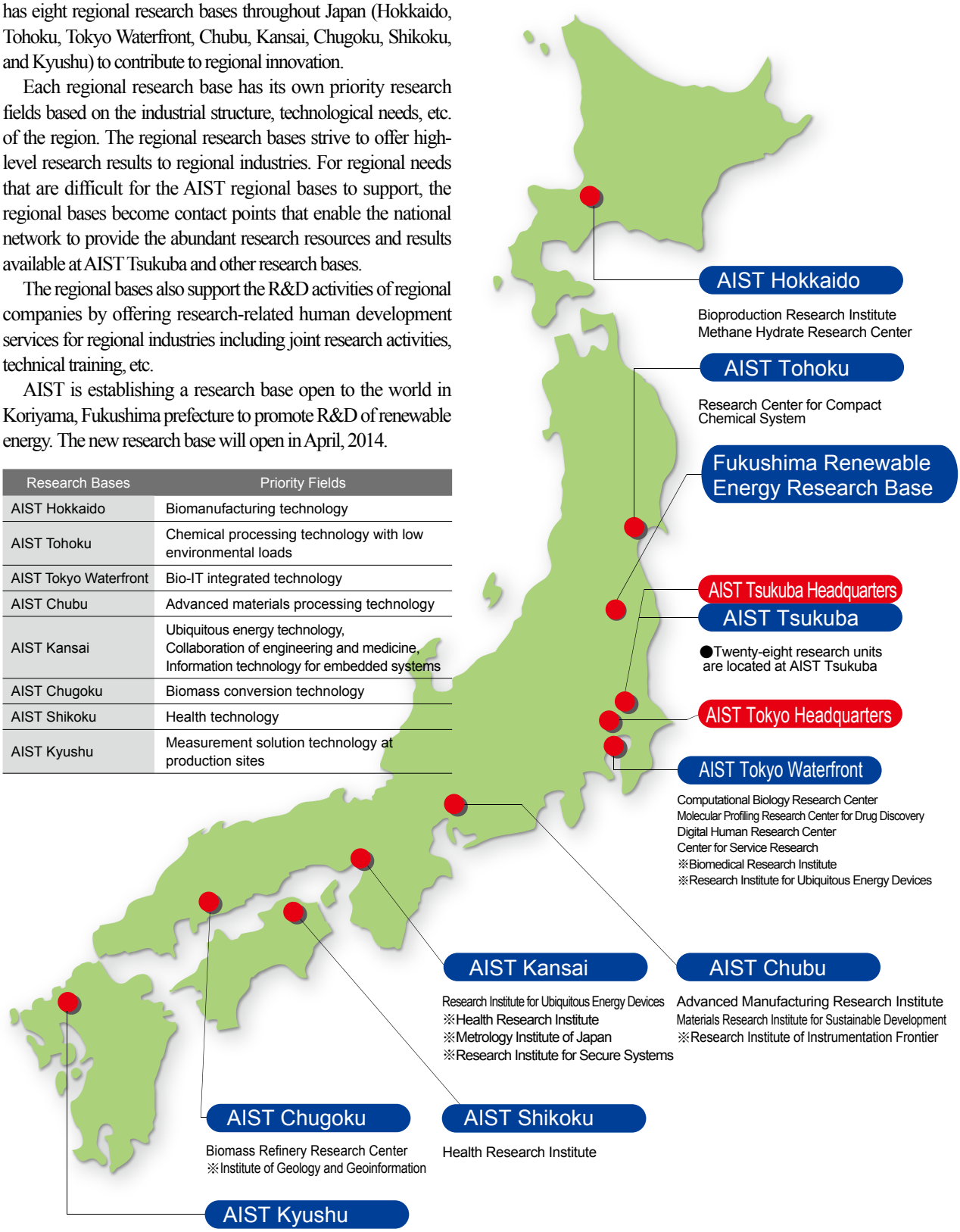
Innovations created by regional companies are expected to play an important role in regional economic revitalization. AIST has eight regional research bases throughout Japan (Hokkaido, Tohoku, Tokyo Waterfront, Chubu, Kansai, Chugoku, Shikoku, and Kyushu) to contribute to regional innovation.

Each regional research base has its own priority research fields based on the industrial structure, technological needs, etc. of the region. The regional research bases strive to offer high-level research results to regional industries. For regional needs that are difficult for the AIST regional bases to support, the regional bases become contact points that enable the national network to provide the abundant research resources and results available at AIST Tsukuba and other research bases.

The regional bases also support the R&D activities of regional companies by offering research-related human development services for regional industries including joint research activities, technical training, etc.

AIST is establishing a research base open to the world in Koriyama, Fukushima prefecture to promote R&D of renewable energy. The new research base will open in April, 2014.

Research Bases	Priority Fields
AIST Hokkaido	Biomanufacturing technology
AIST Tohoku	Chemical processing technology with low environmental loads
AIST Tokyo Waterfront	Bio-IT integrated technology
AIST Chubu	Advanced materials processing technology
AIST Kansai	Ubiquitous energy technology, Collaboration of engineering and medicine, Information technology for embedded systems
AIST Chugoku	Biomass conversion technology
AIST Shikoku	Health technology
AIST Kyushu	Measurement solution technology at production sites



Note) ※ indicates part of the research unit concerned.
As of April 1, 2013

AIST's Network of Research Bases Throughout Japan

AIST Tsukuba

Shingo Ichimura
Director;
Senior Vice-President
of AIST

● **Central 2, 1-1-1 Umezono, Tsukuba, Ibaraki 305-8568, Japan**
TEL: (029) 861-2000 (from outside Japan: +81-29-861-2000)

As a core research facility AIST Tsukuba conducts research in the six areas and serves as an international open innovation hub working in close collaboration with the private sector and domestic and overseas universities and research institutions. We also train young researchers through the Innovation School program, disseminate research results to industries and research institutions through presentations at the Science Square and the Industry-Academia-Government Collaboration Salon, and transfer research results through collaborative research and technical consultations. Through these activities we are providing technology-based solutions to problems of society and industry from both the regional and global perspectives.

AIST Hokkaido

Katsunori Matsuoka
Director

● **2-17-2-1 Tsukisamu-Higashi, Toyohira-ku, Sapporo, Hokkaido 062-8517, Japan**
TEL: (011) 857-8400 (from outside Japan: +81-11-857-8400)

AIST Hokkaido conducts research focusing on biomanufacturing (biotechnology-based material production technology), including drug development using the world's first closed-type transgenic plant production system ("plant factory"), and transfers the results of this research to industry. AIST Hokkaido is collaborating with the agriculture, forestry, and fishery industries and the food industry, which are the major industries in Hokkaido, to contribute to the development of a new industrial infrastructure based on biomanufacturing.

AIST Tohoku

Yasushi Mitsuishi
Director

● **4-2-1 Nigatake, Miyagino-ku, Sendai, Miyagi 983-8551, Japan**
TEL: (022) 237-5211 (from outside Japan: +81-22-237-5211)

In the Tohoku Center, studies for integration of the technologies of chemical reactions, processes, and materials are conducted to contribute to the reduction of environmental burdens from chemical and manufacturing industries, and these studies can lead innovations in the industries. We are transferring the results of these research activities to the industries and also supporting creation of new industrial fundamentals and reconstruction from the earthquake disaster by providing environmentally benign technologies and value-adding technologies to local resources.

AIST Tokyo Waterfront

Yasuyuki Yagi
Director

● **2-3-26 Aomi, Koto-ku, Tokyo 135-0064, Japan**
TEL: (03) 3599-8001 (from outside Japan: +81-3-3599-8001)

AIST Tokyo Waterfront promotes cutting-edge research and development and aims at innovation in human life, social system and services, focusing on fusion of bio and information technologies, such as bioinformatics, post-genome sequence, digitization of human functions and behaviors, interaction of information systems between men and social systems, etc. Located in Tokyo, public-private-partnership through various collaborations, technology transfer, fostering of young researchers, outreach activities, etc. are performed proactively.

AIST Chubu

Motohiro Toriyama
Director

● **2266-98 Anagahora, Shimo-Shidami, Moriyama-ku, Nagoya, Aichi 463-8560, Japan**
TEL: (052) 736-7000 (from outside Japan: +81-52-736-7000)

As a multidisciplinary research and development facility for material manufacturing focusing on ceramics and metals, AIST Chubu conducts R&D of manufacturing technologies to produce various materials and devices, particularly those expected to reduce energy and resource consumption. Through these activities, we are contributing to the development of a next-generation industrial infrastructure in collaboration with industries, universities, and public research institutions in the Chubu region, Japan's major industrial area.

AIST Kansai

Tetsuhiko Kobayashi
Director

● **1-8-31 Midorigaoka, Ikeda, Osaka 563-8577, Japan**
TEL: (072) 751-9601 (from outside Japan: +81-72-751-9601)

AIST Kansai develops greening technologies, which provide environmental suitability and sustainability of society, for electro-products such as secondary batteries made with the high industrial potential of the Kansai region. We focus our R&D also on collaboration of engineering and medicine for the development of healthcare and medical equipments based on biotechnology. We are contributing to system verification and training of software engineers to make Kansai a major center for the embedded system industry.

AIST Chugoku

Osamu Nakamura
Director

● **3-11-32 Kagami-yama, Higashi-hiroshima, Hiroshima 739-0046, Japan**
TEL: (082) 420-8230 (from outside Japan: +81-82-420-8230)

AIST Chugoku conducts research and development toward a sustainable society, with an emphasis on the biomass conversion technologies to produce chemicals, materials, and biofuels from wood-based biomass resources abundant in the Chugoku region. We have been transferring the technologies obtained to local businesses, and training biomass specialists from this and other regions of Japan, as well as Asian and other countries, in order to contribute to the development of a new industrial infrastructure that can form the basis of a recycling-based society.

AIST Shikoku

Norio Matsuki
Director

● **2217-14 Hayashi-cho, Takamatsu, Kagawa 761-0395, Japan**
TEL: (087) 869-3511 (from outside Japan: +81-87-869-3511)

AIST Shikoku conducts research on predictive disease diagnosis based on the evaluation of physical conditions, and on technologies to eliminate and detoxify health risk factors in daily life and the environment. We aim to ensure that research results obtained by combining leading-edge biotechnology, materials technology, and system development technology are used by local industries to help them enter new industries and revitalize the Shikoku region.

AIST Kyushu

Masanobu Watanabe
Director

● **807-1 Shuku-machi, Tosu, Saga 841-0052, Japan**
TEL: (0942) 81-3600 (from outside Japan: +81-942-81-3600)

AIST Kyushu is engaged in research on measurement solution technologies to solve measurement problems at production sites of the regional key industries such as semiconductor, food and livestock industries. We are pursuing collaborations with industries on evaluation of long-term reliabilities of photovoltaics, and also with manufacturers, particularly in the semiconductor industry. We are also serving as a focal point for collaboration between all AIST researchers and companies, universities, and public research institutions in Kyushu.

Environment and Energy

Toward green innovation

For the purpose of green innovation, AIST is promoting the development of technologies for increased use of renewable energy and energy saving to reduce greenhouse gas emissions, the securing and effective use of natural resources, reduction of environmental loads of industry, and evaluation and risk management of various new technologies.

Akira Yabe
Vice-President
Director-General

Masaru Nakaiwa
Deputy Director-General

Hirohide Furutani
Director, Research Planning Office

TEL : 029-862-6033 (from outside Japan: +81-29-862-6033)
E-mail : envene-liaison-ml@aist.go.jp

【Outline of priority strategies】

Expanding the use of renewable energy

The use of inexhaustible renewable energy must be promoted to achieve a low-carbon society. In order to make optimal use of renewable energy, we are conducting research to improve the performance and reliability of solar and wind power systems and research on liquid fuel production from biomass.

Energy saving

Improving energy efficiency has the direct and immediate effect of reducing greenhouse gas emissions. We are developing high-performance power storage devices and fuel cells to increase the efficiency of energy use as well as energy management systems to reduce energy use.

Securing and effective use of natural resources

Securing and efficient use of diverse natural resources, such as biomass and mineral resources, must be ensured to achieve a material-recycling society. We are developing and improving processes to produce chemicals and fuels from biomass and other renewable sources. We are also developing technologies for the efficient use of exhaustible fossil resources such as coal and methane hydrates, and mineral resources such as rare metals, as well as recycling technologies.

Reduction of environmental loads

Manufacturing processes in various industries must be improved for higher efficiency and for the reduction of the environmental load. We are developing green sustainable chemistry technologies to minimize environmental emissions from chemical manufacturing processes and improve the energy efficiency of processes. We are also developing technologies to reduce the environmental load generated by industrial activities and restore the environment.

Evaluation and risk management

New energy technologies and advanced materials must be properly evaluated, and managed to achieve a sustainable society. We are analyzing and evaluating scenarios for introducing new energy technologies, and evaluating CO_2 emission reduction activities. In addition, we are developing technologies to appropriately evaluate risks of chemicals and the environmental impact of substances produced by industrial activities.

Research Institute for Ubiquitous Energy Devices

Toward secondary batteries and other energy-efficiency technologies for daily life


【 Director 】
Kazumi Tanimoto


【 Deputy Director 】
Kuniaki Tatsumi


【 Deputy Director 】
Kazuaki Yasuda

URL : http://unit.aist.go.jp/ubiqen/index_e.html
E-mail : ubiqen-kansai-ml@aist.go.jp
1-8-31 Midorigaoka, Ikeda, Osaka 563-8577, Japan
Tel: (072) 751-8528 / Fax: (072) 751-9629
(from outside Japan: Tel: +81-72-751-8528 / Fax: +81-72-751-9629)

【 Research Base 】 AIST Kansai

【 AIST Participating Technology Research Association 】
Fuel Cell Cutting-Edge Center Technology Research Association
Lithium Ion Battery Technology and Evaluation Center (LIBTEC)

【 Outline 】

In order to promote “green innovation,” in which efforts are made to achieve compatibility between economic growth and the environment in order to realize a low-carbon society, it is necessary to decrease the energy consumption of energy-using equipment such as home appliances and vehicles. High levels of safety and environmental compatibility must also be assured from the perspective of daily life. We are conducting research, from the level of materials through to systems, aimed at reducing the energy and resource consumption of new small mobile power supplies, including secondary batteries and fuel cells, as well as lighting and other appliances.

Cylindrical lithium-ion battery (model 18650) fabricated by our Institute

Research Institute for Environmental Management Technology

Development of new environmentally sound technologies to harmonize industrial activities and environmental protection


【 Director 】
Hiroaki Tao


【 Deputy Director 】
Hiroaki Kondo

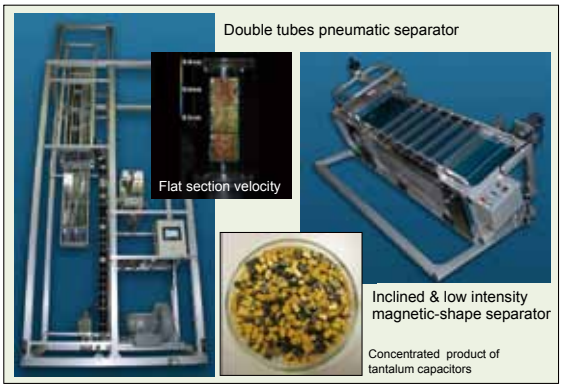

【 Deputy Director 】
Mikiya Tanaka

URL : http://unit.aist.go.jp/emtech-ri/e/
E-mail : emtech-web-ml@aist.go.jp
AIST Tsukuba West, 16-1 Onogawa, Tsukuba, Ibaraki 305-8569, Japan
Tel: (029) 861-8250 / Fax: (029) 861-8258
(from outside Japan: Tel: +81-29-861-8250 / Fax: +81-29-861-8258)

【 Research Base 】 AIST Tsukuba (West)※

【 Outline 】

We are conducting research to address environmental issues such as deterioration of the living environment and health due to hazardous chemicals and global warming in order to harmonize our industrial activities with a safe and secure environment. The areas that we are focusing on include 1) development of next-generation environmental diagnostic technologies upgrading conventional environmental measurement techniques with bio- and nanotechnology; 2) development of technologies to reduce health risks from hazardous chemicals in the air, water, and soil in an energy- and resource-efficient manner; 3) development of compact recycling technologies to increase recycling rates in urban areas where huge wastes are generated; and 4) research on carbon cycling, which will contribute to the prevention of global warming, and on assessment methodologies for evaluation of CO_2 emission reduction technologies.



Recycling of tantalum capacitors from printed circuit boards

※ Note: AIST Tsukuba has Central (No. 1 to No. 7), West, East,and North.

Research Institute for Innovation in Sustainable Chemistry

Research and development in the fields of chemistry and chemical engineering to achieve a sustainable society


【 Director 】
Hiroshi Yanagishita


【 Deputy Director 】
Takao Ohmori


【 Deputy Director 】
Dai Kitamoto

URL : http://unit.aist.go.jp/isc/english_ver/index_e.html
E-mail : isc-web-ml@aist.go.jp
AIST Tsukuba Central 5, 1-1-1 Higashi, Tsukuba, Ibaraki 305-8565, Japan
Tel: (029) 862-6792 / Fax: (029) 861-4457
(from outside Japan: Tel: +81-29-862-6792 / Fax: +81-29-861-4457)

【 Research Base 】 AIST Tsukuba (Central, West)
【AIST Participating Technology Research Association】
Chemical Materials Evaluation and Research Base (CEREBA)
Advanced Laser and Process Technology Research Association (ALPROT)

【 Outline 】

The ultimate goal in the field of chemical technology is to develop technologies to selectively produce desired products using renewable resources and minimum energy but without generating wastes. We are engaged in the research and development (R&D) of innovative industrial technologies to achieve the ultimate goal described above from a long-term perspective, and of technologies to reduce the environmental load in existing industries and improve energy efficiency from a short-term perspective. In the longer term, we aim to develop technologies to produce chemical products from the biomass with the view of introducing renewable resources. In the short term, we conduct the R&D of technologies to produce high value products, as well as green sustainable chemistry (GSC) technologies, process efficiency improvement technologies, chemical laser technologies, and evaluation technologies of chemical materials.

Energy Technology Research Institute

Development of energy technologies providing the basis for a sustainable society


【 Director 】
Katsuhiko Kadoguchi


【 Deputy Director 】
Tetsuo Munakata


【 Deputy Director 】
Fumio Takemura


【 Deputy Director 】
Haruhiko Obara

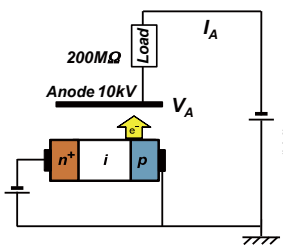
URL : http://unit.aist.go.jp/energy/index_e.htm
E-mail : energy-info-ml@aist.go.jp
AIST Tsukuba Central 2, 1-1-1 Umezono, Tsukuba, Ibaraki 305-8568, Japan
Tel: (029) 861-5280 / Fax: (029) 861-5149
(from outside Japan: Tel: +81-29-861-5280 / Fax: +81-29-861-5149)

【 Research Base 】 AIST Tsukuba (Central, West, East)

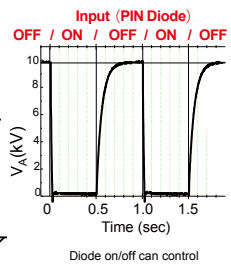
【 Outline 】

We are conducting research and development in the following four areas to prevent global warming and ensure the supply and use of stable and easy-to-use energy sources.

- Clean technologies such as the use of natural energy sources, the production and high-density storage of hydrogen, and the cleaning of hydrocarbon resources
- Energy device and material technologies to develop high-performance solid oxide fuel cells, thermoelectric devices, and energy-storage capacitors, using advanced energy materials
- An energy network to achieve high efficiency of energy use by combining various energy sources, energy storage and transportation technologies, high-efficiency power conversion technologies, and power system control technologies
- Innovative and emerging energy technologies to realize breakthroughs



Diamond vacuum power switch



Diode on/off can control 10 kV on/off.

The world's first vacuum power switch with diamond PIN diode emitter
(Time constant is determined by circuit LC. In principle it is less than msec.

