# Outline of AIST

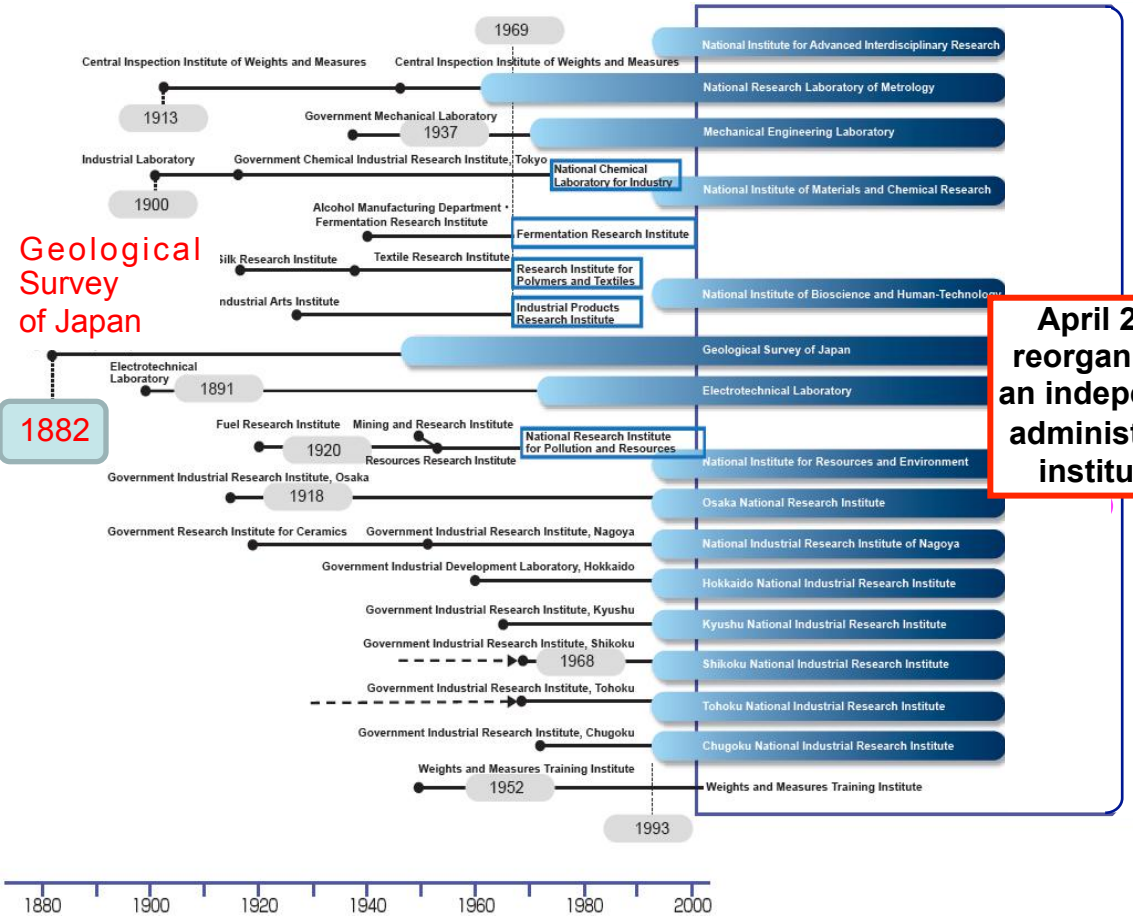
# --Integration for innovation--

**Dr. Satoshi Hamakawa**

**Director, Planning Division,**
**Research & Innovation Promotion Headquarters,**
**AIST**

National Institute of
Advanced Industrial Science
and Technology
AIST

# Brief history of AIST




**April 2001 reorganized as an independent administrative institution**

National Institute of Advanced Industrial Science and Technology
AIST

**Research fields**

- Environment & Energy
- Life Science & Biotechnology
- Information Technology & Electronics
- Nanotechnology, Materials & Manufacturing
- Metrology & Measurement Science
- Geological Survey & Applied Geoscience

