

Achievements of the Strategic International Research Cooperative Program (SICP)

July 2012

Department of
International Affairs



Recent Outstanding SICP Achievements - 1

Green Innovation: Japan-China Research Exchange

Discovery of the High Photocatalytic Activity of Silver Phosphate

— A step towards realizing artificial photosynthesis —

Project Title: Research and Development of Highly Efficient Photocatalytic Materials for Environmental Purification and Hydrogen Production Using Solar Light (FY2007-2010)

Achieved through a combination of material structure analysis techniques from Japan and synthetic materials and evaluation techniques from China



Ye Jinhua

Unit Director, Environmental Remediation Materials unit, National Institute for Materials Science



Zou Zhigang

Director, Ecomaterials and Renewable Energy Research Centre, Nanjing University

Nanotechnology and Materials: Japan-Finland Research Exchange

Clarification at the Atomic Level of the Difference in Recording Mechanism of Typical Optical Disc Materials

— Providing the fundamental knowledge to accelerate the development of next-generation materials —

Project Title: Structural Analysis and Design of New Rapid Phase-Change Materials for Digital Versatile Disk (DVD) Media by a Combination of Density Functional Simulations and Synchrotron X-Ray Radiation Measurements (FY2009-2011)

Achieved through a combination of experimental techniques from Japan and theoretical analysis techniques from Finland



Shinji Kohara

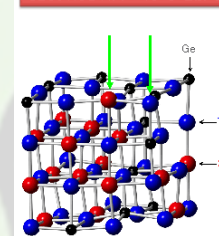
Senior Chief Engineer, Research and Utilization Division, Japan Synchrotron Radiation Research Institute



Jaakko Akola

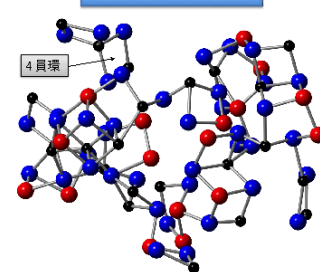
Academy Research Fellow, Tampere University of Technology

記録消去後の原子配列



(A) $\text{Ge}_2\text{Sb}_2\text{Te}_5$ の結晶構造

記録相の原子配列



(B) $\text{Ge}_2\text{Sb}_2\text{Te}_5$ のアモルファス構造

黒: Ge (ゲルマニウム)、赤: Sb (アンチモン)、青: Te (テルル)

Recent Outstanding SICP Achievements - 2

Nanotechnology and Materials: Japan-United Kingdom Research Exchange

Successful Generation and Detection of Quantum Entanglement in a Silicon Semiconductor, Essential for Quantum Computing

— A major breakthrough toward the realization of quantum computers —

Project Title: Quantum Spintronics using Donors in Isotopically Engineered Silicon (FY2009-2012)

Achieved through a combination of material science related to making high-quality, high-purity single crystals from Japan, and pulse magnetic resonance and theoretical analysis techniques from the UK

 Kohei Itoh

Professor, Applied Physics Department,
Keio University

 John J. L. Morton

Associate Professor, Materials Department,
Oxford University

Nanotechnology and Materials: Japan-Germany Research Exchange

Development of New Synaptic Device that Remembers and Forgets like a Human

— Results related to the development of more human-like computers that interact with their environment —

Project Title: Faradaic Currents and Ion Transfer Numbers in Electrochemical Atomic Switches (FY2008-2011)

Achieved through a combination of sulphide thin film creation technology, elemental structure creation technology, and switching mechanism analysis methods from Japan, and amorphous thin film and electrode structure creation technology, and electrochemical measurement and modeling techniques that apply the laws of molecular dynamics, from Germany

 Tsuyoshi Hasegawa

Principle Investigator, International Centre for Materials
Nanoarchitectonics, National Institute for Materials Science

 Rainer Waser

Professor, Faculty of Electrical Engineering and
Information Technology, RWTH Aachen University

Recent Outstanding SICP Achievements - 3

Life Innovation: Japan-Sweden Research Exchange

Explanation of the Method of DNA Replication Dependent on Chromosome Size

— Clarifying the DNA replication mechanism and results related to the development of future cancer-inhibiting agents —

Project Title: Deciphering High Order Chromatin Structure in Eukaryotic Species – An Innovative Approach (FY2009-2012)

Achieved through a combination of analysis technology focusing on Genomics and Computer Science techniques from Japan, and analysis technology based on Genetics and Biochemistry techniques from Sweden



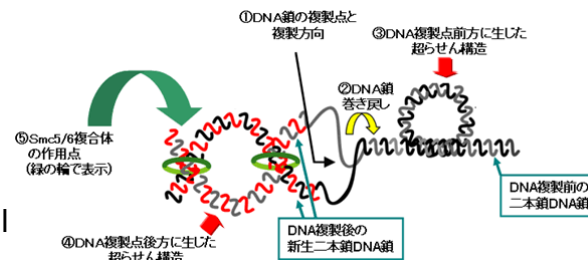
Katsuhiko Shirahige

Professor, Institute of Molecular and Cellular Biosciences, University of Tokyo



Camilla Sjögren

Team Leader, Department of Cell and Molecular Biology, Karolinska Institute



Life Innovation: Japan-Sweden Research Exchange

Development of a Method to Detect Intracellular Fluorescence of the Cancer Marker 'Gluthathione Transferase'