Research Institute of Science for Safety and Sustainability

【 Director 】
Hiroki Yotsumoto

【 Deputy Director 】
Kazumasa Honda

Scientific evaluations of safety and the sustainability of society

URL : http://www.aist-riss.jp/main/?ml_lang=en
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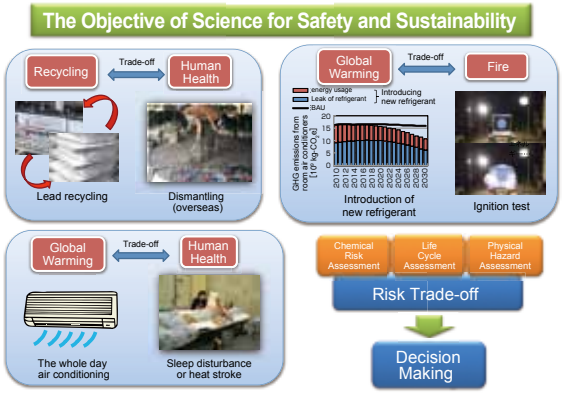
【 Research Base 】 AIST Tsukuba (West, Central)

【 AIST Participating Technology Research Association 】
Technology Research Association for Single Wall Carbon Nanotubes (TASC)

【 Outline 】

In our research, we are pursuing the science for the sustainability of society as well as safety from physical hazards and risks. This is because there are increasing cases of safety and social sustainability issues having a trade-off relationship and we are not in a situation to address only individual safety issues. We are conducting research on safety evaluations to meet the demand for a safer society and present scientifically accurate guidelines for solving multiple trade-off issues based on the results of these evaluations. We are also disseminating the results of these evaluations to help the public, communities, industries, governments, and international organizations make rational decisions and develop realistic standards, thereby contributing to the strengthening of Japan's industrial competitiveness.



Through developing methods and tools for chemical risk assessment , life cycle assessment and the evaluation of physical hazards, we aim to lead trans-disciplinary research to quantify the multifold trade-off issues and give the best solution for launching new technologies into society.

Research Center for New Fuels and Vehicle Technology

【 Director 】
Shinichi Goto

【 Deputy Director 】
Hideaki Hamada

Comprehensive development and standardization of fuel and engine system technologies aimed at the widespread use of next-generation vehicles utilizing new fuels and engines

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【 Research Base 】 AIST Tsukuba (East, Central, West)

【 AIST Participating Technology Research Association 】
International Standard Innovation Technology Research Association (IS-INOTEK)

【 Outline 】

Global energy demand has shown rapid growth in recent years, giving rise to concerns over unstable oil supplies. There is also an increasing need for significant reductions in CO_2 and other greenhouse gas emissions. Furthermore, it is essential to reduce hazardous substances in vehicle exhausts as much as possible to protect air quality. Under these circumstances, in order to promote the widespread use of new green vehicle fuels (clean fuels of biomass origin and fossil origin), improve vehicle energy efficiency, and make vehicle exhaust gases super-clean, we are integrating individual pioneering technologies, conducting comprehensive technology development in close collaboration with industry, developing fuel standards essential for the widespread use of new fuels, and standardizing methods for measuring and evaluating vehicle exhaust emissions. We are also developing an international network of researchers by inviting domestic and international researchers, dispatching researchers, and conducting collaborative research, and are working to serve as an innovation hub to disseminate new fuel and vehicle technologies and related basic technologies.

Dimethyl ether (DME) vehicle

Methane Hydrate Research Center

Combustible ice: Energy of the future


【 Director 】
Hideo Narita


【 Deputy Director 】
Takao Ebinuma


【 Deputy Director 】
Norio Temma

URL : http://unit.aist.go.jp/mhrc/
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【 Research Bases 】 AIST Hokkaido, AIST Tsukuba (West)

【 Outline 】

In the global shift to low-carbon fuels, natural gas is a fossil fuel with good environmental performance and its use is therefore increasing globally in industrialized and other countries. In order to ensure a secure long-term supply of natural gas, improve the self-sufficiency of natural gas supplies, and enhance the energy efficiency of natural gas application technologies, we are conducting research and development of production technologies to securely and economically produce natural gas from methane hydrate resources. Furthermore, we are developing natural gas transportation and storage technologies making use of the physical properties of gas hydrates, for commercial applications. We are also serving as a global platform to promote technology transfers and human resource development for the future commercialization of the technologies developed through AIST's researcher invitation programs and methane hydrate development projects.


Large-scale methane gas production system

Research Center for Compact Chemical System

Development of a compact, simple chemical system with low environmental impact


【 Director 】
Takaaki Hanaoka


【 Deputy Director 】
Tatsuo Tsunoda

URL : http://unit.aist.go.jp/ccs/index_en.html
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【 Research Base 】 AIST Tohoku

【 Outline 】

Under the AIST's mission statement, i.e. "*Contribution to a sustainable society*" we are aiming at process innovations in chemical and the related industries. Our main objective is to develop simple and compact production systems which provide varieties of products with adequate quantities, contributing to efficient energy use and low environmental impact, and finally to establish a recycling based industrial structure. To achieve this goal we are investigating the following three core technologies, particularly mutual integration of these technologies: 1) high-temperature high-pressure chemical engineering, 2) inorganic material processing technology and 3) integrated reaction systems. We are also making use of AIST's network to achieve our research objectives. Through our consortium activities we are contributing to local communities by reducing the environmental load of the manufacturing industry, creating new additional value of their products and the local resources.


Lightweight hydrogen tank with hydrogen barrier clay-layer


High speed camera image of coating spray pattern using supercritical carbon dioxide

Advanced Power Electronics Research Center

Efficient handling of electric power based on new electronics using widegap semiconductors

【 Director 】
Hajime Okumura

【 Deputy Director 】
Hiroshi Yamaguchi

【 Deputy Director 】
Kunihiro Sakamoto

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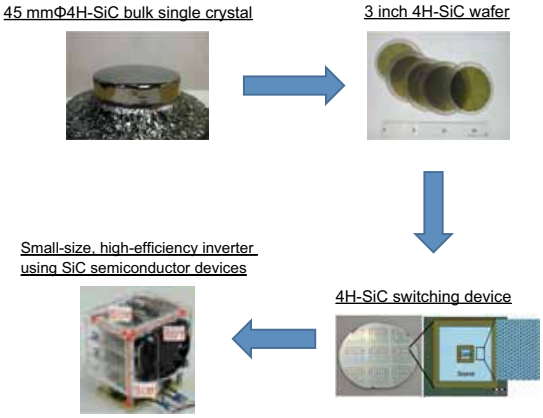
【 Research Base 】 AIST Tsukuba (Central, West)

【 AIST Participating Technology Research Association 】
R&D Partnership for Future Power Electronics Technology (FUPET)

【 Outline 】
Power electronics, represented by inverters used in home appliances and industrial equipment, is a key technology to control electric energy, and is currently based on silicon power devices. However, their performance limits will be revealed. Our goals are to develop wafer technology of widegap semiconductors such as silicon carbide (SiC) and gallium nitride (GaN) and their power device technology; to extend such technologies to a power electronics integration technology consisting of circuit, module/packaging, and control that makes full use of the performance of widegap semiconductor devices; and to make a breakthrough for the current performance limits by making optimal use of this system. The ultimate goal is to establish fundamentals of novel electronics for energy handling.



Research Center for Photovoltaic Technologies

Development of clean next-generation energy sources

【 Director 】
Shigeru Niki

【 Deputy Director 】
Koji Matsubara

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【 Research Bases 】 AIST Tsukuba (Central), AIST Kyushu

【 AIST Participating Technology Research Association 】
Photovoltaic Power Generation Technology Research Association (PVTEC)

【 Outline 】
Research Center for Photovoltaic Technologies is aiming at a sustainable development of photovoltaic technologies to realize the national energy security, low carbon society, economic growth and domestic job creation at the same time with a comprehensive and systematic approach. To this end, we are investigating
1) device and system technologies under the intimate collaboration with private sectors,
2) primary reference cell calibration and neutral characterization of devices and systems,
3) fundamental researches for next-generation innovative devices. We are also emphasizing the international standardization and regional collaboration of the outcome of our research.

The G5 size (1.1 mx1.4 m) CVD machine development activity by collaboration of consortium companies.

High efficiency (15.9 %) flexible CIGS sub-module fabricated on stainless substrate.

Biomass Refinery Research Center

【 Director 】
Satoshi Hirata

Establishment of fundamental technology to convert biomass resources into chemicals, materials and fuels

URL : http://unit.aist.go.jp/brrc/en/
E-mail : brrcj-ml@aist.go.jp
3-11-32 Kagamiyama, Higashi-hiroshima, Hiroshima 739-0046, Japan
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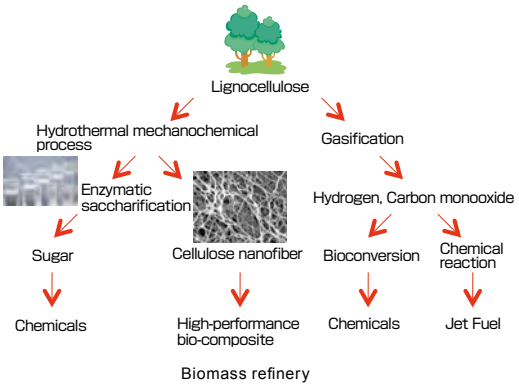
【 Research Base 】 AIST Chugoku

【 Outline 】

The fundamental technologies to decompose lignocellulose, which is most abundant non-edible biomass resources, and to convert into chemicals, materials and fuels are developing by cooperation with the related research units in the AIST. As biomass refinery consists of many processes, the increase in efficiency and the acceleration of the research and development are aimed at by integration of a series of processes from pretreatment of materials, decomposition, and refining as the upper process to manufacture of the last products as the lower process. Moreover, as a core research base of the biomass in Asia, we contribute to technology transfer abroad, standardization and utilization of research products.



Interdisciplinary Research Center for Catalytic Chemistry (IRC^3)

【 Director 】
Kazuhiko Sato

【 Deputy Director 】
Masumi Asakawa

Open a new field of catalytic chemistry

URL : http://unit.aist.go.jp/irccc/
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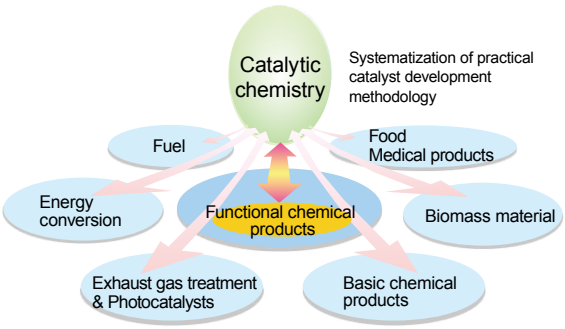
【 Research Base 】 AIST Tsukuba (Central)

【 Outline 】

Interdisciplinary Research Center for Catalytic Chemistry is aiming at innovating synthetic processes of functional chemical products and development of catalyst technologies that will contribute to maintain and strengthen global competitiveness of Japanese chemical industry with its comprehensive approach through four catalytic technologies on “Silicon Chemistry”, “Innovative Oxidation”, “Functional Group Transformation” and “Catalyst Immobilization”, which are core subjects of this center.
More specifically, we investigate the above topics based on three concepts to innovate catalytic technologies for the production of functional chemical materials.1. Saving energy with highly active catalyst (less heating, shorter reaction time, etc.)2. Saving energy with highly selectivity catalyst (least by-products and less process steps)
3. Substantial reduction of rare metal dependence: shifting out from precious metal catalyst systems.



Life Science and Biotechnology

Toward a sustainable society in which people live a long life with health and vigor

It is necessary to build a healthy longevity society where people can live their lives in a state of well-being and security, as well as a sustainable society with less burden on the environment. We are contributing to life innovation by developing new technologies to evaluate health and assisting in the creation of new medicines as well as in the maintenance, improvement, and recovery of health according to the individual's condition. We are also contributing to green innovation by developing technologies to reduce environmental loads using bioprocesses.

Noboru Yumoto
Vice-President
Director-General

Masanao Oda
Deputy Director-General

Tomohiro Tamura
Director, Research Planning Office

TEL : 029-862-6032 (from outside Japan: +81-29-862-6032)
E-mail : life-liaison-ml@aist.go.jp

【Outline of priority strategies】

Development of technologies to create advanced and comprehensive drugs and medical technologies to protect health

In order to solve issues such as disease prevention, early treatment, and personalized medicine, we are developing regenerative-medicine technologies and advanced healthcare support technologies using cell-manipulation and biomaterial technologies, and an infrastructure for the development of medical equipment. For disease prevention and early diagnosis, we are developing technologies to characterize and analyze the functions of biomolecules. We are also developing high-efficiency drug discovery techniques to cut development costs without compromising safety through the amalgamation of information processing and bioanalysis.

Development of technologies to achieve healthy life

In order to ensure a healthy life both mentally and physically, it is important to solve the issues of elderly care and maintenance and improvement of health, as well as mental issues associated with social anxiety. We are developing technologies to quantitatively evaluate mental and physical conditions, including stress, and to restore, maintain, and improve health through personalized medication and rehabilitation, with a view to developing technologies to facilitate healthy living.

Development of technologies to efficiently manufacture high-quality substances using bioprocesses that help to reduce industrial environmental loads

With a view to extending the range of application of bioprocesses (material production using microbes and enzymes) that provide much higher reaction selectivity than chemical processes and allow efficient production of high-value-added compounds, we are searching for microbial resources and useful genes and characterizing their functions. We are also developing high-efficiency biomanufacturing technologies, including technologies to improve the functions of biopolymers and improve and design bioprocesses, technologies to produce transgenic modified plants, and technologies to bring a closed system for transgenic plant production into practical use.

Health Research Institute

Contributing to the realization of a sustainable society by scientifically understanding and elucidating human health

【 Director 】
Yasukazu Yoshida

【 Deputy Director 】
Yoshiro Tatsu

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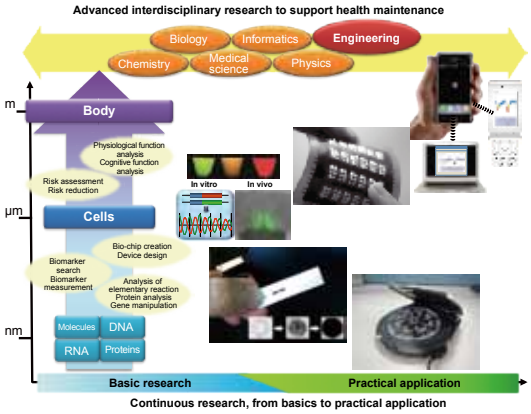
【 Research Bases 】 AIST Shikoku, AIST Kansai

【 Outline 】

Enjoying longevity in health is a key issue for achieving a sustainable society. "Health" means the state that we are sound enough mentally as well as physically to constructively participate in social activities. In order to create such a society, we intensively perform the following scientific and technological researches.

- Advanced technologies for prediction and diagnosis of diseases and the development of their measurement systems
- Technologies to evaluate and eliminate health risks in living and working environments
- Technologies to regenerate tissue and cell functions and to create alternative devices
- Technologies to design and synthesize functional compounds based on analysis of cell functions
- Technologies to assist daily living based on measurement and analysis of the body's physiological and cognitive functions

We aim to create a new health industry and an interdisciplinary science field of health through co-operative and integrated works with related research areas of AIST.



Research in Health Research Institute

Bioproduction Research Institute

From basic to manufacturing research based on living organisms

【 Director 】
Youichi Kamagata

【 Deputy Director 】
Isao Yumoto

【 Deputy Director 】
Satoru Ohgiya

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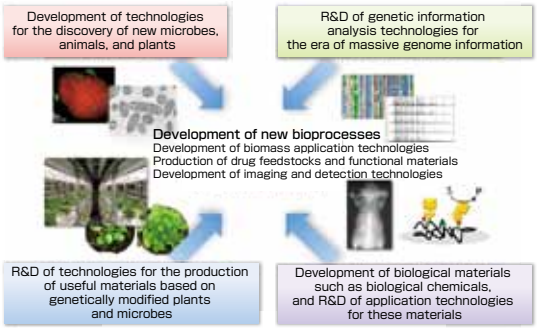
【 Research Bases 】 AIST Hokkaido, AIST Tsukuba (Central)

【 Outline 】

The Bioproduction Research Institute conducts research, from basic to practical application research, aimed at high-efficiency material production using bioprocesses in order to contribute to the development of technologies for the production of materials of high quality, such as fossil fuel alternatives, chemical feedstocks, drug feedstocks, useful proteins, biological materials, and new functional plant species, as well as the attainment of a material-recycling society. To achieve these goals, we are developing: (1) technologies for discovering microbes and various genetic resources; (2) technologies to analyze and search for genetic information at high speed; (3) technologies for the production of useful materials based on genetically modified plants, microbes, and animals; and (4) technologies for producing protein- and nucleic acid-related biological chemicals.



Research activities at the Bioproduction Research Institute

Biomedical Research Institute

Developing new technology for drug discovery and medical treatment

URL : http://unit.aist.go.jp/biomed-ri/cie/
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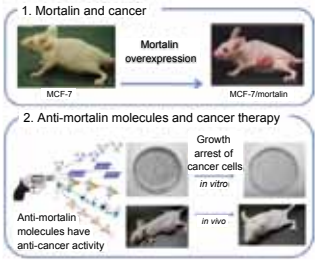
【 Research Base 】 AIST Tsukuba (Central), AIST Tokyo Waterfront

【 Outline 】

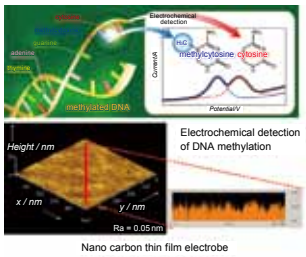
We are conducting research and development to clarify the structure and functions of biomolecules and develop new basic technology for drug discovery and medical treatment using knowledge including our study results.
It is required for development of new drugs and new treatment of the disease that biomolecules involved in the diseases are studied and abnormal biomolecules are removed or normalized. We are characterizing the functions and structures of genes and proteins that are involved in diseases, developing regulatory techniques of mechanisms that control many biological functions in the cells and the organ, and developing sensors for highly sensitive detection of markers required for disease diagnosis. Through these research activities, we contribute to the development of new drugs and the promotion of the healthcare industry, and also create research outcomes in cooperation with companies and international organizations.

【 Director 】
Yoshihiro Ohmiya

【 Deputy Director 】
Shinya Honda



New anticancer drug candidate: Anti-mortalin molecules



Nano carbon thin film electrobe

Nano-label electrochemical DNA measurement using a nano carbon film

Human Technology Research Institute

Creating products and living environments through a scientific understanding of human characteristics

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【 Research Base 】 AIST Tsukuba (Central, East)

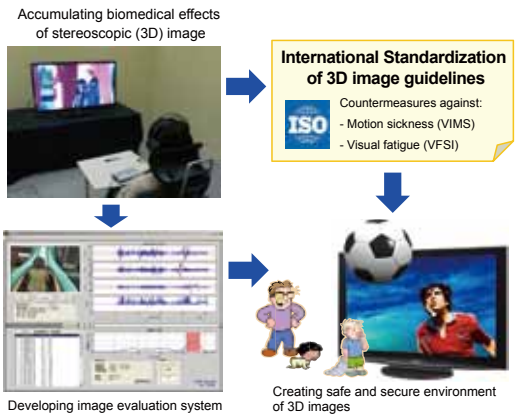
【 Outline 】

Our institute is a unique research organization consisting of researchers in a wide range of disciplines such as ergonomics, psychology, physiology, brain science, bioengineering, and mathematical science. This allows multidisciplinary approaches to the scientific understanding of human characteristics. The results would enable the development of products and living environments that are highly compatible with human characteristics. In close cooperation with the related industries, we conduct researches on higher brain functions for cognitive and knowledge-based skills relevant to the information society, and on technologies to evaluate and improve health and mind-body fitness, restore physical functions for independent living, and develop medical devices that are safe and less burdensome for patients. Researches are also carried out to promote industrial standardization applicable to product design for the elderly and people with disabilities, and to develop guidelines to facilitate speedy development of medical devices. The main focus of our research activities is to produce research outcomes that are useful to society.