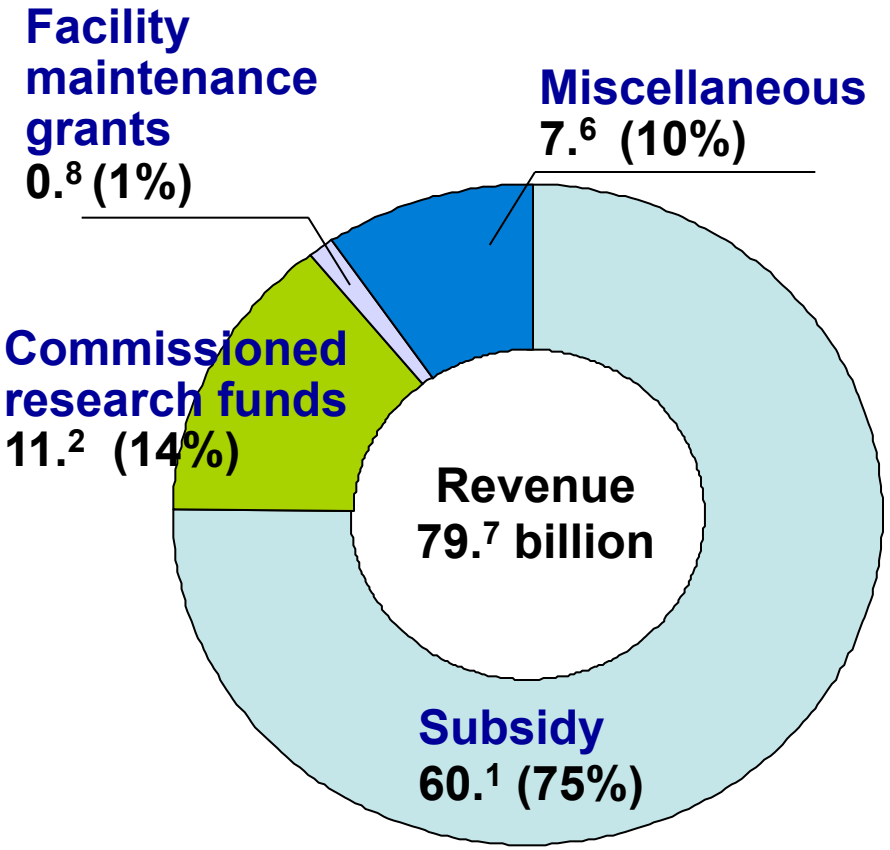
AIST was established as an research institute after an integration of 16 research institutes etc. under the former Ministry of International Trade and Industry. AIST has six research fields in the institute to promote collaboration within a discipline and between disciplines.