— Contribution towards new techniques for cancer diagnosis and pre-medication diagnosis —

Project Title: From Detection of Single Enzyme Molecules to Tumor Treatment (FY2011-2013)

Achieved through a combination of fluorescent compound, chemiluminescent compound, nuclear magnetic resonance probe and low-molecular-weight drug design techniques from Japan, and bioactivity analysis, kinetic analysis, cell imaging and efficacy evaluation from Sweden



Hiroshi Abe

Senior Research Scientist, Nanomedical Engineering Laboratory, RIKEN Advanced Science Institute



Ralf Morgenstern

Professor, Institute of Environmental Medicine Division of Biochemical Toxicology, Karolinska Institute

Urgent Funding for International Collaborative Research and Investigation (J-RAPID)

In the aftermath of the Tohoku earthquake and tsunami and in response to events that demand an urgent emergency response nationally and internationally, a new framework was rapidly launched in cooperation with overseas research funding agencies and research institutions, in order to support international collaborative research and investigation. Thus far, 35 projects have been supported (in partnership with USA, France, UK, Indonesia, and Thailand).

Examples of projects supported:

Development of Rescue Robots with Greater Exploration Abilities – Created a detailed map of disaster-affected building using aerial robots from America and terrestrial robots from Japan –

Project Title: Aerial Robots for Rapid Response: Remote Autonomous Exploration and Mapping (FY2011-2012)



Kazuya Yoshida, Professor,
Tohoku University



Vijay Kumar, Professor,
University of Pennsylvania

Ground Survey and Investigation of Liquefaction Impacts on Buildings in Urayasu

– Obtained basic data for recovery measures after liquefaction by a combination of different ground survey methods from Japan and the USA –

Project Title: US-Japan Collaborative Investigation of Geotechnical Problems Relating to The 2011 off the Pacific coast of Tohoku Earthquake (FY2011)



Koji Tokimatsu, Professor,
Tokyo Institute of Technology



Ross W. Boulanger,
Professor, University of California,
Davis

Investigation of Fishing Grounds using Underwater Robots

– Provided information for the recovery of fisheries and contributing to the understanding of hazardous points when navigating fishing boats –

Project Title: Recovery Activities Using Underwater Robots in Tsunami-devastated Areas (FY2011-2012)



Fumitoshi Matsuno, Vice-President,
International Rescue System Institute



Robin Murphy, Professor, Texas A&M
University



Policy Effects of the SICP

- In correspondence with government officials at the highest ministerial levels and in intergovernmental meetings such as the Joint Committee on Science and Technology, the SICP has been applied as a concrete tool for bilateral cooperation.
- Many comments have been praising the collaboration made possible in the SICP, from partner countries' government agencies and cooperation agencies.

Strengthening Relationships with Partner Countries as a part of Science and Technology Diplomacy

Case Study:

Agreement in relation to Science and Technology collaboration, made in correspondence with high-level officials, realized in the framework of the SICP.

Summit Meetings: India, Denmark, Brazil, Mexico

Ministers' Meetings: USA, South Korea, Switzerland

Government Officials: Singapore, Thailand, South Africa

The memorandum entered into between JST and its cooperation partner agency in Mexico was mentioned at the summit between (previous) Prime Minister Hatoyama and President Calderón. The memorandum entered into between JST and its cooperation partner agency in Canada was incorporated into a joint presentation made after the summit between Prime Minister Noda and Prime Minister Harper. Furthermore, reference to SICP has been made at ministers' meetings and meetings of senior government officials between Japan and Spain, Japan and Germany and Japan and India.

SICP implementation agreed at the Joint Committee on Science and Technology

UK, China, Sweden, Germany, France, Australia, Israel

SICP Numerical Data

Numbers of Papers, Conference Presentations and Patent Applications (FY2007-2011)

Papers	Conference Presentations	Patent Applications
2,977	6,129	85

- A great number of co-authored papers have been published in leading journals, including Nature and Science.
- There are very many achievements per amount invested.

On-top funds for international research exchange X Matching funds from partner countries
 = **High investment efficiency**

Reciprocal Visits and Workshops (FY2007-2011)

Reciprocal Visits (Japan→Abroad)	Reciprocal Visits (Abroad→Japan)	Number of Workshops Held
27,723 man-days (23.2~36.1 man-days per challenge per year)	20,025 man-days (15.9~26.4 man-days per challenge per year)	625 (0.6~1.1 workshops per challenge per year)

- There have been a great many Japanese researchers studying and working in partner countries, as well as exchange students and post-docs from partner countries coming to Japan.
- Beyond the laboratory, there are also several examples of exchanges developing between research institutions or scientific societies.

e.g. Several research institutions supported in projects conducted by Japan and France have established the central **Japanese-French Laboratory for Informatics (JFLI)**.

Post-Evaluation Results for 105 Research Exchange Projects Finalised by FY2010

Excellent	Very Good	Good	Fair	Poor
17% (18)	49% (51)	27% (29)	7% (7)	0% (0)

With 'Excellent' and 'Very Good' projects comprising 66% of the total, the projects have been evaluated as appropriately implemented.