【 Director 】
Motoyuki Akamatsu

【 Deputy Director 】
Kiyoyuki Chinzei

【 Deputy Director 】
Takashi Yokoi



Research Center for Medical Glycoscience

Development of glyco-biomarkers and glycoscience databases

【 Director 】
Hisashi Narimatsu

【 Deputy Director 】
Masanori Gotou

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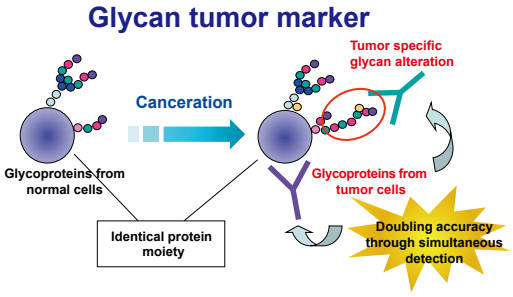
【 Research Base 】 AIST Tsukuba (Central)

【 Outline 】

Our research objective is primarily to discover glyco-biomarkers. In collaboration with corporations, universities and medical institutions, we work on the development of effective biomarkers for cancer and neurological disorders, as well as on the development of diagnostic systems along with the formulation of the base technology for drug development. In addition, we share our research outcomes worldwide as well as give them back to society through the construction of the integrative database of glycoscience "JCGGDB" and collaborative activities. We are establishing our status as a hub organization of glyco-research.



Development of high-accuracy tumor markers based on simultaneous detection of glycans and proteins

Computational Biology Research Center

Conducts comprehensive analysis of biological data and develops algorithms, software tools and databases in bioinformatics

【 Director 】
Kiyoshi Asai

【 Deputy Director 】
Hiroyuki Toh

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【 Research Base 】 AIST Tokyo Waterfront

【AIST Participating Technology Research Association】
Epigenomics Technology Research Association
Technology Research Association of Highly Efficient Gene Design

【 Outline 】

Our goal is not simply to unravel complex biological mechanisms, but also to build technologies that aid our understanding of living systems from the perspective of information science and to utilize biological mechanisms for industrial purposes. CBRC focuses on three main fields of research: biological sequence information analysis, structural and functional analysis of biological molecules, and cellular informatics.
Our development of software and databases is intended to provide a useful collection of tools in bioinformatics. CBRC is building an integrated environment of these tools and public software and databases in order to offer more practical applications in bioinformatics.
As a purely "dry" bioinformatics research center, computing power is a critically important component of our infrastructure. The most important CBRC resource, however, is the researchers and staff, and we are open to accepting talented new members at all times and conducting collaborative researches with the private sector and universities.

Development of the life science information analysis platform

Research Center for Stem Cell Engineering

Toward establishing stem cell techniques as the basis for regenerative medicine and drug development and creating a stem cell industry

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【 Research Base 】 AIST Tsukuba (Central)

【AIST Participating Technology Research Association】
Stem Cell Evaluation Technology Research Association

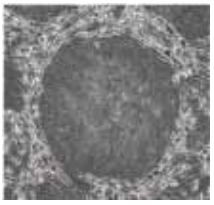
【 Director 】
Makoto Asashima

【 Deputy Director 】
Mahito Nakanishi

【 Deputy Director 】
Masashi Suzuki

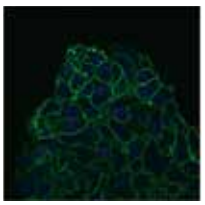
【 Outline 】

In recent years, the application of cells, tissues, and organs generated from multipotent stem cells (ES cells, iPS cells, MSC) to drug discovery screening and regenerative medicine is expected to become a next-generation innovation ensuring good health and security. In order to realize this expectation, we are developing techniques to establish stem cell lines and isolate stem cells for obtaining standard stem cell lines. We are also developing techniques to effectively differentiate stem cells and to create desired cell types, as well as a drug discovery screening system and medical drugs using the created cell types. Through these research activities, we develop basic technologies to accelerate the practical application of stem cells.

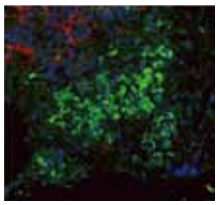


Human iPS cells generated with SeVdp-iPS vector

Electron microscopy of cilia of the ciliated cells differentiated from ES cells



ES cell colony stained with an ES/iPS-cell-specific probe "AiLec-S1" (Green: AiLec-S1 staining, Blue: nuclei staining with DAPI)



Pancreatic tissue cells differentiated from ES cells(Green: Pancreatic beta cells expressing insulin, Red: Exocrine cells expressing amylase, Blue: Nucleus)

Molecular Profiling Research Center for Drug Discovery

Construction of Rational System for Molecular Profiling in Drug Discovery

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【 Research Base 】 AIST Tokyo Waterfront

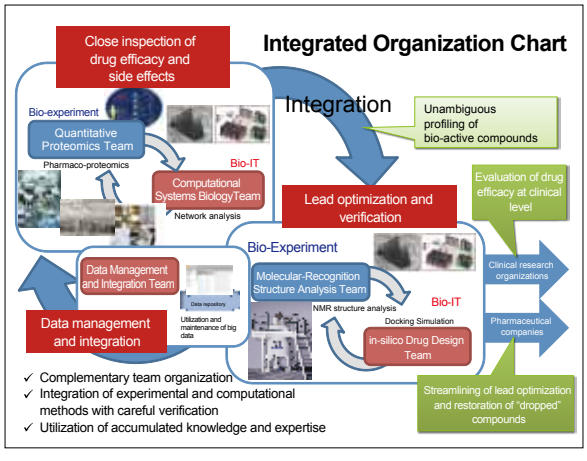
【 Director 】
Tohru Natsume

【 Deputy Director 】
Katsuhisa Horimoto

【 Deputy Director 】
Tai Kubo

【 Outline 】

The aim of our center is to bring immediate and effective innovation to drug discovery in Japan. In our fusion of experimental and computational biology, we can redesign previously rejected chemical compounds and promote newly designed chemical compounds to clinical tests by sophisticated molecular profiling methods and strengthened chemical design techniques. For these purposes, we systematically unify the following 5 steps for drug discovery: Systematic molecular profiling by measuring the absolute amounts of all of the proteins and antibodies in a cell; Estimation of activated pathways and drug-efficacy mechanisms; Construction of workflows for utilizing vast data resources by using semantic technology; Computer-aided drug development for lead optimization based on protein-compound docking and molecular dynamics simulations; and Estimation of structural aspects of molecular recognition, especially between small-molecule ligands and drug target proteins, by NMR.



Information Technology and Electronics

Toward improved social vitality and safety through green-IT

Rapid growth and spread of IT have increased energy consumption and imposed threats on information security and reliability issues. AIST is contributing to the development of energy-efficient IT devices and IT services to reduce energy consumption, which are supported by safe and reliable software technologies.

Toshihiko Kanayama
Vice-President
Director-General

Satoshi Sekiguchi
Deputy Director-General

Tetsuji Yasuda
Director, Research Planning Office

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【Outline of priority strategies】

Green-IT: Conserving energy in/by IT

The energy consumption of computers, networks, and other IT equipment has reached 5% of the total electricity generated in Japan, and continues to increase as network traffic expands at an annual rate of 40%. We are developing an all-optical-path network, which does not require electrical-optical conversion, as well as electronic devices that operate at very low voltages and nonvolatile memories that do not require refreshing, in order to significantly improve the energy efficiency of data centers and computer networks. We are also developing a smart grid that will interconnect solar power and other distributed energy sources via high-speed power-line communication to contribute to IT-based improvement of the energy efficiency of society.

Ensuring safety in people's lives by means of IT

Innovations with new technologies and machines require careful examination to ensure that they have no adverse effects on society. We are developing robot safety standards and safety certification technologies to create an environment for introducing life support robots into the home to provide nursing care and welfare. In addition, we are developing technologies to improve the reliability of embedded systems by automated software testing and model checking, while educating engineers in this field at the same time. In cloud computing environment, information security technologies that allow prompt system recovery even if a password is leaked is being developed.

Innovative electronic devices

Since the invention of the transistor, new electronic devices such as the IC and the CCD sensor have prompted innovation. We are engaged in research on devices that trigger innovation, such as new logic devices to replace CMOS, high-speed and low-power nonvolatile memories to replace DRAMs, organic transistors suitable for flexible displays, and strongly correlated electronic devices that produce new functions based on electrical, magnetic, and optical interaction.

Science-based innovation of service industry

The service industry accounts for 70% of the industries in Japan. It has been pointed out that unlike the manufacturing industry, which has achieved high productivity by automated robots on a large scale, the Japanese service industry is small and inefficient. We are performing scientific analyses based on observation of the behavior of service providers and recipients to improve service productivity, and conducting research on efficient methods for designing new services. Using Web services, we are also integrating AIST's contents and media in different areas such as geological and environmental information, in order to create new innovations based on new services.

Intelligent Systems Research Institute

Innovation with robot technology (RT)



【 Director 】 **Hirohisa Hirukawa**
【 Deputy Director 】 **Kazuhito Yokoi**
【 Deputy Director 】 **Kohtaro Ohba**

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【 Research Base 】 AIST Tsukuba (Central, East, North)

【 Outline 】

We study intelligent system technologies that are defined as technologies in the fields of intelligent information processing, robotics, and mechatronic systems that support intellectual activities and physical operations performed by humans, or perform these activities for humans. We are conducting research and development of basic principles, elemental technologies, and system architecture in this field. The targets of our research include safety technologies for life-support robots, basic life-support robot technologies to improve quality of life, robot technologies to increase efficiency and save labor in the service and manufacturing industries, technologies to improve the energy efficiency of transportation systems, and basic humanoid technologies.

Autonomous running chair and micro mobility

Information Technology Research Institute

From IT infrastructure to application technology: Make, connect, use


【 Director 】 **Satoshi Itoh**
【 Deputy Director 】 **Tomohiro Kudoh**

URL : http://itri.aist-go.jp/en/
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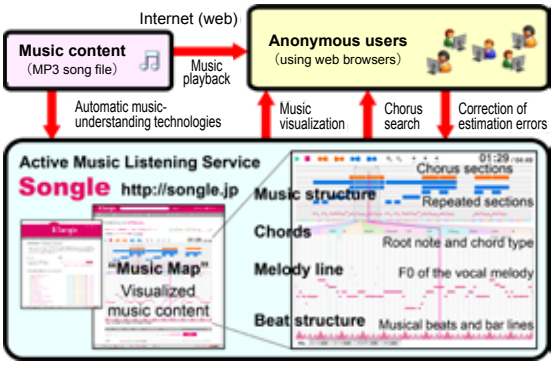
【 Research Bases 】 AIST Tsukuba (Central)

【 Outline 】

We are engaged in promoting IT innovation and industrial competitiveness by advancing technologies through research and development. Specific initiatives include infrastructural technologies such as high-performance, high-reliability and green cloud data centers; the realization of robust and secure yet flexible data integration and network management systems; communication systems for smart grid; interactive information utilization technologies for voice, images and other data; communication platforms that distribute sensing data; and technologies for the utilization of geographical information. We seek to share research outcomes with society at large, not only in the form of technical contribution but also through supplying industry with easy-to-use platforms and services.



Songle: Active Music Listening Service

Nanoelectronics Research Institute

Nanoelectronics integration for green innovation

【 Director 】
Seigo Kanemaru

【 Deputy Director 】
Masahiro Aoyagi

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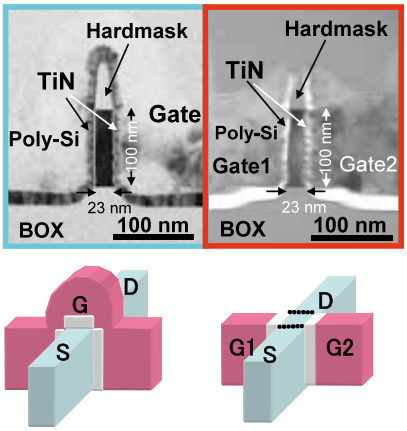
【 Research Base 】 AIST Tsukuba (Central, West)

【AIST Participating Technology Research Association】
Minimal Fab Development Association

【 Outline 】

We are developing nano-device and integrated-circuit technologies for the realization of low-power-consumption, high-speed, and multifunctional information devices. Specifically, we are developing a ultra-miniaturized CMOS integrated circuit technology, nonvolatile electronics technologies using ferroelectric or chalcogenide materials, hybrid device technologies combining different semiconductors. In addition, we are working to develop innovative semiconductor fabrication machines leading to the creation of new semiconductor markets.



20 nm-generation Fin-typed transistors

Electronics and Photonics Research Institute

Creating innovations with electronic and photonic technologies: From theory and material to device and system

【 Director 】
Satoshi Haraichi

【 Deputy Director 】
Masahiko Mori

【 Deputy Director 】
Koichi Awazu

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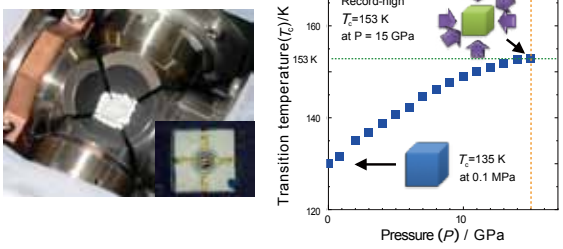
【 Research Base 】 AIST Tsukuba (Central)

【AIST Participating Technology Research Association】
Advanced Laser and Process Technology Research Association (ALPROT)
Photonics Electronics Technology Research Association (PETRA)

【 Outline 】

We pursue innovative possibility of electronic technologies and photonic technologies in addition to improving information and communication technologies to achieve safe and sustainable society. Concretely, we are developing new technologies used of both electron and light, such as photonic interconnection and the living body information sensing. We are also conducting the research and development of theories, materials, and devices concerning a quantum information processing, a strong correlated electron system, superconducting, and organic material. Moreover, we are promoting innovations of laser induced processing technology based on the laser fundamental research, and of optical or electronic observation and analysis systems.



The highest bulk superconductive transition temperature ever reported at T_c = 153 K.

Research Institute for Secure Systems

【 Director 】
Toshihiro Matsui

【 Deputy Director 】
KazuoTakaragi

Realizing a safer Information-Technology (IT) based society and providing security values to industries

URL : http://www.risec.aist.go.jp/
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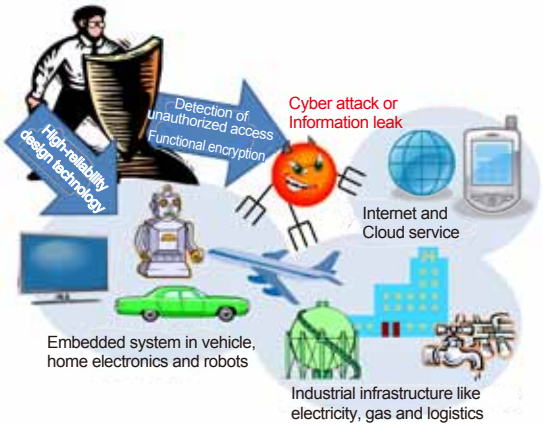
【 Research Base 】 AIST Tsukuba (Central), AIST Kansai

【 AIST Participating Technology Research Association 】
Control System Security Center (CSSC)

【 Outline 】

As IT becomes more prevalent in society, threats that exploit vulnerabilities in information systems that lead to theft of information assets such as intellectual property or privacy information, as well as threats that bring down an IT system, are increasing. Also, since the scale of embedded systems in vehicles, telecommunications, and financial systems continue growing and are becoming increasingly complex, system design and modification relying on traditional manual methods are facing at risks of disastrous failures. Through research and development of security for IT services in clouds and for control systems in industrial infrastructures, safe methods for system design and maintenance, and security of IC chips, Research Institute for Secure Systems creates security values in industries. Furthermore, we conduct innovative research on new encryption algorithms including functional encryption with complete mathematical proofs as countermeasures against new threats breaking out daily.



Network Photonics Research Center

【 Director 】
Shu Namiki

【 Deputy Director 】
Hitoshi Kawashima

Development of optical devices and systems for ultra-low energy consuming optical network for video concentric era

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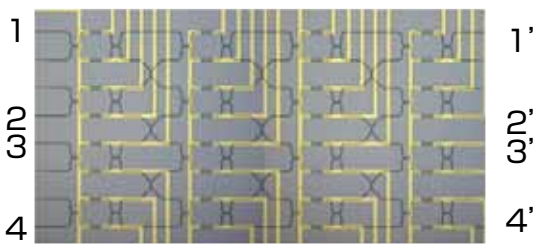
【 Research Base 】 AIST Tsukuba (Central)

【 Outline 】

Power consumption of internet routers due to the increasing traffic is getting a crucial problem for the forthcoming video concentric era where huge capacity video data occupies most of the traffics. We are developing technologies for optical path network based on circuit switching, which can handle huge capacity data with ultimately low power consumption. Being developed are silicon photonics based optical switches, wavelength selective switches using glass waveguide, and Si-LSI based optical data unit switches. For network systems, being developed are automatic compensation technology of fiber dispersion, multiplexing technologies for efficient use of fibers, and optical node technologies which incorporate all of these technologies. Our goal is to realize networks which enable us to route huge capacity data with power consumption per throughput of less than 1/1000 when compared with the present IP networks.



Silicon-photonics based 4 x 4 optical switch. The ligth signal input to any port on the left side can be routed to any port on the right side. The swich size is 1.8 mm x 0.9 mm.

Digital Human Research Center

Modeling the human body, behavior, and everyday life situations in the computer to assist designs of products and services that fit for the individual and society

【 Director 】
Masaaki Mochimaru

【 Deputy Director 】
Satoshi Kagami

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【 Research Base 】 AIST Tokyo Waterfront

【 Outline 】

Our scope is to establish a healthy, safe, and sustainable society through provisions of products and services to individuals. Understanding the changes of human factors and behaviors with the intervention of products and services is required.
We are researching technologies to represent human functions on the computer. These are digital human technologies that enable observing human factors (body shapes, movements, sensations) and modeling them, as well as monitoring behavior through real services and providing information based on behavioral models. We are developing designs for products and services that support the quality of life for individuals, and designs for communications that motivate individuals to take action with an understanding of society's requirements.

Simulator of children's behavior with visualization of risks in living environments

Spintronics Research Center

Creating green innovations based on nonvolatile memory

【 Director 】
Shinji Yuasa

【 Deputy Director 】
Akio Fukushima

URL : http://unit.aist.go.jp/src/cie/en_index.html
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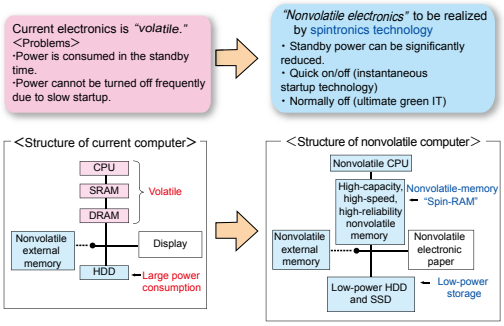
【 Research Base 】 AIST Tsukuba (Central)

【 Outline 】

The rapid development of IT society is accompanied with a large increase in the power consumption of electronic devices. To reduce the total power consumption of IT appliances, power consumed during input "standby time" has to be significantly reduced. To achieve this, it is essential to develop nonvolatile memory, which retains data even after the power is turned off. We are developing high-capacity, high-speed, and highly-reliable nonvolatile memory based on spintronics and nanotechnology. Based on these technologies we are also developing basic technologies for a normally-off computer, which is the ultimate green IT solution with no power consumption during the standby time.



Center for Service Research

From "experience and intuition-based" to "scientific and engineering approach-based" services

【 Director 】
Masaaki Mochimaru
(concurrent post)

【 Deputy Director 】
Yoichi Motomura

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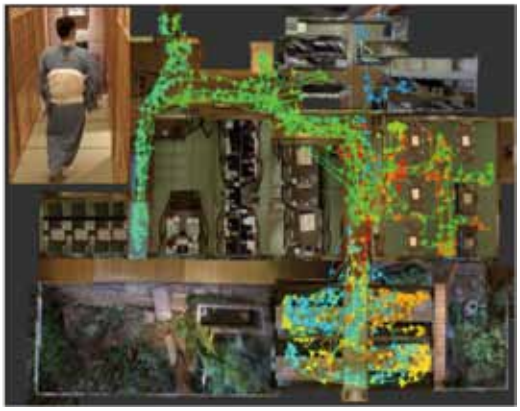
【 Research Bases 】 AIST Tokyo Waterfront, AIST Tsukuba (Central)

【 Outline 】

The service industry accounts for 70% of Japan's economy and is expected to serve as an engine of economic growth along with the manufacturing industry. At AIST, with the progress of research in this field, we have an increasing number of research themes whose envisaged outcome is the creation of new services. To address these developments, AIST established the Center for Service Research on April 1, 2008. Here, we are developing a methodology for "service innovation" that increases added value for service recipients and efficiency for service providers though the following steps: (1) making a shift from "experience and intuition-based" to "scientific and engineering approach-based" services through research and development; (2) repeating the phases of observation, analysis, design, and application in services; and (3) coordinating the needs and behavioral patterns of recipients with the contents of services and methods for providing them.