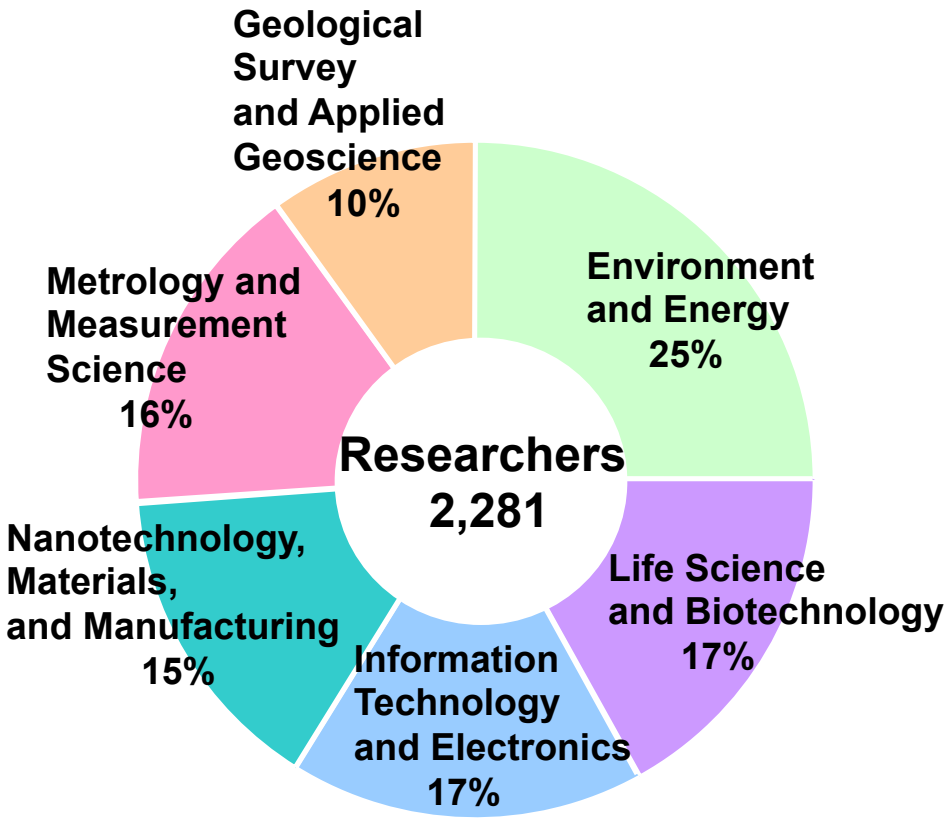
# Organization Data

Established:2001 (1882)

President, Head of the Organization: Dr. Ryoji Chubachi

Number of Research Institutes/Centers: 41 (21Institutes, 20 Centers)




Initial Budget for FY 2012

# AIST Mission

To contribute to the realization of problem-solving country advocated by the Japanese government, AIST undertakes R&D focusing on major goals: solution for the 21st century issues and reinforcing functions of an open innovation hub.

## Solution for the 21st century issues

○**Promotion of Green Technology**

Renewable energy, Energy saving, Safety assessment, etc.

○**Promotion of Life Technology**

Contribution to drug discovery and medical care, safety in life, etc.

○**Industrial infrastructure supporting safety and security**

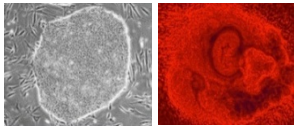
Measurement standards, Measurement technologies, Geological information, etc.

**Promotion of "Green Technology"**

ex. Solar cell research center

**Promotion of "Life Technology"**

ex. Robotics for better QOL



ex. Human iPS cells

ex. differentiated tissue

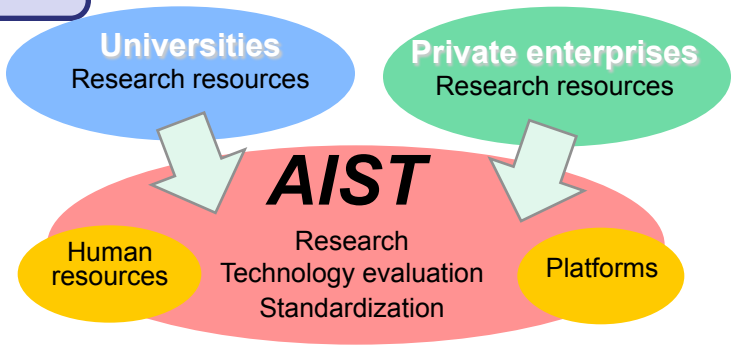
## Reinforcing functions of an open innovation hub

○**Developing new innovation system**

Promoting research / technology evaluation / standardization by furthering industry-academia-government partnerships and by utilizing its "human resources" and "platforms".