Research on behavior analysis for wide-area indoor environments

Flexible Electronics Research Center

Green Innovation with thin, light, flexible devices

【 Director 】
Toshihide Kamata

【 Deputy Director 】
Tatsuo Hasegawa

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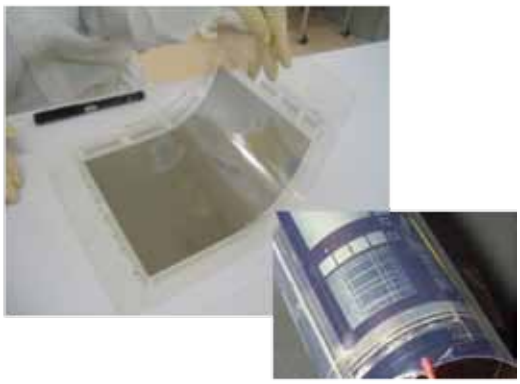
【 Research Base 】 AIST Tsukuba (Central)
【 AIST Participating Technology Research Association 】
Chemical Materials Evaluation and Research Base (CEREBA)
Japan Advanced Printed Electronics Technology Research Association (JAPERA)

【 Outline 】

We are developing thin, light and flexible devices with the purpose of improvement of the usability and saving energy of telecommunication interface devices such as displays, sensors and so on. Moreover, we are developing the fabrication techniques of these flexible devices making good use of the print method from the point of view of energy conservation, the saving resource, and the high throughput. It aims wide distribution of information terminal devices into society, and promotion of a green innovation through these technological developments.



Printed TFT array prepared on a plastic film, and a flexible display driven by this printed TFT array.

Nanotechnology, Materials and Manufacturing

Toward the development of revolutionary materials and manufacturing technologies that contribute to green innovation

AIST is contributing to green innovation, the aim of which is to achieve enhanced Japanese competitiveness and a sustainable society by creating materials and devices that play a core role in green innovation with nanotechnology as the key technology, and by revolutionizing manufacturing processes in the fields of nanotechnology, materials, and manufacturing.

Toshihiko Kanayama
Vice-President
Director-General

Norimitsu Murayama
Deputy Director-General

Masaru Yoshida
Director, Research Planning Office

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【Outline of priority strategies】

Realization of technologies to reduce CO_2 emissions from transportation equipment, houses, and buildings by the development of highly functional components

It is important for the prevention of global warming to reduce CO_2 emissions by improving energy use efficiency while maintaining the quality of life. We are conducting research on lightweight alloys used to reduce vehicle weight for improved fuel economy and on technologies for machining these alloys. We are also engaged in the development of building materials such as light-controlling window glass materials and humidity-controlling materials, to improve the energy efficiency and comfort of houses, office buildings, and factories.

Reduction of the use of rare metals and precious metals and development of technologies as alternatives to them, in order to secure and effectively use resources

Rare metals and other exhaustible mineral resources are commonly used in vehicles and home appliances. We are studying technologies to reduce the use of rare and precious metals such as tungsten and platinum, which are essential for leading-edge industries but very unstable in supply, as well as alternative material technologies.

Development of materials and devices that will play a core role in green innovation through nanosystems

An innovative technology evolves with the development of a new material or device that has new functions or features not available in conventional technologies. We are developing materials and components that function at the nano level, using nanosystematization combining a theoretical simulation technique and a nanotechnology experimental technique. Another focus of our research is the development of technologies for the mass-production of single-walled carbon nanotubes expected to be used for the reduction of component weights and the realization of low-power consumption devices, the development of technologies for the mass-production of graphene expected to be used for the transparent conductive film.

Development of technologies to reduce the burden on the environment by innovations in manufacturing

New manufacturing processes are essential to reduce the environmental load of industrial activities without compromising industrial competitiveness. We are developing manufacturing technologies for high-mix, variable-volume production that have a smaller environmental load or take resource productivity into account. In order to improve microelectromechanical systems (MEMS) and promote their widespread use, we are developing manufacturing technologies to combine and integrate MEMS devices in different areas and a system to monitor energy consumption at manufacturing sites using MEMS devices.

Advanced Manufacturing Research Institute

Development of manufacturing process technologies offering low cost, high resource productivity, and low environmental burden



【 Director 】 **Masanobu Awano**
【 Deputy Director 】 **Yasuo Iida**
【 Deputy Director 】 **Naoki Ichikawa**

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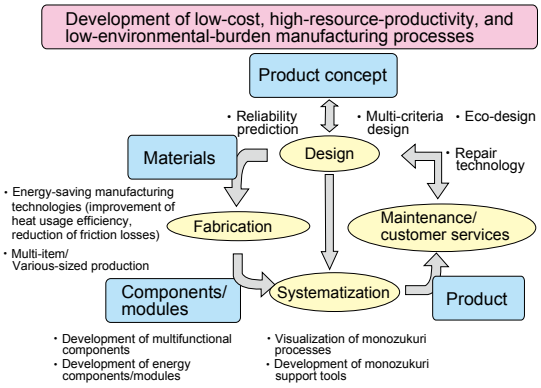
【 Research Bases 】 AIST Chubu, AIST Tsukuba (East, Central)

【 AIST Participating Technology Research Association 】

Advanced Laser and Process Technology Research Association (ALPROT)
R&D Partnership for Future Power Electronics Technology (FUPET)
Fine Ceramics Research Association (FCRA)
Minimal Fab Development Association

【 Outline 】

We pursue researches under the banner of Minimal Manufacturing, which is the manufacture of “maximal performance products” through “minimal resource input and minimal energy use” with “minimal environmental load”. To realize the “Minimal Manufacturing”, we carry out fundamental researches on the innovative materials/devices and revolutionary processing technologies. We disseminate the seeds of the fundamental researches into the wide range of industries through the total design approaches of manufacture, including functionality analysis, lifetime prediction, and assessment of environmental burden. In addition, we contribute to the effective resolution of issues from small and medium-sized manufacturing enterprises, through developing “Monozukuri tools”, such as databases on processing technologies and softwares for introduction of IT that are open to public and widely used in the companies.



Materials Research Institute for Sustainable Development

Contributing to the sustainability of industry and society through the development of rare-metal alternatives, less rare-metal-intensive technologies, and advanced lightweight metal components and building components to improve energy efficiency



【 Director 】 **Mamoru Nakamura**
【 Deputy Director 】 **Keizo Kobayashi**
【 Deputy Director 】 **Masato Tazawa**

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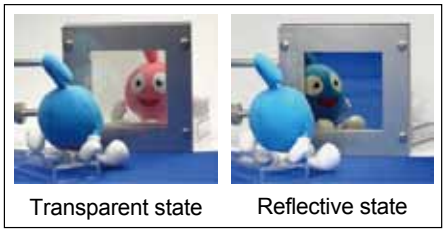
【 Research Base 】 AIST Chubu

【 AIST Participating Technology Research Association 】

Technology Research Association of Magnetic Materials for High-Efficiency Motors (MagHEM)

【 Outline 】

We are engaged in the research and development of materials and components to facilitate the sustainable development of society using limited natural resources and energy sources. In this work we are focusing on R&D of (1) technologies (rare metal substitute materials technologies, technologies to reduce rare metal consumption) to address the supply of some rare metals (tungsten, platinum, dysprosium, etc.), which will be difficult to secure in the near future due to rapidly increasing demand in developing countries and an oligopoly for the rare metal resources, in order to ensure the sustainable development of industry; (2) lightweight metals to reduce vehicle weight for improved fuel economy (technologies for high-performance magnesium alloys); and (3) energy-efficient building components (light-controlling glass, advanced wood-based materials, humidity-controlling walls, etc.), which will be effective in reducing CO_2 emissions in the transportation and commercial/residential sectors.



Switching of the switchable mirror using magnesium-alkaline-earth alloy thin film.

Comparison of heat resistance between the developed isotropic Sm-Fe-N magnet and the conventional anisotropic Nd-Fe-B magnet (change in the number of magnetic-attracted iron balls on each magnet by heating).

Nanosystem Research Institute

Bringing nanometer material control technologies into the real world

URL : http://unit.aist.go.jp/nri/
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【 Research Base 】 AIST Tsukuba (Central, East)

【 AIST Participating Technology Research Association 】

Technology Research Association for Single Wall Carbon Nanotubes (TASC)
Chemical Materials Evaluation and Research Base (CEREBA)
Minimal Fab Development Association
Technology Research Association of Magnetic Materials for High-Efficiency Motors (MagHEM)

【 Director 】
Tomohiko Yamaguchi

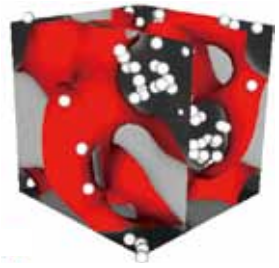
【 Deputy Director 】
Yoshihiro Asai

【 Deputy Director 】
Keiichi Ikegami

【 Deputy Director 】
Ko-ichi Sugawara

【 Outline 】

Nanotechnology refers to technologies to control atoms and molecules in the nanometer-scale world in order to create new functions. To predict the behavior of materials in this invisible world, design them, and create systems out of them, it is necessary to develop materials, processes, and measurement technologies, and to combine and integrate individual technologies such as theoretical analysis and computational simulation. The Nanotechnology Research Institute and the Research Institute for Computational Science have been merged into the Nanosystem Research Institute to achieve these goals. We are working to realize closer collaboration among leading-edge technologies that have been developed up to now, and developing new technologies required by society.



Computer simulation of Nanoparticle-Dispersed Structure of Nano-composite Materials used in the Automotive Tire.

Colorful Solutions of Single Wall Carbon Nanotubes Separated as Semiconductor (S) and Metal (M).

Nanotube Research Center

Toward a world-leading research center covering all aspects of nanotube materials

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【 Research Base 】 AIST Tsukuba (Central)

【 AIST Participating Technology Research Association 】

Technology Research Association for Single Wall Carbon Nanotubes (TASC)

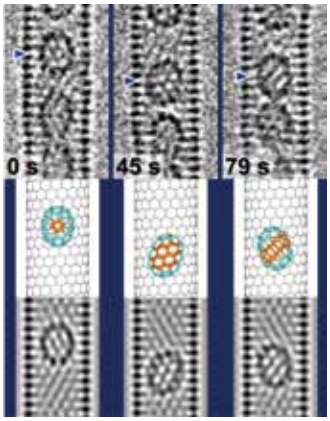
【Director】
Sumio Iijima

【 Deputy Director 】
Motoo Yumura

【 Deputy Director 】
Takeshi Sasaki

【 Outline 】

We are focusing on nanotube structures as typical nanostructures expected to lead to new industries, and the creation of applications, primarily for carbon and graphene developed by AIST, by adding high functionality to them. Our goal is to contribute to the fostering of new industries in Japan through these efforts. We are also developing measurement and analysis techniques for nanostructures, including nanotube materials, offering the highest levels of performance, and aim to be a world-leading research center covering all aspects of nanotube materials.



Top: Movement and rotation of a fullerene molecule captured by a high-performance electron microscope
Middle: Structural model
Bottom: Simulated image

Research Center for Ubiquitous MEMS and Micro Engineering

Toward ubiquitous microsystems watching over people and society

URL : http://unit.aist.go.jp/umemsme/cie/
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【 Research Base 】 AIST Tsukuba (East)

【 AIST Participating Technology Research Association 】

NMEMS Technology Research Organization Technology Research Association
Minimal Fab Development Association

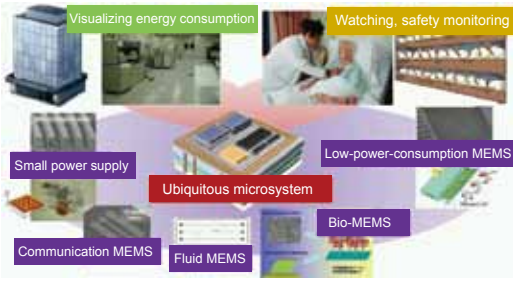
【 Director 】
Ryutaro Maeda

【 Deputy Director 】
Hiroshi Hiroshima

【 Deputy Director 】
Toshihiro Itoh

【 Outline 】

We are engaged in R&D of microelectromechanical system (MEMS) and of ubiquitous microsystems for a low-carbon, safe, and secure society. We are creating an environment for leading-edge MEMS R&D and test-fabrication in collaboration with industry, and developing an open research center for MEMS as well as for the fostering of human resources. In addition, we are implementing the Integrated Research and Development of Microsystems research project (project leader: Masayoshi Esashi, Advanced Institute for Materials Research, Tohoku University), one of 30 designated research topics in the Funding Program for World-Leading Innovative R&D on Science and Technology.



Ubiquitous microsystem to watch over people and society

Metrology and Measurement Science

Setting measurement standards and developing intellectual techno-infrastructures for measurement, testing, and certification to support technological innovation and a fair and secure society

Measurement is necessary for designing and developing products as well as for testing and certifying their qualities. It serves as a driving force to maintain Japan's industrial competitiveness, and as an intellectual techno-infrastructure for sharing technical policies to maintain the security of society and the lives of individuals, preserve the environment, and maintain energy and resources. AIST develops and maintains national measurement standards in order to ensure global acceptability of consistency, of relevant technologies, and is systematically developing measurement technologies from the standpoint of intellectual infrastructure.

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Director-General

Kiyoshi Yase
Deputy Director-General

Tokihiko Kobata
Director, Research Planning Office
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E-mail : standard-liaison-ml@aist.go.jp

【Outline of priority strategies】

Development of new national measurement standards and dissemination of measurement standards to industrial and social users

AIST develops new national measurement standards required to specifically support "green innovation" that promotes energy-efficient technologies, also "life innovation" to ensure food safety, and industrial competitiveness such as facilitating the application of advanced industrial technologies to Japanese industry, in response to the rapidly growing global market, and keeps providing national calibration services to users.

Development and standardization of advanced measurement technologies

We develop the following techniques in order to improve the development and design of new products and support a fair and secure society: advanced measurement techniques, basic evaluation techniques, industrial standards and conformity assessment techniques, and measurement techniques to solve problems arising at production lines of industrial sectors. We also train measurement experts.

Improvement on basic national measurement standards

The improvement on basic national measurement standards required to ensure the reliability of industrial measuring instruments is intended to respond to new measurement needs for high-performance metrology at production sites, refinement on national traceability hierarchy, direct application of national metrology standards to certification at production sites, and application of on-demand calibration service for small and medium size enterprises to strengthen their R&Ds.

Contribution to and leadership in the global metrology system

Our international activities lead the global metrological system for international mutual acceptance of measurement standards and measuring instruments and global standardization on measurement technology, including the cooperation for the redefinition of basic units such as the kilogram and the second. Our dissemination activities also cover the training of metrological experts and verification experts for domestic industrial and regulatory activities, and the metrological administration officers based on the measurement law of Japan.

Development and administration of database as intellectual infrastructure for innovation

To support domestic industrial activities for innovations, we continuously update reliable databases and provide the data to the world through our website. It includes spectral database for organic materials and thermal properties for industrially important materials, and it has served more than 50 million visitors a year from the world.

Metrology Institute of Japan

Precision measurement technologies and metrological traceability supporting R&D, quality control, and international trade

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【 Research Bases 】 AIST Tsukuba (Central), AIST Kansai

【 Director 】
Koichi Chiba

【 Deputy Director 】
Masaru Arai

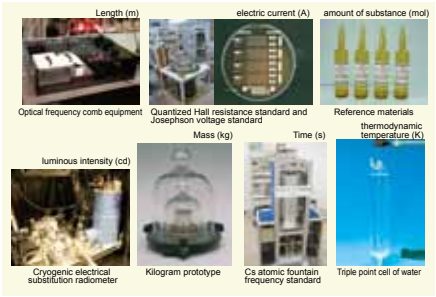
【 Deputy Director 】
Toshiyuki Takatsuji

【 Deputy Director 】
Akihiro Mito

【 Deputy Director 】
Toshiyuki Fujimoto

【 Outline 】

The Metrology Institute of Japan is engaged in technical development and improvement of national metrology standards, and also calibration and testing services using the developed technologies. Furthermore, we are pioneering in advanced research and development on measurement and analysis technology, which is a common infrastructure for various fields, aiming at world-leading research achievements. Through these activities, we are taking the initiative in implementation and management of domestic metrological system from a technical viewpoint so that anyone can choose and utilize a reliable measurement guaranteed by metrological traceability according to cost and time, thereby contributing to the smooth progress of Japan's economic activities in the global market.



National standards for base units

Research Institute of Instrumentation Frontier

Evolution from measurement into analysis with the dissemination of advanced instruments

URL : http://unit.aist.go.jp/riif/index_en.html
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(from outside Japan: Tel: +81-29-861-5300 / Fax: +81-29-861-5881)

【 Research Bases 】 AIST Tsukuba (Central), AIST Chubu
【 AIST Participating Technology Research Association 】
Minimal Fab Development Association

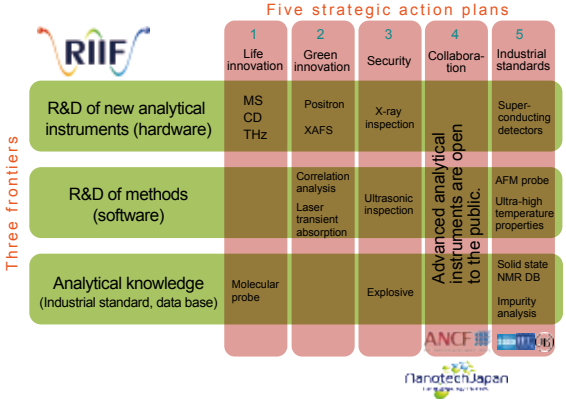
【 Director 】
Masataka Ohkubo

【 Deputy Director 】
Yukihiko Yamauchi

【 Deputy Director 】
Naoaki Saito

【 Outline 】

From an historical perspective, new scientific and technical disciplines and new industries have often appeared after the invention of novel measurement instruments. For instance, the invention of the scanning tunnel microscope created the modern discipline of nanotechnology. It is said that instrumental observation is the origin of science and technology. Although science and technology are indispensable for our present way of life, we should also be aware of their power for harm. The survival or destruction of the human race depends on how we create and control industries. As such, observation only is insufficient. We have to analyze measurement results, find ways to solve each problem, and explain the findings in a meaningful way. In other words, analytical results should be extracted from measurements. We carry out five strategic action plans by expanding three analytical instrumental frontiers as shown on the right-hand side.



Measurement Solution Research Center

Developing measurement technology solutions for better productivity to keep the safety and security of industry and society.

【 Director 】
Michiru Sakamoto

【 Deputy Director 】
Hidehiko Nonaka

URL : http://unit.aist.go.jp/msrc/index_en.html
E-mail : msrc-webmaster-ml@aist.go.jp
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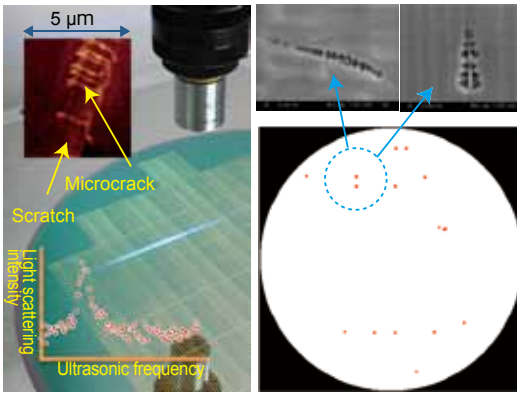
(from outside Japan: Tel: +81-942-81-3646 / Fax: +81-942-81-3690)

【 Research Base 】 AIST Kyushu

【 Outline 】

Our mission is to provide the solutions on time to various problems arising at production sites and in society by integrating the research results of measurement, instrumentation and relating technologies. As a means to achieve this, we are promoting the collaboration with "meisters" who are the specialists at the production sites in private sectors and well informed about the measurement problems there (we call this approach as "meister system"). We also take a consortium-type approach if the problems are relatively common in a certain field of industry and society. By accumulating the cases which resulted in the solutions and by sending out the proper information, we contribute to the improvement of the productivity to keep the safety and security of industry and society.