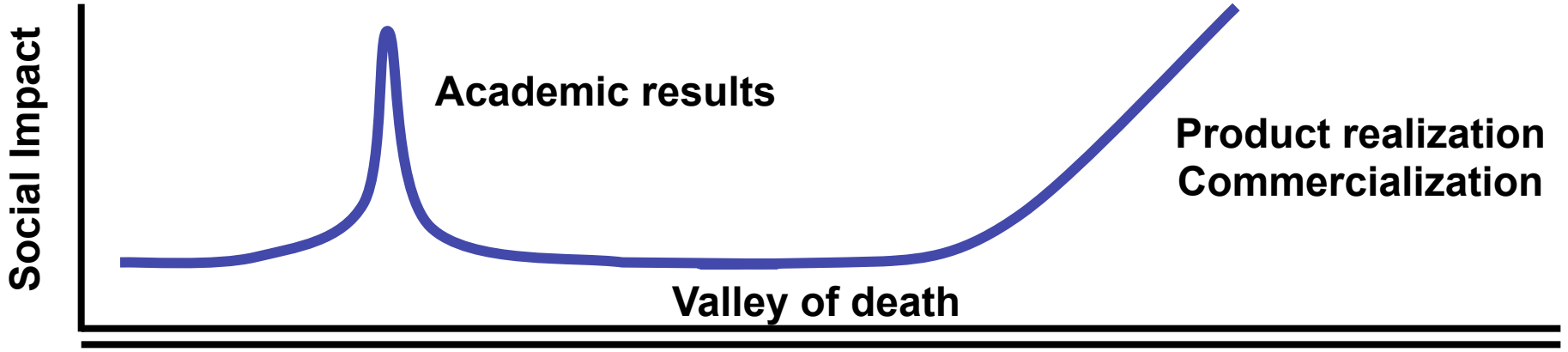
○**Establishing open innovation centers**

Tsukuba Innovation Arena (TIA nano)



# Research and Development

## AIST contributes to product realization by open innovation




**Universities** | **Private enterprises**

**"Full Research" of AIST**

**Basic exploratory research**

**Conducting R&D to support and promote product realization and commercialization by private enterprises**

- Technologies for mass production, systemerization
- Technologies to evaluate durability, reliability and safety
- Standardization

**Product Realization**
**International standardization**

**AIST has been conducting "Full Research" with the human resources and technological platform, where the research resources of universities and private enterprises are combined, innovation hub.**

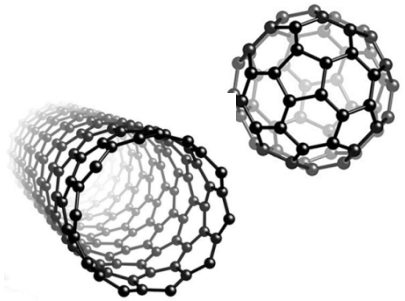
# Mass-production technology of carbon nanotube

Universities

## Basic exploratory research

○ Discovery of novel nano carbon materials

- Discovery of fullerene by Kroto, Smalley, Curl et. al. [1985]
- Discovery of carbon nanotube by Sumio Iijima [1991] the director of Nanotube Research Center (then at NEC Inc.)

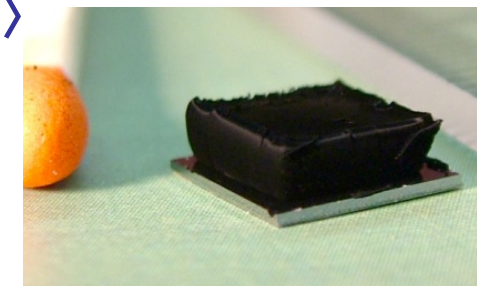


AIST

## 〈〈Research on mass-production technology〉〉

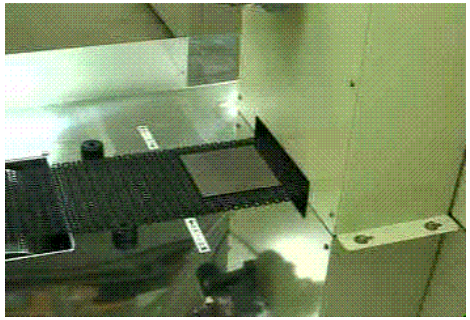
○ Discovery of Super-Growth method

- Growth-rate increases by 1000-fold, opening the possibility of mass production for industry
- Impurity is reduced to 1/2000.