Example of microcracks in the surface of a semiconductor wafer

Metrology Management Center

For establishment and dissemination of measurement standards in Japan

【 Director 】
Takashi Usuda

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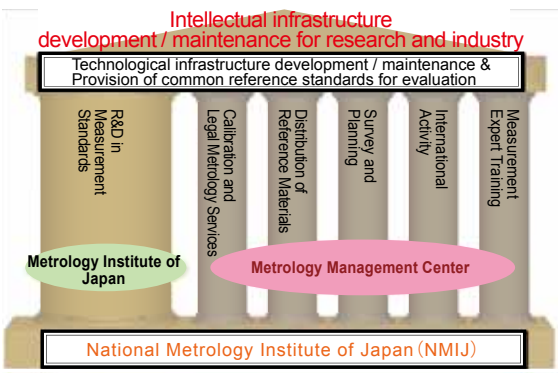
【 Locations 】 AIST Tsukuba (Central), AIST Kansai

【 Outline 】

Metrology Management Center (MMC) in AIST is responsible for establishment and dissemination of the measurement traceability in Japan. In particular, MMC disseminates measurement standards to markets and customers via calibration services, legal metrology and reference materials in cooperation with Metrology Institute of Japan (MIJ) as well as with Japan Calibration Service System (JCSS). Other MMC's important missions are to establish strategies for national measurement standards through surveillance and analysis of users' demands, and to ensure the international equivalence of measurement standards through CIPM under the Metre Convention. Furthermore, under the metrology related laws, MMC is also in charge of training measurement experts and disseminating the outcomes of activities in metrology.



Geological Survey and Applied Geoscience

Well understanding about the Earth, harmonizing our life with this planet

AIST gathers geological information essential for realizing a safe and secure society in Japan. It also develops technologies to solve such problems as alleviating natural disasters, protecting the global environment, developing resources and energy sources, and so on. The Geological Survey of Japan (GSJ), an arm of AIST, disseminates information gathered and organized for international cooperation on behalf of the country.

Eikichi Tsukuda
Vice-President
Director-General

Yusaku Yano
Deputy Director-General

Junichi Itoh
Director, Research Planning Office

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E-mail : geo-liaison-ml@aist.go.jp

【Outline of priority strategies】

Compilation and expansion of the use of geological information concerning the land and surroundings of Japan as fundamental information on the country

Geological information is fundamental information on the land of a country obtained through systematic geoscientific investigations. We are conducting geological surveys of the land of Japan and its surrounding waters and developing basic geoscientific maps of the land and waters in response to requests from society. In particular, we are developing geological data on urban and coastal areas to mitigate urban hazards and obtain data on unsurveyed areas. We use information from earth observation satellites. In addition, we are working to improve the survey and research techniques and technologies required for these purposes.

Contribution to the protection and robust use of the geospheric environment by developing technologies to evaluate the resources and environment of the geosphere

The geosphere, a basic component of the Earth, nurtures natural resources and, as part of the Earth's material circulation system, has a significant effect on the human environment. We are evaluating and characterizing the geosphere system and developing technologies for the development of natural resources that create a smaller environmental load, the preservation of the geospheric environment, and the use of the geosphere system.

Minimizing of disaster risks by developing technologies to predict and evaluate future disasters such as earthquakes and volcanic eruptions

The threats posed by geological hazards are very serious to the population of the Japanese Archipelago, a region of significant seismic and volcanic activity. In order to mitigate natural hazards, we are carrying out investigations into the history of seismic and volcanic activity based on survey and observation data, and developing technologies to characterize the mechanisms of such activity, predict future activity, and assess hazards.

Provision and dissemination of geological information, and implementation of emergency geological surveys and research at the time of natural disasters

In order to disseminate understanding of the usefulness of geological information as fundamental information for society, we are working to reach out to the public and conduct geopark activities. We also undertake emergency surveys and studies of geological hazards, such as earthquakes and eruptions. We promptly provide geological information obtained by emergency surveys to the public by various means.

Promotion of international research cooperation through initiatives mainly in Asia

We are vigorously pursuing international collaborative geological research projects, primarily in the regions of Asia, Africa, and South America, using our accumulated knowledge and experience as well as a global network of geological survey organizations. We are conducting research projects on the development of geological data, the mitigation of geological hazards, resource exploration, and environmental protection through international organizations and research programs.

Institute for Geo-Resources and Environment

Protecting the Earth and exploring its gifts



【 Director 】 **Shinsuke Nakao**
【 Deputy Director 】 **Toshiyuki Tosha**
【 Deputy Director 】 **Yuji Mitsuhata**

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【 Research Base 】 AIST Tsukuba (Central, West)

【 Outline 】

In order to develop a sustainable and stable energy cycle using geothermal resources required for a sustainable society and to contribute to the safe living environment through the use and protection of the geo-environment, and to contribute to the secure supply of natural resources which form the basis of the industrial activities and life in society, we are engaged in surveys and research on geological disposal of nuclear wastes, geologic sequestration of CO_2, soil pollution, rare metal resources, and groundwater resources. In addition, we are constructing and disseminating an intellectual infrastructure of information based on geological surveys, which forms the foundation of this research.


Drilling survey for exploring rare earth elements in the Republic of South Africa

Institute of Geology and Geoinformation

Disseminating national geological information necessary for society to live in harmony with the Earth



【 Director 】 **Masahiko Makino**
【 Deputy Director 】 **Kazuhiro Miyazaki**
【 Deputy Director 】 **Ken Ikehara**

【 Deputy Director 】 **Yuichiro Tanaka**

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【 Research Bases 】 AIST Tsukuba (Central), AIST Chugoku

【 Outline 】

We are characterizing the geology of Japan and its surrounding sea through comprehensive basic geoscientific research, developing a knowledge base in the form of geological maps, and providing geological information required to mitigate geological hazards and protect the environment in the coastal regions and volcanic areas, and to facilitate the utilization of the deep geo-environment. We are also working to improve techniques for the analysis of geological information, and conducting research to develop and integrate geological information, including in the Asian region, while promoting the innovative use of such information, in order to meet the needs of society.

Volcanoes of Japan (Third Edition)

Active Fault and Earthquake Research Center

Understanding earthquakes and predicting their activity

【 Director 】
Yukinobu Okamura

【 Deputy Director 】
Yasuto Kuwahara

URL : http://unit.aist.go.jp/actfault-eq/english/
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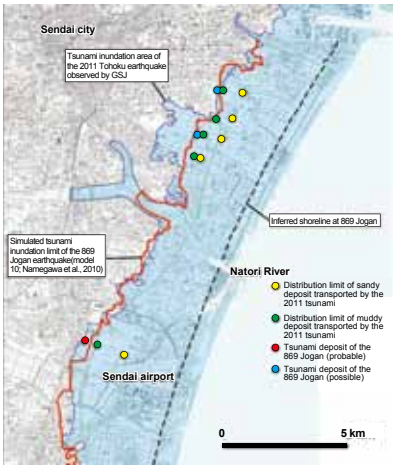
【 Research Base 】 AIST Tsukuba (Central)

【 Outline 】

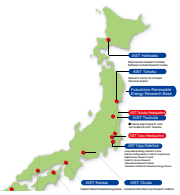
In the Japan arc and its surrounding seas, many earthquakes occur due to rupture of active faults and subduction plate boundaries. We are investigating rupture events of active faults and plate-boundaries that have occurred over the past few thousand years and estimating the intervals and magnitudes of earthquakes and tsunami disasters based on topographic and geologic surveys. We are also conducting research on the simulation-based prediction of earthquakes using geophysical models and the detection of precursors of the Tokai, Tonankai, and Nankai earthquakes based on observations of groundwater and crustal movements.



Tsunami flooded areas of the 2011 Tohoku (blue area) and the 869 Jogan (red dash line) earthquakes in the Sendai Plain

Geoinformation Center

Integrating and providing reliable and impartial geoinformation for the public



【 Director 】
Yoshio Watanabe

【 Deputy Director 】
Satoshi Tsuchida

URL : http://www.gsj.jp/geoinfo-center/center-en.html
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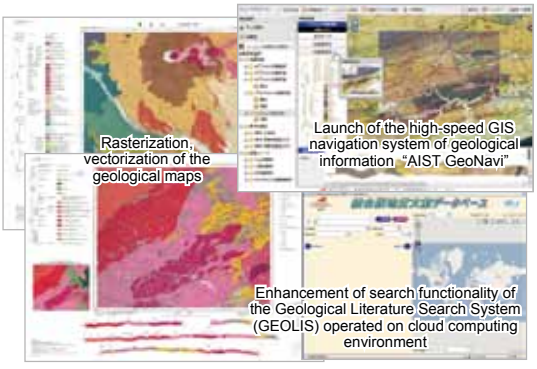
【 Location 】 AIST Tsukuba (Central)

【 Outline 】

We provide reliable and impartial geoinfomation for the public in close coordination with the geoscience research divisions. We develop geoscientific data infrastructure and promote the geological standardization in order to meet greater needs in Japan. We register the metadata of geological publications and build bibliographic database. Integrated database of geoinfomation and satellite images is another major task of us for interoperable data dissemination through the web.



Electronic publication, cloud computing and improvement of geo-information

Geological Museum

Management of geologic specimens and disseminating the geologic information

【Director】
Seiichi Toshimitsu

【Deputy Director】
Koichi Shimokawa

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【 Location 】 AIST Tsukuba (Central)

【 Outline 】

We are managing, registering and archiving a large number of geologic specimens which are collected through the investigation and research of the Geological Survey of Japan, AIST. We are supporting the use of these geologic specimens for research, education and others, and supporting geologic researches by making thin sections of rock specimens. While cooperating with the related research units, we are disseminating the geological information by improvement of the display of the Geological Museum, planning and administration of various events as special exhibitions, special lectures, experience study events, geological consultation. In addition, we are promoting outreach activities out of the museum, such as the geopark, the geological information exhibition, and others.

Special exhibition of the Geological Museum

Research and Innovation Promotion Headquarters

Toward reinforcing our functions of open innovation hub

While setting our goal to build Japan's industrial competitive advantage, we demonstrate the function of open innovation 'hub' and create innovations by promoting research projects that may be attractive to industry. In more detail, along with implementing integrated researches of our 6 research fields, we try to deliver on our strategy in 3 stages: creating promising seeds (stage 1); developing outstanding technology (stage 2); and establishing paths to the market (stage 3), and promote green innovation, life science-based innovation etc.

Masahiro Seto
Vice-president
Director-General

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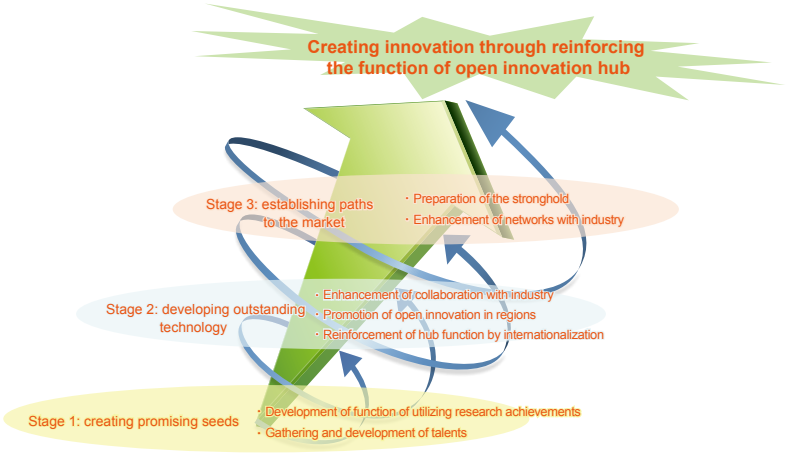
TEL: 029-862-6040 / FAX: 029-862-6130
(from outside Japan: TEL: +81-29-862-6040 / FAX: +81-29-862-6130)



【Outline of priority strategies】

Strengthening function of utilizing research achievements

For practical application of our research results, we decide on policies concerning alliances, licenses, venture businesses and international standardization according to seeds levels or market trends, and we aim for the comprehensive use of the results by preparing a system for implementation.

Gathering and development of talents

We promote the establishment of a collaboration arena where players who hold a variety of missions and potentials gather, by effectively using our domestic and global network with companies, universities and research institutes. Also we train personnel of high-level industrial technology through collaborative research projects.

Enhancement of collaboration with industry

To meet the technological challenges, we, with our highly rated potentials and cutting-edge research facilities, encourage a variety of collaborative projects such as R&D providing solutions, R&D providing high technologies, and R&D based on forecasts of future industry.

Promotion of open innovation in regions

We contribute, as an open innovation hub in local regions, to the vitalization of the regional industry, and support local companies to improve their technologies by using our organizational power and network which covers the whole country.

Reinforcement of hub function by internationalization

By building partnerships with foreign innovative institutes and universities, we promote strengthening the hub function through globalization of networks with such organizations and within AIST.

Preparation of the stronghold

We aim at setting up strongholds with necessary systems to utilize human resources and research facilities of AIST in order to realize open innovation.

Enhancement of networks with industry

We also try to reinforce networks with industry through events such as AIST Open Lab, lectures and symposiums.

Planning Division

Reinforcement of function of open innovation hub where 'technology' and 'collaboration' unite

E-mail : raipl-general-ml@aist.go.jp
TEL : 029-862-6040 FAX : 029-862-6130
(from outside Japan: TEL: +81-29-862-6040 / FAX: +81-29-862-6130)

【Director】
Satoshi Hamakawa

【Manager, Strategic Research Promotion Office】
Masaki Taniguchi

【Manager, Regional Research Promotion Office】
Yasushi Shigemasa

【Outline】

The division pulls together all other divisions of Research and Innovation Promotion Headquarters and formulates strategies for creation and promotion of innovation, drafts plans and implements projects. In addition, it promotes alliances for invigoration of local industry in regional basement areas and open innovation within technology research associations that utilize AIST as a hub. It predominantly supports research that accelerates integration of different fields and collaboration with companies, and encourages the spread of technologies developed by AIST to society.

Intellectual Property Division

From strategic and efficient acquisition of rights and maintenance of research outcome to technology transfer

E-mail: chizai_web-ml@aist.go.jp
Tel: (029)862-6153 / Fax: (029)862-6154
(from outside Japan: TEL: +81-29-862-6153 / FAX: +81-29-862-6154)

【Director】 **Koji Manaka**

【Deputy Director】 **Kazuya Takai**

【Manager, Planning Office】 **Masahiro Shibata**

【Outline】

We aim to acquire intellectual property rights such as patents and know-how strategically and efficiently, maintain and take advantage of them to transfer our research outcome to industry to create innovation by collaboration with industry. Through these activities, we intend to maintain and improve the international competitiveness of our country's industry.

Fiscal year	2010	2011
Technology transfer revenue (million yen)	288	235
Number of contracts	765	781
Domestic patent applications	817	789

Collaboration Promotion Division

To promote collaboration among industry, academia, public research organization, and local government

E-mail: sgk.plan-ml@aist.go.jp
Tel: (029)862-6144 / Fax: (029)862-6148
(from outside Japan: TEL: +81-29-862-6144 / FAX: +81-29-862-6148)

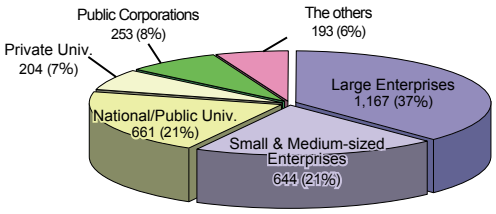
【Director】 **Kiyoyuki Shimizu**

【Deputy Director】 **Mitsuo Suzuki**

【Manager, Planning Office】 **Ken-ichi Miyamoto**

【Outline】

We plan and coordinate collaborative activities among industry, academia, public research organization, and local government to implement the Third Mid-term Plan through cooperation with them. Our major responsibilities are as follows: developing regional technology policy, constructing networks among relevant organizations in the Kanto and Koshinetsu Districts, providing technological consultation service, promoting the utilization of our research results for small and medium-sized enterprises, and managing joint research or commissioned research agreements.



The Number of Joint Research Projects
April, 2011-March, 2012

International Affairs Division

Establishment through globalization of an international research network to strengthen AIST's hub function

URL: http://www.aist.go.jp/aist_e/international/index.html
E-mail: kokusai-soukatsu-ml@aist.go.jp
Tel: (029)862-6244 / Fax: (029)862-6249
(from outside Japan: TEL: +81-29-862-6244 / FAX: +81-29-862-6249)

【Director】 **Yoshinori Miyazaki**

【Manager, Global Collaboration Office】 **Jun Tamba**

【Outline】

We facilitate the conclusion of memoranda of understanding (MOUs) and researcher exchanges with foreign institutions in order to build good research networks and to plan and promote international cooperation. We work towards 1) promoting complementary researches with foreign institutes through the utilization of each institute's unique specialty, and mutually beneficial researches by the use of regional resources not available in Japan, 2) supporting the overseas expansion of Japanese enterprises, 3) cooperating with foreign institutes with the purpose of international standardization, and 4) contributing to governmental missions. We also manage the export of goods and the transfer of technology required in the research activities in accordance with Japanese law.

Comprehensive MOU : 35, Specific MOU : 35

Division for Start-ups

Vitalize Japan by fostering innovation through venture creation

URL: http://unit.aist.go.jp/dsu/cie/index.html
E-mail: dsu-koho-ml@aist.go.jp
Tel: (029)862-6655 / Fax: (029)862-6656
(from outside Japan: TEL: +81-29-862-6655 / FAX: +81-29-862-6656)

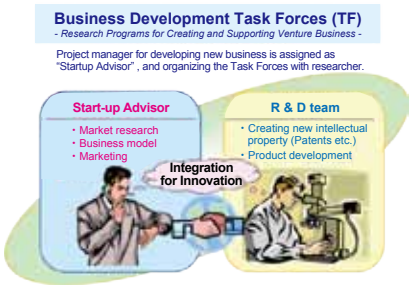
【 Outline 】

DSU's mission is to focus on extracting value from technologies of AIST as well as industry and academia in developing high-tech ventures with high growth potential. DSU provides a founding program named Business Development Task Force in which researcher and experienced business person jointly create business ventures.

【 Director 】
Haruyuki Yoneda

【 Deputy Director 】
Takashi Iwasaki

【 Manager, Planning Office 】
Ryouichi Kitagawa



International Standards Promotion Division

Contributes to the activation of standardization based on the R&D results

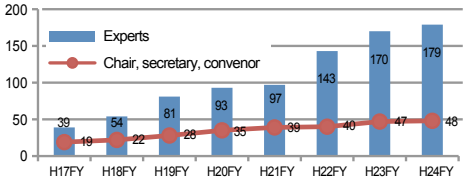
URL: http://unit.aist.go.jp/ispd/index_en.html
E-mail: hyoujunbu-ml@aist.go.jp
Tel: (029)862-6221 / Fax: (029)862-6222
(from outside Japan: TEL: +81-29-862-6221 / FAX: +81-29-862-6222)

【 Outline 】

International Standards Promotion Division contributes to the activation of standardization based on the research outputs of AIST. Standardization is one of the most important activities of giving back AIST research outcomes to society. To realize the activities, we provide financial support, both for participation to the ISO/IEC meetings and for R&D activities for developing the new national/ international standards. We also hold some symposiums to disseminate the importance of standardization and standards in research activities.

【 Director 】
Hiro Matsuda

【 Manager, Planning Office 】
Koichiro Hattori



Contribution to international standardization activities

Innovation School

Postdoctoral researchers revitalize Japan

URL: http://unit.aist.go.jp/inn-s/ci/index_e.html
E-mail: school-jimukyoku-ml@aist.go.jp
Tel: (029)849-1600 / Fax: (029)862-6130
(from outside Japan: TEL: +81-29-849-1600 / FAX: +81-29-862-6130)

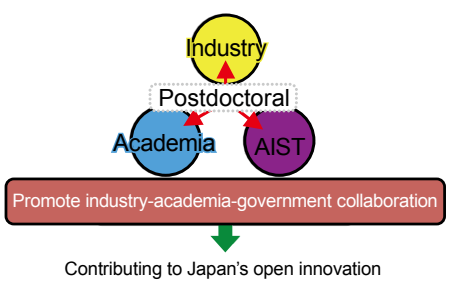
【 Outline 】

In FY2008, AIST opened the Innovation School and since then has been training postdoctoral researchers and PhD students for their carrier development and the promotion of industry-academia-government collaboration by giving them various lectures and On-the-Job Training in private companies and AIST.
After graduation from the School, over 200 trained researchers have been actively working in various sectors, such as private companies, universities and public institutions toward future innovations.

【 Director 】
Shingo Ichimura

【 Deputy Director 】
Masahiro Seto

【 Bureau Manager 】
Tetsuo Kotoku



Contributing to Japan's open innovation

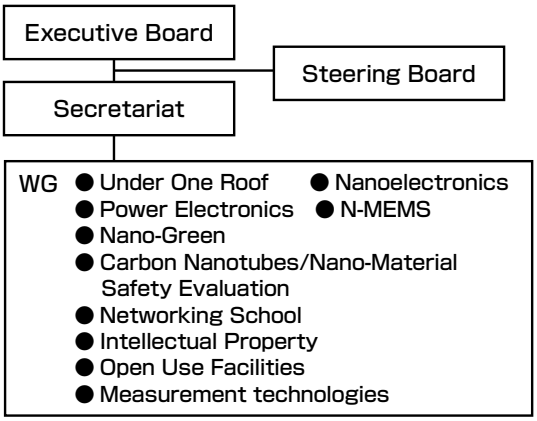
Tsukuba Innovation Arena for Nanotechnology (TIA-nano)

Creation of global nanotechnology research complex ～ Open Innovation Hub ～

TIA-nano is creating a global nanotechnology research and education complex under the leadership of the National Institute of Advanced Industrial Science and Technology (AIST), National Institute for Materials Science (NIMS), University of Tsukuba, and High Energy Accelerator Research Organization (KEK) with the support of Keidanren (Japan Business Federation) in Tsukuba city, where advanced facilities and human resources for nanotechnology are accumulated.

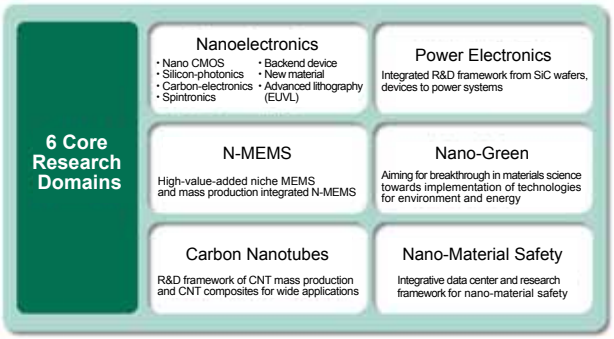
【 Organization of TIA-nano 】

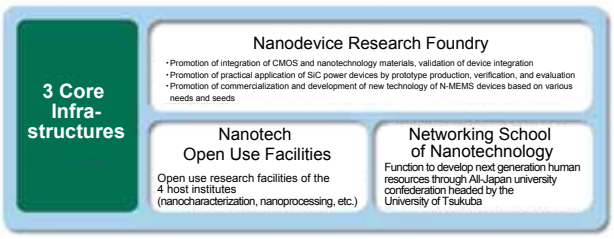
- The Executive Board, consisting of six members comprised of respective heads of the four core institutes, is responsible for making important management matters of TIA-nano. Other routine operational matters are handled by the Steering Board.
- The Secretariat is jointly-managed by the four core institutions.
- For the operation of each core research domain and core infrastructure, 10 working groups comprised of relevant parties from industry, academia and government have been established.



【Activities of TIA-nano - 6 core research domains and 3 core infrastructures - 】

- TIA-nano is strongly implementing national projects with industry, academia, and government collaboration. These projects are based on 6 core research domains utilizing the state-of-the-art facilities of TIA-nano.
- Core infrastructures of TIA-nano offer a group of advanced facilities, including super clean room (SCR) with prototype device foundry, nano-metrology and microfabrication facilities at AIST/ NIMS, and photon factory at KEK. Some of these facilities are operated as open use facilities.
- In cooperation with Tsukuba University and other associated universities, TIA-nano is implementing education and training of the next generation, utilizing the core infrastructures of TIA-nano.





Contact for TIA-nano

Official website http://tia-nano.jp/en E-mail tia-nano_info@tia-nano.jp

Tsukuba Innovation Arena Headquarters

Creating global nanotechnology complex for open innovation

From this fiscal year, Tsukuba Innovation Arena (TIA) headquarters has been established as a new headquarters office. The TIA headquarters is promoting and managing several TIA activities at AIST, to function as an advanced planning and managing office of TIA. Core infrastructures and state-of-the-art facilities of TIA, such as Super Clean Room (SCR), Silicon-Carbide (SiC) power device pilot line, and/or open use facilities, are strongly managed and operated by TIA headquarters.

Toshihiko Kanayama
Vice-President
Director-General of Tsukuba Innovation Arena headquarters

Hiroshi Iwata
Counselor
(general management)

Michiya Okada
Counselor

Tsukuba Innovation Arena Planning Office

TEL: 029-862-6584 FAX: 029-862-6048 E-mail: tia-kikaku-ml@aist.go.jp
(from outside Japan: TEL: +81-29-862-6584 / FAX: +81-29-862-6048)

Engages in planning of basic strategies on TIA promotion policies, planning of projects, gathering, analyzing, and survey of information. In charge of total management concerning TIA promotion.

【Director】
Yoichi Sakakibara

Tsukuba Innovation Arena Collaboration Promotion Office

TEL: 029-862-6123 FAX: 029-849-1020 E-mail: tia-renkei-ml@aist.go.jp
(from outside Japan: TEL: +81-29-862-6123 / FAX: +81-29-849-1020)

Engages in necessary coordinating activities for TIA promotion, such as collaboration with outer organizations and/or related departments.

【Manager】
Koichi Suzuki

Open Research Facility Coordination Office

TEL: 029-862-6592 FAX: 029-862-6048 E-mail: tia-kyoyo-ml@aist.go.jp
(from outside Japan: TEL: +81-29-862-6592/ FAX: +81-29-862-6048)

Engages in maintenance and operation of rules on usage of registered facilities, instruments and equipment (open research facilities, etc.). Performs requested analysis, requested prototype production and manufacturing, which uses open research facilities.

【Manager】
Junichi Murakami

Super Clean Room Management Office

TEL: 029-849-1530 FAX: 029-849-1533 E-mail: tia-scr-ml@aist.go.jp
(from outside Japan: TEL: +81-29-849-1530 / FAX: +81-29-849-1533)

Engages in support for R&D on design, test production, evaluation and demonstration of devices using the Super clean room (SCR). Also engages in maintenance and upgrading of technology infrastructure, technical guidance, dissemination of outcomes and operation of SCR.

【Director】
Yasuo Inoue

AIST Participating Technology Research Associations

Participation in technology research associations
— A new scheme for "promoting open innovation" —

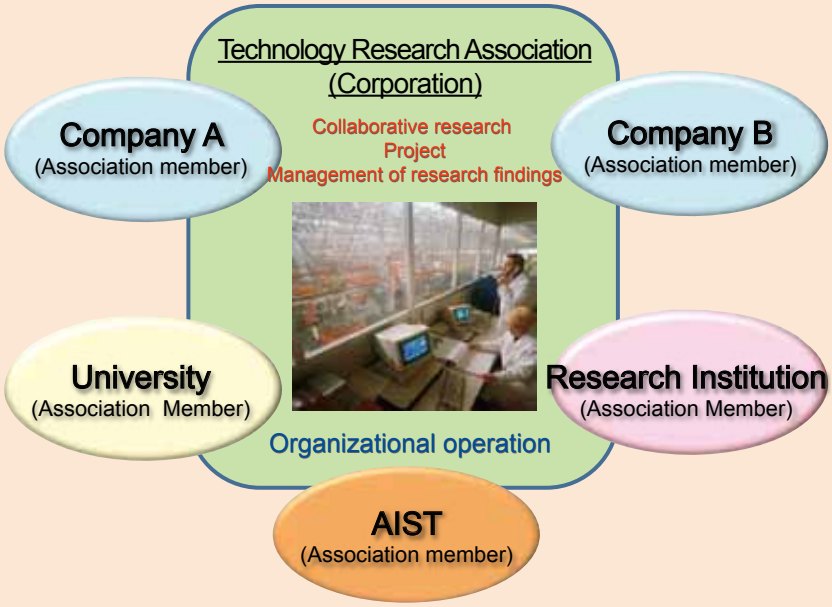
A new way for AIST to cooperate with industry and universities has arrived. It is the participation of AIST in technology research associations. Up until now, AIST had been contributing to the associations as an outside collaborator. However, legal changes in 2009 eliminated the restrictions for joining the associations. Now it is able to work within the associations in planning, implementation and utilization of achievements as a member.

Being a member of the associations, AIST takes advantage of its potential and aims to become a stronghold where researchers are able to effectively conduct research and development, and pursue productization and standardization activities. In order to do so, a collaboration arena where a variety of institutions, human resources and their knowledge interact with each other through technology research association projects are formed in which "human resources" and "research facilities" of AIST are utilized, and contribute to promote open innovation functions.

In the technology research associations, "human resources" of AIST are participating as important members such as researchers, project leaders, directors. Also, main research hubs are placed inside "research facilities" of AIST, and they offer an environment for researchers in industry and universities to intensively conduct research. In this way, AIST promotes its functions as an open innovation hub.

AIST works on research and development with the associations as a more strategic effort, which is not only for research and development and commercialization but also reflects the strategies of intellectual property and standardization for maintaining and enhancing the industrial competitiveness of Japan.

The followings are 19 associations in which AIST currently participates.



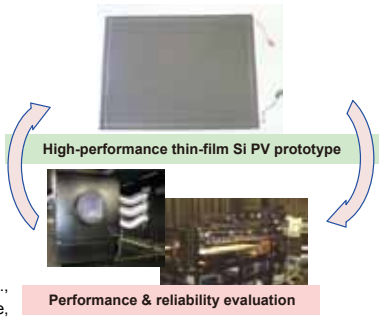
One of the organizational forms for actualizing open innovation

Photovolatic Power Generation Technology Research Association (PVTEC)

Research and development of high-performance PV cells and reliability evaluation

【 Establishment 】 December 1990
【 President 】 Yukinori KUWANO (Former Executive Director & President of SANYO Electric Co. Ltd)
【 Month of AIST's participation 】 December 2009
【 Members 】 58 companies, 4 organizations (as of Apr. 1, 2013)

Asahi Kasei Chemicals, Asahi Glass, Ulvac, Iwasaki Electric Co., Ltd., EKO Instruments, Espec, NPC, Onamba Co., Ltd., Okura Industrial, Kaneka, Kikusui Electronics, Kyocera, Kyodo Printing, Kuraray, Kobelco Research Institute, Komatsu NTC, SAES getters, Saga Prefecture, C.I. KASEI, SHARP, SHOEI CHEMICAL INC.,Shin-Etsu Chemical Co., Ltd., SHINNIHON KAGAKU MFG., LTD., JX Nippon Oil & Energy, Sumitomo Seika Chemicals CO.,LTD, Sekisui Chemical, Daikin Industries, Daisel, Daido Steel, Dai Nippon Printing, Tanaka Holdings, Choshu Industry, DIC, Teijin DuPont Films, Dexerials Corporation, DuPont, Japan Electrical Safety & Environment Technology Laboratories, Denki Kagaku Kogyo, Central Research Institute of Electric Power Industry, Tokyo Electron, TMEIC, Toyo Aluminum, Toyo Ink, TOYOBO, Toray Industries, Toray Engineering, Dow Corning Toray, Toppan Printing, Nitto Denko, Nippon Sheet Glass, Hitachi Chemical, Panasonic, Fuji Electric Holdings, Fujifilm, Mitsui Chemicals, Du Pont-Mitsui Polychemicals, Mitsubishi Heavy Industries, Ltd., Mitsubishi Rayon, UL Japan, LINTEC, Lasertec , AIST



【 Purpose 】
The research and development of PV technology by unifying R&D capabilities of the member companies / Promotion of corporation with universities and public research organizations.

【 Outline of R&D 】
R&D of advanced solar cell technology
R&D and survey of fundamental technologies for mass introduction into the market
Research of PV technology and industry trends and facilitation of information exchange

【 Project 】
・NEDO Projects "Research & development of next-generation high–performance PV generation system technologies" (thin-film silicon project)
・METI Project "Asia-Pacific Industrial Science & Technology and International Standardization Cooperation Program"

Contributions of AIST

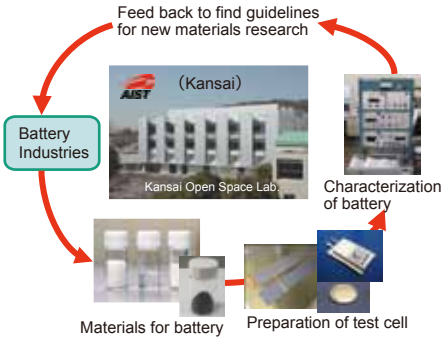
・Research Center for Photovoltaic Technologies makes contributions to the activity of Technology Research Association.
・Michio Kondo, Supervisory Innovation Coodinator, manages the METI Project as project leader.
・Improve visiting researchers' knowledge and technical skills in order to promote Japan's national PV development capability

Lithium Ion Battery Technology and Evaluation Center (LIBTEC)

Common technology platform for evaluation and analysis of new materials used in battery in AIST Kansai

【 Establishment 】 April 2010
【 President 】 Akira Yoshino (Fellow, Asahi Kasei Corporation)
【 Month of AIST's participation 】 April 2010
【 Members 】 17 companies, 1 organization (as of Apr. 1, 2013)

Asahi Kasei Corp., Ishihara Sangyo Kaisha, Ltd., Kaneka Corp., Kuraray Co., Ltd., JSR Corp., JNC Corp., Sumitomo Bakelite Co., Ltd., Daikin Industries, Ltd., Dai Nippon Printing Co., Ltd., Toray Industries Inc., Toppan Printing Co., Ltd., Nitto Denko Corp., Nippon Shokubai Co., Ltd., Zeon Corp., Fujifilm Corp., Mitsui Chemicals, Inc, Mitsubishi Chemical Corp., AIST



【 Purpose 】
Research on test protocols of materials for lithium ion battery and other storage battery in cooperation with members of the association
Improvement of members' skill, and promotion of putting new materials into practical use

【 Outline of R&D 】
Build a common technology platform to characterize novel materials used in batteries
Evaluate charge-discharge and other characteristics for new materials developed by members using test cells such as coin-type, or laminated-type cells
Propose "guidelines for new materials research" based on accumulated data so as to reduce of negotiation time between materials supplier and battery industries

【 Project 】
NEDO Project "Fundamental Study of Evaluation Method for Battery Material R&D"

Contributions of AIST

・Research Institute for Ubiquitous Energy Devices makes contributions to the activity of Technology Research Association.
・Establish Technology Research Association at Open Space Laboratory in AIST Kansai
・Build and support a network of member companies in which their technologies are integrated to develop for standardized evaluation methods

Fuel Cell Cutting-Edge Center Technology Research Association (FC-Cubic)

Improvements of polymer electrolyte fuel cell (PEFC) by advanced analysis technology

【 Establishment 】 April 2010
【 President 】 Takao Asami (Nissan Motor Co., Ltd., Senior Vice president)
【 Month of AIST's participation 】 April 2010
【 Members 】 5 companies, 6 universities,1 organization (as of Apr. 1, 2013)
Toyota Motor Corp., Nissan Motor Co., Ltd., Panasonic Corp., Toshiba Fuel Cell Power Systems Corp., JX Nippon Oil & Energy Corp., Sophia Univ., Japan Advanced Institute of Science and Technology, Ochanomizu Univ., Kyushu Univ., Hokkaido Univ., Tokyo Institute of Technology, AIST


Instruments for gas diffusion and permeation test


Instruments for imaging analysis of degraded electrolyte membranes

【 Purpose 】
Research on cutting-edge and fundamental technology about PEFC in cooperation with members of the association
Improvement of skills of members, and promotion of putting new technologies to practical uses

【 Outline of R&D 】
Establish "advanced technology for measurements and analyses" of materials for fuel cells, and contribute to cost reduction, higher performance and reliability for promotion of PEFC
Propose guidelines for designing new materials through analyses of structure, reaction, and mass transfer concerning "membrane and electrode assembly (MEA)", a key component of PEFC

【 Project 】
NEDO Project "Strategic Development of PEFC Technologies for Practical Application, Fundamental Technology Development, Structure, reaction, mass transfer analyses of MEA materials"

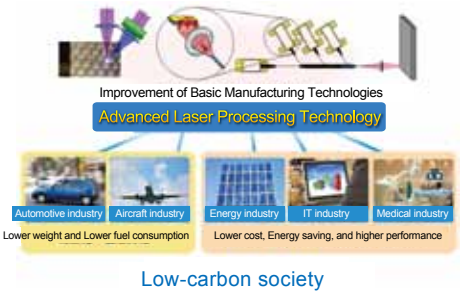
Contributions of AIST

- Research Institute for Ubiquitous Energy Devices makes contributions to the activity of Technology Research Association.
- Build Technology Research Association Center at AIST waterfront
- Offer the association our infrastructures such as research equipment
- Offer AIST's technology to the association for their research development

Advanced Laser and Process Technology Research Association (ALPROT)

Research and development of the high power and advanced laser beam machining technology

【 Establishment 】 May 2010
【 President 】 Sadao Nakai (Professor emeritus of Osaka Univ.)
【 Month of AIST's participation 】 May 2010
【 Members 】 8 companies, 3 organizations (as of Apr. 1, 2013)
Hamamatsu Photonics K.K., ULVAC, Inc., Shin Nippon Koki Co., KATAOKA CORP., FURUKAWA ELECTRIC CO., LTD., Mitsubishi Chemical Corp., Miyachi Corp., ASPECT inc., Manufacturing Science and Technology Center, Institute for Laser Technology (ILT), AIST



【 Purpose 】
The purpose of this project is to establish non-contact, high-quality and high-speed processing of advanced materials with high-power and high-quality laser, and to develop advanced laser beam machining technologies for manufacturing new products for the low-carbon society, with lower weight, higher strength, and higher performance.

【 Outline of R&D 】
Laser beam machining technologies developed by ALPROT will improve basic manufacturing technologies widely contributing to fields of automobile, aircraft, energy, networked home appliances, medical care and nursing, etc.