○ Continuous production equipment of carbon nanotube

- Production capacity increases from 25g/day to 600g/day.
- Accelerate application development by providing the kg order CNT samples

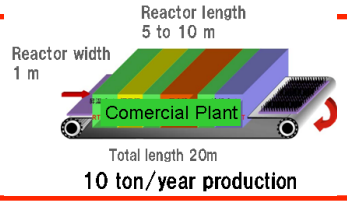


"Full Research"

Private enterprises

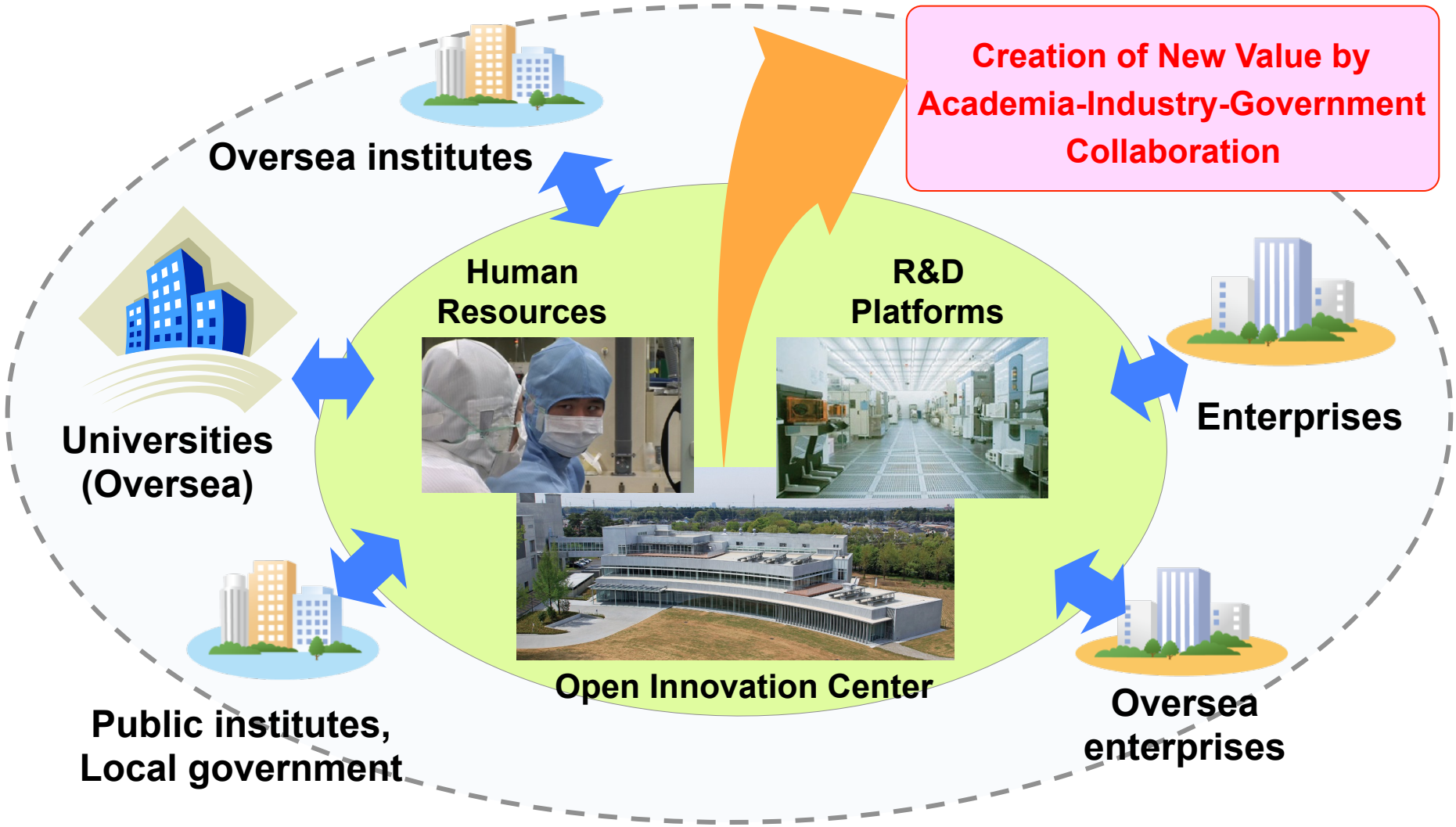
10 ton/year production, exceeding present-day total production of the whole world

Introduction of commercial plant



# Open Innovation Model of AIST

## New Innovation System with Human Resources and R&D Platforms



# Enhancement of Open Innovation Hub

## 4 Major Activities to Function as an Open Innovation Hub

Creating R&D Cluster → With Industry Cooperation and Global Network

### Collaboration with Industry

- **Collaboration with industry through "Full Research".**
- **Conducting R&D to support and promote product realization.**

### Fukushima Renewable Energy Research institute

- **Promote collaborative R&D for renewable energy.**
- **New research center will open in 2014FY.**

### Global Nanotechnology Center (TIA-nano)

- **Implementing collaborative research with advanced facilities.**
- **Global researchers gathers "Under One Roof"**

### International Network

- **Promote mutual joint research and global standardization with global partners.**
- **Creating global network toward the future.**

# Fukushima Renewable Energy Research Institute

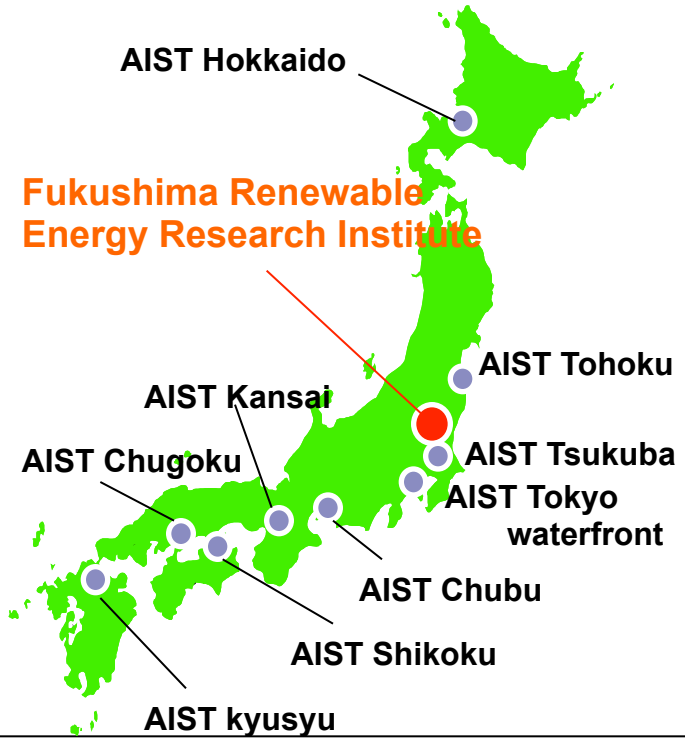
Photovoltaic modules with thin crystal silicon wafer