【 Project 】
NEDO Project ''Advanced Laser and Processing Technology for Next-generation Materials Project''

Contributions of AIST

- ISC, ESPRIT and AMRI* make contributions to the activity of Technology Research Association.
- Hiroyuki Niino, Principal Research Manager of ISC, takes initiatives of the project at Processing System Technology Development Center in Tsukuba Central as a project team leader.
- Promote Processing System Development by building platform which enables collaboration with user companies

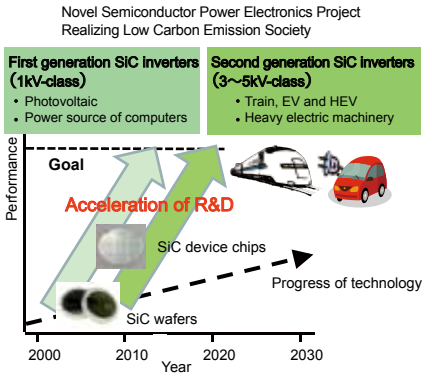
*ISC: Research Institute for Innovation in Sustainable Chemistry
ESPRIT: Electronics and Photonics Research Institute
AMRI: Advanced Manufacturing Research Institute

R&D Partnership for Future Power Electronics Technology (FUPET)

Research and development of power semiconductor devices for green innovation

【 Establishment 】 August 2009
【 President 】 Setsuhiro Shimomura (Chairman of the board of Mitsubishi Electric Corporation)
【 Month of AIST's participation 】 May 2010
【 Members 】 23 companies,1 university, 1 organization (as of Apr. 1, 2013)

Kwansei Gakuin Univ., Asahi Diamond Industrial Co., Ltd., Calsonic Kansei Corp., Sanken Electric Co., Ltd., Showa Denko K.K., Nippon Steel & Sumitomo Metal Corporation, Takatori Corp., DENSO CORP., TOKYO CATHODE LABORATORY CO., LTD., TOSHIBA CORP., Toray Research Center, Inc., TOYOTA MOTOR CORP., TOYOTA CENTRAL R&D LABS., INC., Toyota Tsusho Corp., NISSAN MOTOR CO., LTD., Panasonic Corp., Hitachi Chemical Co., Ltd., Hitachi, Ltd., Fuji Electric Co., Ltd., FUJIMI INCORPORATED, Honda R&D Co., Ltd., Mitsubishi Electric Corp., MEIDENSYA CORP., ROHM Co., Ltd., AIST



【 Purpose 】

R&D of technologies for next-generation power electronics by collaboration between members

【 Outline of R&D 】

Development of high-quality, low-cost and large-scaled SiC wafer fabrication technology
Development of SiC switching device fabrication technology
Development of high-temperature components and packaging technology

【 Project 】

NEDO projects Novel Semiconductor Power Electronics Project Realizing Low Carbon Emission Society, Development of Compornents and Packaging Technologies Operating in High Temperature Environment

Contributions of AIST

- Advanced Power Electronics Research Center makes contributions to the activity of Technology Research Association.
- Hajime Okumura,Director of Research Center, manages the NEDO Project as project leader
- Develop concentrated research lab at AIST's Power Electronics Research Center in order to promote the development of SiC power device manufacturing technology
- Instruct visiting researchers how to use technology and equipment

Technology Research Association for Single Wall Carbon Nanotubes (TASC)

Promote cabon nanotube and graphene application technology development

【 Establishment 】 May 2010
【 President 】 Naozumi Furukawa (President of ZEON Co.)
【 Month of AIST's participation 】 May 2010
【 Members 】 8 companies, 1 organization (as of Apr. 1, 2013)

Oike & Co., Ltd., KANEKA CORPORATION, Sumitomo Precision Products Co., Ltd, Dai Nippon Printing Co., Ltd., TEIJIN Ltd., TORAY Industries Inc., ZEON Co., NEC Co., AIST

【 Purpose 】

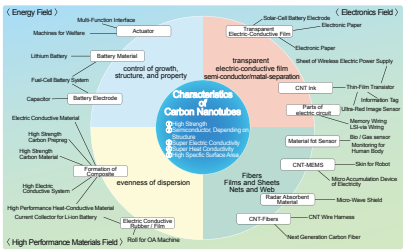
Performing experimental research cooperatively for practical use of new single-walled carbon nanotube integrated materials and graphene by the association members
Improving technological level of the association members
Starting enterprises to put CNTs and graphene into practical use

【 Outline of R&D 】

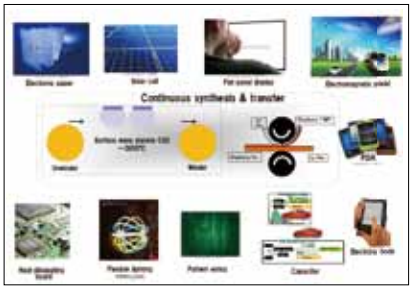
Development of control technology of form and property of CNT, separation technology of metallic and semiconducting CNTs, and evaluation technology of them
Development of homogeneous dispersion technology of CNTs
Development of simplified safety management technology for nanomaterials
Technology development of the transparent conductive films by quality improvement of graphene

【 Project 】

NEDO Project "Innovative carbon nanotubes and their application project for low carbon society"
NEDO Project "Innovative carbon nanotubes and their application project for low carbon society (Base research and development of graphene) / Research and development of high-performance flexible graphene components : Graphene transparent conductive films and heat dissipating multilayer graphene materials with high thermal conductivity"



Application image for CNT materials



Application image for graphene materials

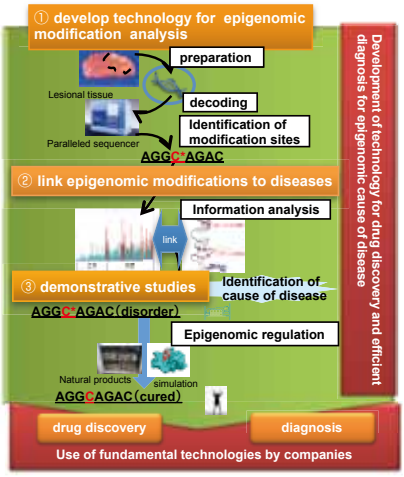
Contributions of AIST

- Nanotube Research Center makes contributions to the activity of Technology Research Association.
- Managed by Motoo Yumura, Deputy Director of the Research Center, as project leader for the CNT project and Masataka Hasegawa, a team leader of the center, as project leader for the graphene project
- Promote the project with our critical abilities in R&D
- Offer the association member our infrastructures such as research equipment
- Instruct visiting researchers how to use technology and equipment

Epigenomics Technology Research Association

Development of fundamental technology for drug discovery based on epigenomics research

【 Establishment 】 September 2010
【 President 】 Hisafumi Okabe (Forerunner Pharma Research Co., Ltd., Director)
【 Month of AIST's participation 】 September 2010
【 Members 】 4 companies, 3 organizations (as of Apr. 1, 2013)
Forerunner Pharma Research Co., Ltd., Kyowa Hakko Kirin Co., Ltd., Kowa Co., Ltd., Sysmex Co.; JBIC, JFCR, AIST



【 Purpose 】
Conduct experimental epigenomic research on drug discovery and diagnosis
Improve members' skill and practical application of the epigenomic technology in collaboration among members

【 Outline of R&D 】
Development of technology for epigenomic modification
Development of basic technology to link epigenomic modifications to diseases
Development of screening system for chemical compounds affecting epigenomic modifications

【 Project 】
NEDO Project "development of fundamental technology for drug discovery based on epigenomics research"

Contributions of AIST

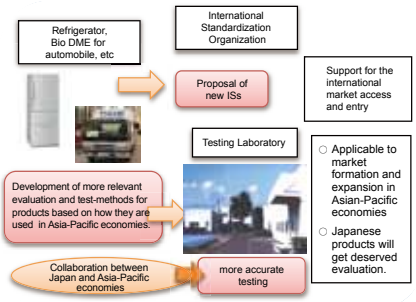
- CBRC, MOLPROF, and BIOMED* make contributions to the activity of Technology Research Association
- Develop and deploy bioinformatics tools and databases, and elucidate functions of non-coding RNAs in epigenomic regulation

* CBRC: Computational Biology Research Center
MOLPROF: Molecular Profiling Research Center for Drug Discovery
BIOMED: Biomedical Research Institute

International Standard Innovation Technology Research Association (IS-INOTEK)

Promotion of international standardization activities in close cooperation with Asian-Pacific economies

【 Establishment 】 January 2011
【 President 】 Shinya Tsuda (Executive Engineer, Panasonic Corporation)
【 Month of AIST's participation 】 January 2011
【 Members 】 18 companies, 1 University, 7 organizations (as of Apr. 1, 2013)
Panasonic Corp., Toshiba Corp., Hitachi Ltd, Mitsubishi Electric Corp., Sony Corp., Fujitsu Ltd., NEC Corp., Technofer Ltd., Isuzu Advanced Engineering Center Ltd., Nakashima Medical Co., Ltd., Intertek Japan k.k., Sharp Corp., Canon Inc., Bridgestone Corp., Tsukuba Wellness Research, Daikin Industries Ltd., Fujifilm Corp., AstreX LLC, Kyushu Institute of Technology, Japan Quality Assurance Organization, Japan Electrical Safety & Environment Technology Laboratories, DME Vehicle Promotion Committee, The Japan Electrical Manufacturers' Association, The Japan Refrigeration and Air Conditioning Industry Association, The Society of Japanese Aerospace Companies, AIST



【 Purpose 】
Take the initiative in R&D on international standardization and certification technologies originated in Japan, in cooperation with Asian-Pacific economies

【 Outline of R&D 】
Develop test-methods and certification systems for energy-efficiency of refrigerators. Implement R & D of standardization technologies on next-generation Bio DME* for vehicle through evaluations and round-robin tests (*DME: Dimethyl Ether)
Development of functional and safety evaluation standards of the personalized artificial joints.
Implement R&D on standardization and certification systems for Smart Technologies, Nanosatellite Environment, Air Conditioners etc. as new projects.

【 Project 】
METI Project "Asia-Pacific Industrial Science & Technology and International Standardization Cooperation Program"

Contributions of AIST

- Research Center for New Fuels and Vehicle Technology makes contributions to the activity of Technology Research Association.
- Implement R&D on evaluation for next-generation Bio DME fuel specifications for vehicle, and making a draft standard.
- Lead international standardization activities at the IS-INOTECH through AIST's Life innovation research, "the next generation artificial joints".

Stem Cell Evaluation Technology Research Association

Development of evaluation technologies for practical usage of human stem cells

【 Establishment 】 February 2011

【 President 】 Yukinobu Kohno (Executive Officer of Kawasaki Heavy Industries, Ltd.)

【 Month of AIST's participation 】 February 2011

【 Members 】 3 companies, 3 organizations (as of Apr. 1, 2013)
Kawasaki Heavy Industries, Ltd., National Center for Child Health and Development, Taiyo Nippon Sanso Corporation, Nikon Corporation, Japan Bioindustry Association, AIST

【 Purpose 】
Development of evaluation technologies for practical usage of human stem cells. Advancement of the technology level of members required for commercial use of the stem cells

【 Outline of R&D 】
1. Development of technologies for stable culture and storage of human stem cells
2. Development of technologies for quality control and supply of human stem cells

【 Project 】
NEDO projects "Development of fundamental technologies for industrial application of human stem cells / Investigation of manufacturing and quality control techniques for the international standardization of the stem"

Contributions of AIST

- Research Center for Stem Cell Engineering makes contributions to the activity of Technology Research Association
- The project is driven by various core technologies of AIST for culture, storage and differentiation, of human stem cells.

Photonics Electronics Technology Research Association (PETRA)

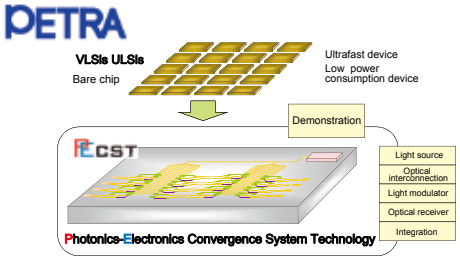
Development for new generation device and networking technology by utilizing photonics electronics convergence technology

【 Establishment 】 August 2009

【 President 】 Hideichi Kawasaki (President, Oki Electric Industry Co., Ltd.)

【 Month of AIST's participation 】 February 2011

【 Members 】 8 companies, 2 organizations (as of Apr. 1, 2013)
NTT Electronics Corp., Oki Electric Industry Co., Ltd., Toshiba Corporation, Hitachi, Ltd., NEC Corporation, Nippon Telegraph and Telephone Corporation, Optoelectronic Industry and Technology Development Association, FUJITSU LIMITED, Furukawa Electric Co., Ltd., AIST



First-program "Research on Photonics-Electronics Convergent System Technology"

【 Purpose 】
The purpose of this association is to perform project research and development for next generation optoelectronic devices and technologies targeting to realize highly efficient networks and information processing.

【 Outline of R&D 】
Basic technologies to realize highly efficient information processing and transmission are being developed with a concept of convergence of optics and electronics. These projects promote research and development of these innovative technologies for photonics-electronics convergence in order to realize an on "On-chip data Center" - a data center integrated on a chip.

【 Project 】
First-program "Research on Photonics-Electronics Convergent System Technology"
Future Pioneering Project "Photonics Electronics Convergence Technology for Power-Reducing Jisso System"

Contributions of AIST

- AIST makes contribution to develop basic technologies realizing inter-chip optical interconnections as the activity of FIRST program with PETRA.
- AIST makes contribution to the activity of Technology Research Association for developing jisso technologies of silicon photonics devices in the Future Pioneering Project.

Chemical Materials Evaluation and Research Base (CEREBA)

Contribution to rapid product development through R&D of common evaluation technology for chemical materials

【 Establishment 】 March 2011

【 President 】 Ryuichi Tomizawa (Senior Corporate Advisor, Mitsubishi Chemical Corporation)

【 Month of AIST's participation 】 March 2011

【 Members 】 11 companies,1 organization (as of Apr. 1, 2013)
Mitsubishi Chemical Corp., JSR Corp., Showa Denko K.K., Fujifilm Corp., Hitachi Chemical Co. Ltd., Sumitomo Chemical Co. Ltd., Zeon Corp., Konica Minolta, Inc., JNC Corp., Asahi Kasei Corp., Kaneka Corp., AIST

【 Purpose 】

Research on a common evaluation technologies for new chemical materials to realize rapid product development in cooperation with members of the association
Improvement of members' skill, and promotion of putting new materials into practical use

【 Outline of R&D 】

Build a common technology platform to characterize advanced materials supplied from the members
Develop technologies for evaluation, standardization, and fundamental analysis, especially for the materials used in organic electronics fields
Propose a new international code and standards such as IEC from Japan, based on the data obtained through development of evaluation technologies.

【 Project 】

NEDO Project "Development of Advanced Evaluation Methods for Next-Generation Organic Electronics Materials"

Contributions of AIST

- Research Institute for Innovation in Sustainable Chemistry, Flexible Electronics Research Center and Nanosystem Research Institute make contributions to the activity of Technology Research Association.
- Establish Technology Research Association at Tsukuba Central-5 in AIST Tsukuba
- Utilize our technologies for basic performance analysis
- Build and support a network of member companies to develop for standardized evaluation methods

Japan Advanced Printed Electronics Technology Research Association (JAPERA)

Development of manufacturing technologies and device technologies for printed flexible devices

【 Establishment 】 March 2011

【 President 】 Keiichi Utaka (Adviser, Subordinate Director, Manufacturing & Technology Division,TOPPAN PRINTING CO., LTD.)

【 Month of AIST's participation 】 March 2011

【 Members 】 27 companies, 1 organization (as of Apr. 1, 2013)
Asahi Kasei Corp., Bando Chemical Industries, Ltd., Dai Nippon Printing Co., Ltd., DIC Corporation, FUJIFILM Corporation, Fujikura Ltd., Harima Chemicals, Incorporated, Hitachi Chemical Co., Ltd., Idemitsu Kosan Co., Ltd., JNC CORPORATION, Komori Corporation, Konica Minolta, Inc., LINTEC Corporation, Mitsubishi Chemical Group Science and Technology Research Center, Inc., NEC Corporation, Nippon Kayaku Co., Ltd., Panasonic Corporation, Ricoh Company, Ltd., Soken Chemical & Engineering Co., Ltd., Sony Corporation, Sumitomo Chemical Company, Limited, TEIJIN LIMITED, Tokyo Electron Limited, TOPPAN PRINTING CO., LTD., TOSHIBA CORPORATION, TOYOBO CO., LTD., ULVAC, Inc., AIST

【 Purpose 】

JAPERA aims to achieve early commercialization of printed electronics by developing manufacturing technologies and device technologies for printed flexible devices.

【 Outline of R&D 】

1. Development of manufacturing technologies which can make large area electronic circuits with lower power consumption, lower cost, and higher productivity.
2. Development of technologies for flexible devices that are thin, lightweight, bendable, shock-resistant, and large area.
3. Establishment of methods to evaluate electrical and mechanical properties and reliability of printed devices with high reproducibility, in addition to gathering of data for standardization.

【 Project 】

NEDO Project "Development of Materials and Process Technology for Advanced Printed Electronics"

Contributions of AIST

- Flexible Electronics Research Center makes contributions to the activity of Technology Research Association.
- Development of manufacturing technologies, device technologies, and evaluation methods is carried out at AIST Tsukuba.

Technology Research Association for Next Generation Natural Products Chemistry

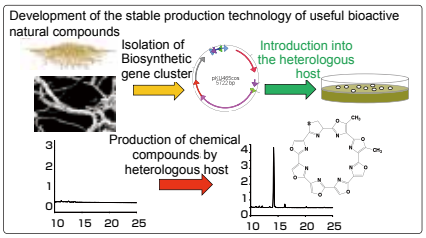
Promote the efficiency of drug discovery by using the large-scale natural product library

【 Establishment 】 April 2011

【 President 】 Makoto Takeuchi (Corporate Executive of Astellas Pharma Inc.)

【 Month of AIST's participation 】 April 2011

【 Members 】 9 companies, 2 organizations (as of Apr. 1, 2013)
Astellas Pharma Inc., Eisai Co., Ltd.,OP BIO Factory Co., Ltd., Kumiai Chemical Industry Co., Ltd., Godo Shusei Co., Ltd., Shionogi & Co., Ltd., Daiichi Sankyo RD Novare Co., Ltd., MicroBiopharm Japan Co., Ltd., Meiji Seika Pharma Co.Ltd., JBIC, AIST



【 Purpose 】
Conduct experimental research for practical use of the stable production technology of useful bioactive natural compounds
Improve member's skill and practical application of next generation natural products chemistry in collaboration among association members

【 Outline of R&D 】
1. Development of the stable production technology of useful bioactive natural compounds
2. Promotion of the use of the natural product library

【 Project 】
NEDO Project "Development of stable heterologous production method for industrially useful natural compounds"

Contributions of AIST

- Biomedical Research institute(BIOMED) and Computational Biology Research Center(CBRC) make contributions to the activity of Technology Research Association
- Kazuo Shinya, Cheif Senior Researcher of BIOMED, takes initiatives of NEDO project as a project leader.
- Promote the project by establishment of the large-scale natural product library

NMEMS Technology Research Organization Technology Research Association

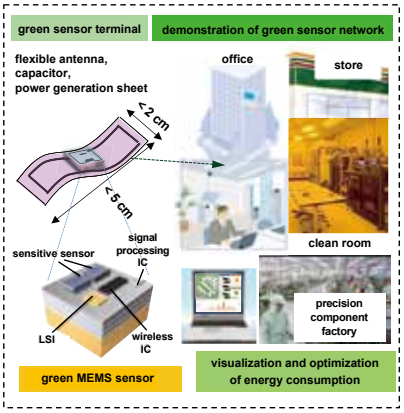
Development of green sensor terminal and green sensor network system

【 Establishment 】 July 2011

【 President 】 Koichi Imanaka (Director of MNOIC, MMC)

【 Month of AIST's participation 】 July 2011

【 Members 】 17 companies, 1 University, 2 organizations (as of Apr. 1, 2013)
ULVAC Inc., NTT DATA Co., OMRON Co., OLYMPUS Co., Suminoe Textile Co., Ltd., Seiko Instruments Inc., Seven-Eleven Japan Co., Ltd., Daikin Industries Ltd., Dai Nippon Printing Co., Ltd., Takasago Thermal Engineering Co., Ltd., DENSO Co., Tokyo Electric Power Co., Ltd., Toko Electronic. Co., Nisshinbo Holdings Inc., Hitachi Ltd., Yokogawa Electric Co., ROHM Co., Ltd., Tokyo Institute of Technology, MMC, AIST



【 Purpose 】
To contribute the realization of low-carbon society by developing green sensor terminal and green sensor network system.

【 Outline of R&D 】
1. Development of green MEMS sensor
2. Development of wireless and off-grid power green sensor terminal
3. Construction and development of green sensor network

【 Project 】
NEDO Project "Development of technology of green sensor network system"

Contributions of AIST

- Research Center for Ubiquitous MEMS and Micro Engineering makes contributions to the activity of Technology Research Association.
- Ryutaro Maeda, Director of Research Center, manages the NEDO project as project leader.
- Offer the association 8/12 inch MEMS lines

Control System Security Center (CSSC)

Defending critical infrastructure from cyber attacks and enhance the competitiveness of secured facilities

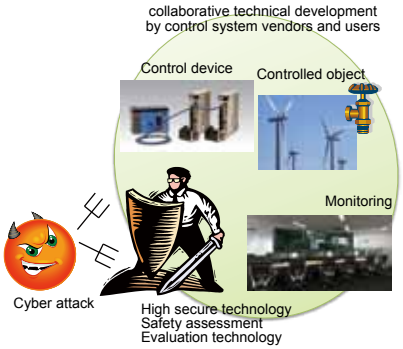
【 Establishment 】 March 2012

【 President 】 Seiichi Shin (Professor, University of Electro-Communications)

【 Month of AIST's participation 】 March 2012

【 Members 】 13 companies, 1 university, 2 organizations (as of Apr. 1, 2013)

Azbil Corporation, NRI Secure Technologies, Ltd., OMRON Corporation, Toshiba Corporation., Toyota InfoTechnology Center Co., Ltd., Trend Micro, Inc., Hitachi, Ltd., Fujidenki Co., Ltd., McAfee Co., Ltd., Mitsubishi Heavy Industries, Ltd., Mitsubishi Research Institute, Inc., Mori Building Co., Ltd., Yokogawa Electric Corporation, The University of Electro-Communications, IPA, AIST



【 Purpose 】

Develop the technology to establish a control system security against the threat of cyber attacks to the critical infrastructure including electricity, gas, water, etc.