Geothermal utilization

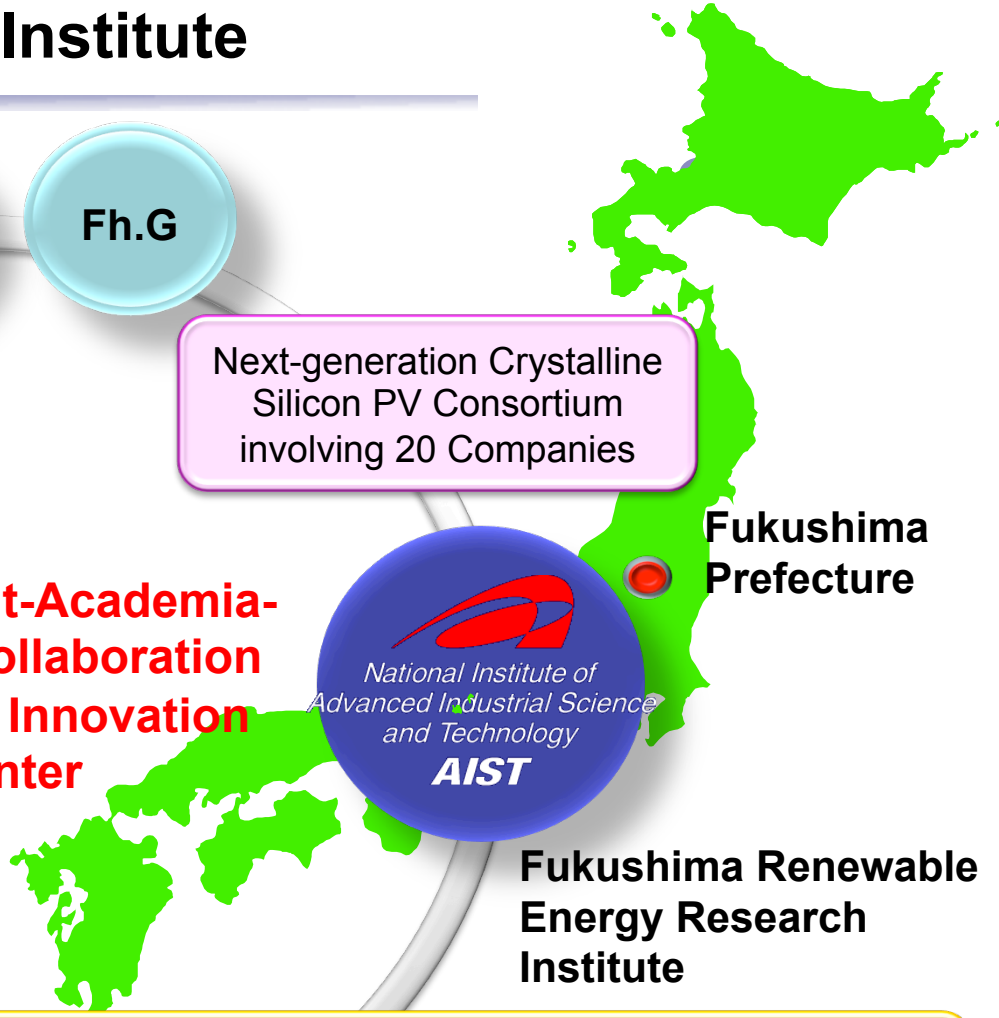
Demonstration experiments of wind power generation

Integrated energy management systems

Production and utilization of hydrogen career



# Collaboration of Fukushima Institute



Europe

SINTEF

Fh.G

Reconstruction Agency “Program on Evaluating Technologies Invented by Industry in Tohoku Area”

Next-generation Crystalline Silicon PV Consortium involving 20 Companies

Fukushima Prefecture

USA

NREL

**Government-Academia-Industry Collaboration with Open Innovation Center**

National Institute of Advanced Industrial Science and Technology AIST

JST, MEXT Future PV Innovation “Si Nano-Wire Solar Cells”

Fukushima Renewable Energy Research Institute

ASIA

Thailand

Indonesia

Singapore

MEXT (Ministry of Education, Culture, Sports, Science and Technology Japan) “Regional Innovation Strategy Support Program Participation of Universities in Fukushima”

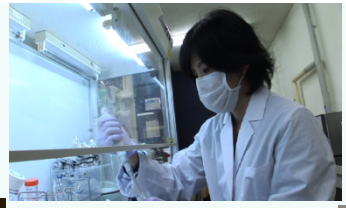
# Global Nanotechnology Center -TIA-nano

## Mission of TIA-nano

- Nanotechnology research center to crate new industries
- Installation of advanced facilities and equipments for open users
- Cultivation of next-generation leaders in nanotechnology fields

**—Various collaborations are formulated "Under One Roof"—**

Collaborative Research

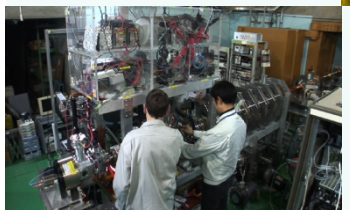


Education & Training

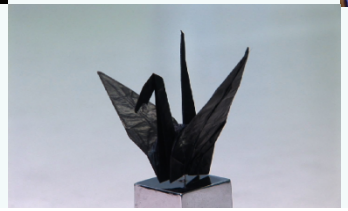
State-of-the-art Facilities

TIA nano Tsukuba Innovation Arena

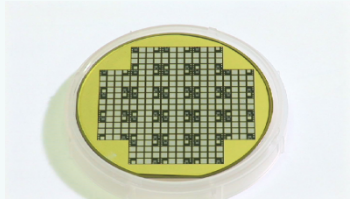
Event & Seminar



Win-Win Network



Cutting-Edge Technology

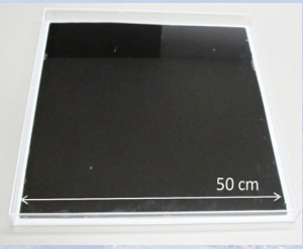


# Open Innovation of TIA-nano

## TIA-nano is enhancing open innovation with various projects and R&D partnerships

**Founded**: 2009
**Leading Members**: AIST,NIMS, KEK, University of Tsukuba
**Projects**: 26
**Industrial Partners**: 128

SiC single crystal




Carbon nanotube

300mm wafer of graphene

National Institute of Advanced Industrial Science and Technology
AIST

筑波大学
University of Tsukuba

NIMS

# AIST Global Strategy

- Promotion of complementary and mutually beneficial joint research
- Promotion of international standardization
- Support of R&D activities in enterprises and their globalization


R&D which leverage overseas research potential

Support R&D activities of enterprises which leverage the AIST network

Contribution to diplomatic mission

International collaboration toward international standardization

# Examples of International Collaborative Research

Joint laboratory
**CNRS (France)**
Robotics

**Fraunhofer (German)**
Macromolecule actuator

Joint laboratory
**SJTU (China)**
Liver cancer marker

**NREL etc. (US)**
Renewable Energy

AIST

Joint laboratory
**DBT (India)**
Searching for
anti-cancer chemicals,

**VAST (Vietnam)**
Water purification

**BPPT, LIPI, GAI (Indonesia)**
Improvement in natural rubber production, Metrology, Renewable Energy

**NSTDA, TISTR, NIMT (Thailand)**
Bio-diesel Fuel, Metrology

# Creating Sustainable Society by Green and Life technology with Full Research

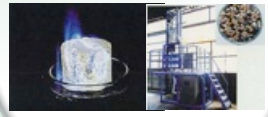
## Creating Sustainable Society

**Green Technology**

**Energy Generating, Accumulating, Saving**

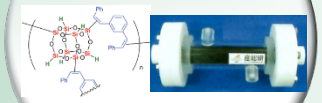
Renewable Energy
Power electronics

**New Resources**



Methane Hydrate
Metal Recycling

**Reducing Environmental Risk**



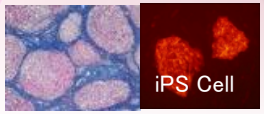
Green Chemical Process

**Life Technology**

**Health & Safety**

Kids Design
Healthcare Robot

**Medical Treatment**




Cancer Diagnosis
Regenerative Medicine

**Drug Discovery**

Genomic Pharmaceuticals
Medical Robot

**Fukushima Renewable Energy Research Institute**

**Tsukuba Innovation Arena (TIA-nano)**

**Bio-IT Research Center (Tokyo Waterfront)**

## AIST Core Technologies

| | | | | |
|---|---|---|---|---|
| Nanotechnology & Material | Energy | Manufacture | Environment | Life Science |
| Safety | Geoscience | Metrology | Measurement | Information | Data base |

National Institute of Advanced Industrial Science and Technology

AIST

# -Integration for Innovation-

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