【 Outline of R&D 】

Build control system test beds for the research and developments of the following technologies:
1.Secure design technology to prevent targeted malware codes from intruding control systems
2.Security verification and evaluation technology for control systems and their components
3.Analysis technology of intrusion incidents to control systems
4.International standardization for criteria of safety evaluation, and education of control system safety technologies

【 Project 】

Project for Safety Evaluation, Public Awareness Center Development,and Promotion of Information Technology for Critical Infrastructure for the Revival and Recovery of Tohoku
(FY2013 Special Account for Reconstruction from the Great East Japan Earthquake)

Contributions of AIST

- Research Institute for Secure Systems makes contributions to the activity of Technology Research Association.
- Settlement of CSSC's research office at the Tokyo Waterfront Center
- Leading the development of highly secure technology for control system

Fine Ceramics Research Association (FCRA)

Development of high-temperature components for SiC semiconductor power modules

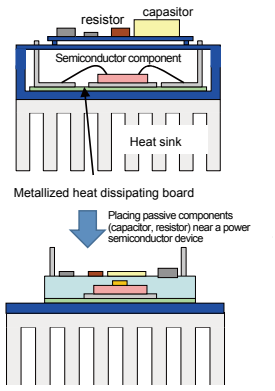
【 Establishment 】 September 1981

【 President 】 Nobuo Takahashi (Vice President, New Business Development Electronic Business Group, NGK Insulators, Ltd.)

【 Month of AIST's participation 】 April 2012

【 Members 】 8 companies, 3 organizations (as of Apr. 1, 2013)

NGK Insulators, Ltd., Murata Manufacturing Co., Ltd., KOA Corporation, Taiyo Yuden Co., Ltd., Denki Kagaku Kogyo Kabushiki Kaisha, NGK Spark Plug Co., Ltd., Japan Fine Ceramics Co., Ltd., Noritake Co., Limited., Japan Fine Ceramics Center, Japan Fine Ceramics Association, AIST



Miniaturization realized by development and implementation of high heat-resistant components

【 Purpose 】

SiC semiconductor power device has an advantage of being operational at higher temperature compared to the conventional device, and it is expected to be applied to a high-performance power converter. These researches are aiming at developing heat-resistant components placeable near the SiC power device which is operational at high temperature.

【 Outline of R&D 】

Development of the high-temperature components (capacitor, resistor, metallized heat dissipating board, circuit board) is carried out. R&D Partnership for Future Power Electronics Technology will be responsible for the basic technology for implementation in the NEDO project mentioned below.

【 Project 】

NEDO Project "Development of high-temperature components and packing technology for SiC power modules" in "Development of Next-generation Power Electronics Technogy (Green IT Project)"

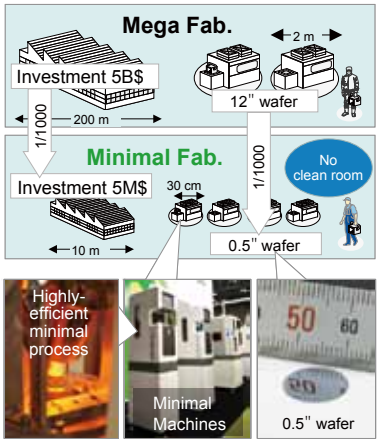
Contributions of AIST

- Participation of Advanced Manufacturing Research Institute.
- Contribution to the promotion of the project by Norimitsu Murayama, Deputy Director-General, as a technical promotion subleader.
- Contribution from the research aspect by establishing laboratories of concentrated systems at Chubu Center, and Tsukuba Central 5.

Minimal Fab Development Association

Development of a minimal manufacturing system on half-inch wafers for customizing semiconductor devices

【 Establishment 】 May 2012
【 President 】 Yasuyuki Harada (Chairman of Pre-Tech Co., Ltd.)
【 Month of AIST's participation 】 May 2012
【 Members 】 24 companies, 1 organization (as of Apr. 1, 2013)
Pre-Tech Co.,Ltd., Litho Tech Japan Corp., Sanmei Co., Inc., PMT Corp., Fujikoshi Machinery Corp., Fuji Imvac Inc., Sakaguchi E. H. VOC Corp., Aichisystem Corp., Tazmo Co., Ltd., Fujikin Inc., Horiba STEC Co., Ltd., Design Network Co., Ltd., Sanyo Co., Ltd., Taisei Corp., Logic Research Co., Ltd., Jedat Inc., Tool Corp., Yokogawa Solution Service Corp., Okamoto Glass Co., Ltd., Yonekura MFG Co., Ltd., Koyo Thermo Systems Co., Ltd., KURODA PRECISION INDESTRIES LTD., KATAGIRI ENGINEERING CO.,LTD., Seinan industries, Co.,Ltd., AIST



【 Purpose 】
To develop small machines and a process technology for manufacturing semiconductor devices on half-inch wafers without the requirement of a clean room. The developing system promotes the establishment of a device production line with 1/1000 investment of the existing mega-fab. The advantages of minimal fab are low investment cost, user-friendly, low power consumption, and minimum waste.

【 Outline of R&D 】
1.Development of minimal manufacturing equipment for semiconductor devices.
2.Development of the 0.5" silicon wafers and minimal valves.
3.Development of the process technology and fab system technology for high-mix low-volume production.

【 Project 】
METI project "Innovative fab system technology development by half-inch wafers and minimal equipment (minimal fab)"

Contributions of AIST

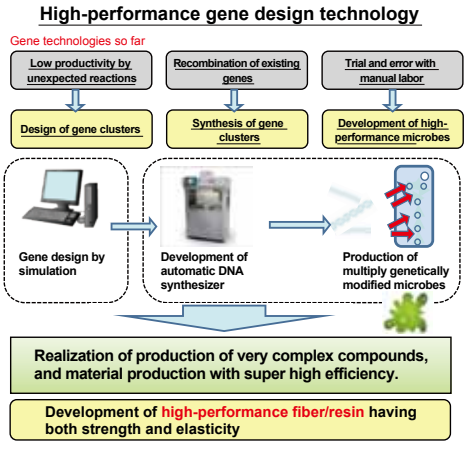
- NERI, NRI, RIIF, AMRI* make contributions to the activity of Technology Research Association.
- Shiro Hara, Director of Minimal System Group, manages the METI Project as project leader.
- Originating the concept of minimal fab system
- Developing wafer transfer system as a core technology of minimal fab system
- Developing the minimal process technology for semiconductor devices manufacturing
- Establishing the minimal fab as an innovation platform for variable researches and industry

* NERI: Nanoelectronics Research Institute
NRI: Nanosystem Research Institute
RIIF: Research Institute of Instrumentation Frontier
AMRI: Advanced Manufacturing Research Institute

Technology Research Association of Highly Efficient Gene Design

Production of high-performance microbe with super high productivity through gene design technology

【 Establishment 】 September 2012
【 President 】 Hiroyuki Kojima (Corporate Fellow of Ajinomoto Co., Inc.)
【 Month of AIST's participation 】 September 2012
【 Members 】 10 companies, 1 university, 3 organizations (as of Apr. 1, 2013)
Ajinomoto Co., Inc., Astellas Pharma Inc., in silico biology, Inc., Kaneka Corporation, Kumiai Chemical Industry Co., Ltd., KNC Laboratories Co., Ltd., Kojima Press Industry Co., Ltd., Spiber Inc., Precision System Science Co., Ltd., Mitsubishi Chemical Corporation, Kobe University, Technology Research Association for Next-Generation Natural Product Chemistry, Japan Bioindustry Association, AIST



【 Purpose 】
Advancement of the technology level of members required for "Development of artificial gene synthesis technology for creating innovative biomaterial".

【 Outline of R&D 】
We will design gene clusters for material production including a control system of gene expression, then will synthesize long chain DNA according to the design. We aim at the development of effective production technology for innovative biomaterials, such as high-performance fiber/resin which has both strength and elasticity, an anticancer agent with few side effects, a non-natural amino acid, and a pesticide without antibacterial activity, through producing a high-performance genetically-modified microbe with high productivity.

【 Project 】
METI project "Development of artificial gene synthesis technology for creating innovative biomaterial".

Contributions of AIST

- AIST is mainly in charge of gene design technology development in cooperation with Kobe Univ. and Keio Univ.
- AIST contributes to development of multi-functional database for gene design, and plant derived material production with Actinomyces.

Technology Research Association of Magnetic Materials for High-Efficiency Motors (MagHEM)

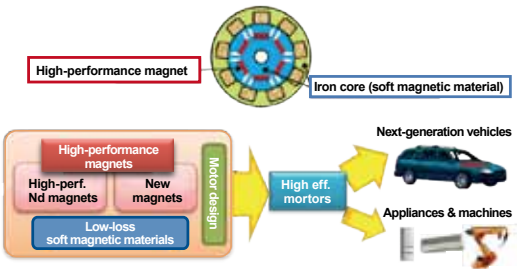
Developing high-performance magnetic materials to realize high-efficiency motors

【 Establishment 】 September 2012

【 President 】 Michihisa Kyoto, Ph.D. (CEO, T&T Innovations Inc.)

【 Month of AIST's participation 】 September 2012

【 Members 】 9 Companies and 2 Organizations (as of Apr. 1, 2013)
T&T Innovations Inc., Aichi Steel Corp., Intermetallics Co. Ltd., NEC Tokin Corp., JFE Steel Corp., Daikin Industries Ltd., Denso Corp., Toyota Motor Corp., Mitsubishi Electric Corp., Japan Research and Development Center for Metals, AIST



strudture of high-efficiency motors (example)

【 Purpose 】

Collaborative R&D on magnetic materials for high-efficiency motors and motor design using these materials, and other projects to improve technical potential of members and to promote commercialization

【 Outline of R&D 】

1. Development of high-performance neodymium magnets without dysprosium
2. Development of new magnets without rare earth elements
3. Development of low loss soft magnetic materials
4. Development of high efficiency motors
5. Common fundamental survey and research

【 Project 】

Ministry of Economy, Trade and Industry "Technology for the future: Development of magnetic material technology for high-efficiency motors"

Contributions of AIST

- Project management by an AIST staff as the project leader
- Application of high density sintering technology developed by AIST for sintering new magnetic and soft magnetic materials
- Developing common fundamental research together with analysis and evaluation in Magnetic Materials R&D Center in AIST Chubu

About AIST's Website and Research Results

Website

The results of research carried out by AIST and information on AIST's activities can be found on our website. This includes the entire contents of the AIST TODAY public relations magazine, which are provided in HTML and PDF format on the same day that the magazine is issued. An e-mail magazine is also published to deliver the contents of the website as soon as possible. You can subscribe to the magazine from our website.
(http://www.aist.go.jp/index_en.html)

Research results

In order to develop a knowledge base and contribute to the creation of new industries, we have developed a database of research information and results from many research and development projects and have made it available on the website and other media in an organized, easy-to-use form.
(http://www.aist.go.jp/aist_j/aist_repository/index.html)

- **Research Information Database (RIO-DB)**
  This is a multimedia-based research information disclosure system to disseminate research results from numerous research and development projects and promote reform of the economic structure by creating new industries.

- **Research Results Presentation Database (RRPDB)**
  This database contains research papers published in academic journals and oral presentations given at international conferences since April 2001, geoscientific information such as geological maps, metrology technology information, and knowledge-based results obtained in the process of research.

- **Databases of AIST**
  This portal lists open research information databases other than RIO-DB.

- **Research Staff Database (RSDB)**
  This is a system to search for AIST researchers, designed to reply to questions such as "Is there anyone doing such-and-such research?" "If so, who?"

- **Information on Development of Technology in AIST (IDEA)**
  The purpose of IDEA is to widely disclose AIST's patents and other intellectual properties to make research and development results available to industry.

Exhibition Facilities

Science Square Tsukuba (Tsukuba City, Ibaraki)

This museum introduces the latest fruits of research at AIST and its contributions to society. Visit the exhibition and hands-on experience sections, which are based on the concept “Full of Future Technologies!”, to understand more about AIST’s research activities and industrial technologies.

- Closed: Mondays (or the next business day when a national holiday falls on a monday) and Dec.28 - Jan.4
- Open: 9:30 am to 5:00 pm
- For inquiries, contact the Science Communication Office, Public Relations Department.
  Tel: (029) 862-6215 / Fax: (029) 862-6212
  (from outside Japan: Tel: +81-29-862-6215 / Fax: +81-29-862-6212)
  http://www.aist.go.jp/aist_e/sst/

Geological Museum (Tsukuba City, Ibaraki)

This is one of the most distinctive museums in the world, specializing in geology. Here you will find easy-to-understand explanations on themes such as geology in general and the Earth, its history, the mechanisms of its changes, the relationship between humankind and the Earth, etc. in addition to geological samples.

- Closed: Mondays (or the next business day when a national holiday falls on a monday) and Dec. 28 - Jan. 4
- Open: 9:30 am to 4:30 pm
- For inquiries, contact the Geological Museum.
  Tel: (029) 861-3750 / Fax: (029) 861-3746
  (from outside Japan: Tel: +81-29-861-3750 / Fax: +81-29-861-3746)
  http://www.gsj.jp/Muse/eng/

Training Center

Metrology Training Center (Tsukuba City, Ibaraki)

The Metrology Training Center, established by the Measurement Act, is the only training center in Japan that teaches knowledge and skills in the field of metrology. The Center provides training to metrology personnel of local governments engaged in metrology activities and measurement engineers (general measurement engineers, environmental measurement engineers) in the private sector, and organizes courses for uncertainty analysis in order to construct traceability systems. It also provides training to metrology personnel from developing countries.

- AIST Tsukuba Central 1 (Sakura-kan Building), 1-1-1 Higashi, Tsukuba, Ibaraki 305 - 8561
- Tel: (029) 861-2422 / Fax: (029) 861-2423
  (from outside Japan: Tel: +81-29-861-2422 / Fax: +81-29-861-2423)
- E-mail: mettrain-ml@aist.go.jp
  https://www.nmij.jp/english/info/center/#m5

Contact Information for General Inquiries at Each Research Base

Each AIST research facility has an administrative office that serves as a point of contact for general inquiries. If you have any questions or inquiries concerning a research facility, please contact its administrative office.

AIST Tokyo Headquarters
General Affairs Office 1-3-1 Kasumigaseki, Chiyoda-ku, Tokyo 100-8921, Japan
Tel: (03) 5501-0900 (from outside Japan: +81-3-5501-0900)

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General Administration 2-17-2-1 Tsukisamu-Higashi, Toyohira-ku, Sapporo, Hokkaido 062-8517, Japan Tel: (011) 857-8400 (from outside Japan: +81-11-857-8400)

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AIST Tsukuba ※Guide Map is shown on the following page.
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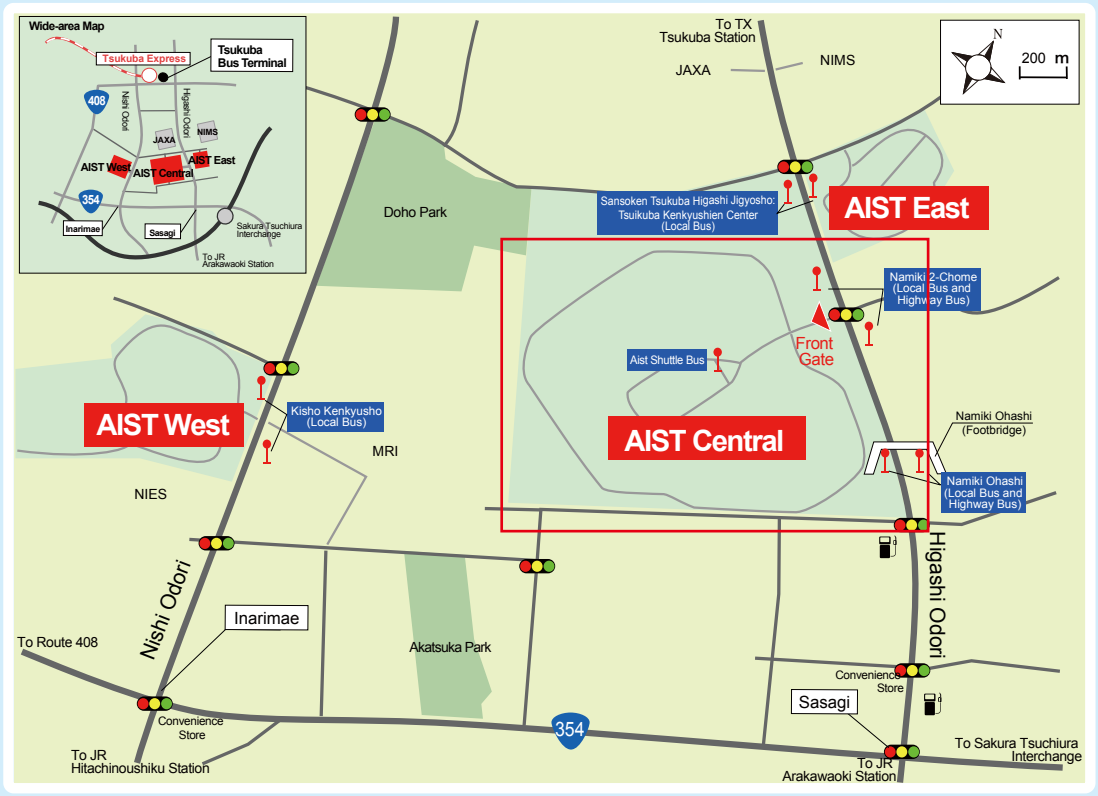
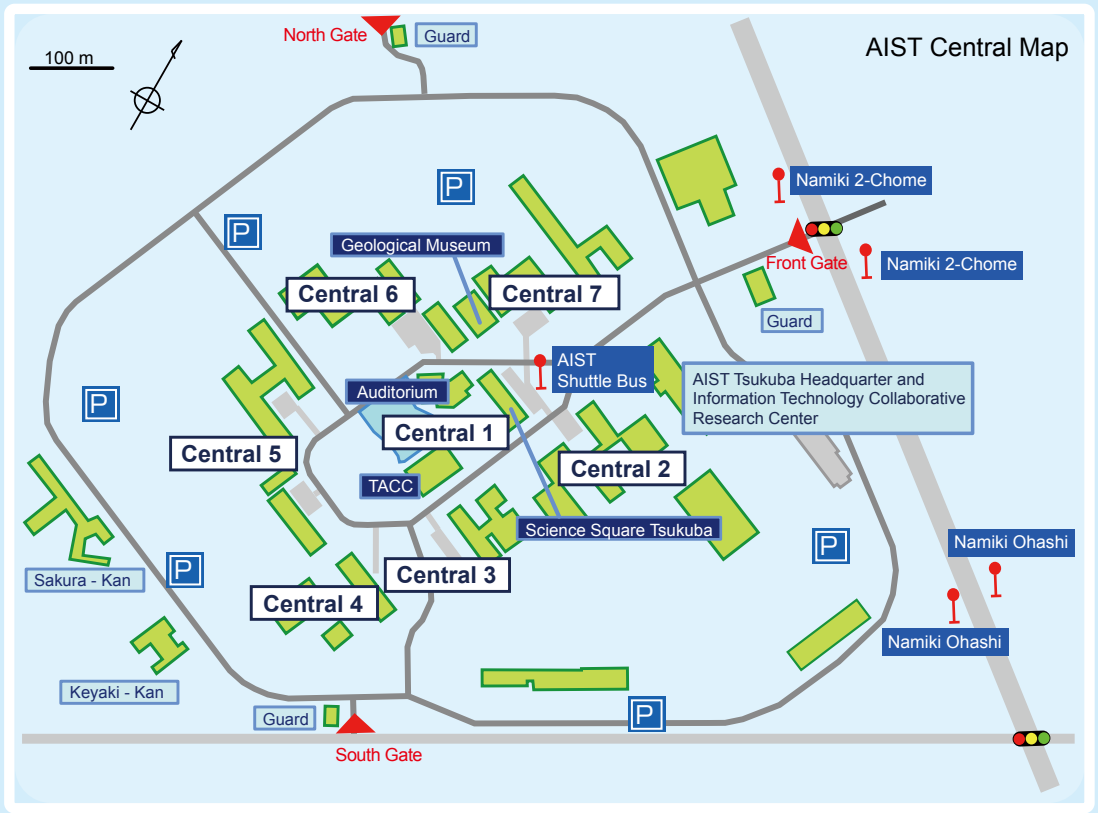
※ Reception hours: 8:30 am to 5:30 pm, Monday through Friday (closed Saturdays, Sundays and national holidays)

AIST Tsukuba Guide Map





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