PROMOTING TECHNOLOGY TRANSFER AND INNOVATION

Utilizing university intellectual property to drive innovation
Creating a platform for dialogue to drive innovation

Driving Innovation through the Utilization of University-generated Intellectual Property and the Creation of a Platform for Dialogue between Industry, Academia and Government

Bridging the gap between academia and industry

http://www.jst.go.jp/tt/EN/
Utilizing university IP to drive innovation

JST's program to promote technology transfer and innovation through collaboration between universities—and other public-sector research institutions—and the private sector encompasses a broad array of bridging activities. These include promoting the pursuit of patents based on the basic research output—science and technology seeds (hereafter, “seeds”)—of universities.

- **Development of plans and proposals related to IP strategies**
  - Output from basic research (seeds)
  - Patent applications relating to research output
    - Conversion of research output to rights (Patent acquisition support)
  - Promotion of the use of IP

Companies

Creating a platform for dialogue to drive

JST works to accelerate innovation driven by close collaboration between industry, academia, and government, and facilitated by a platform for dialogue between all three sectors. JST also aims to foster the creation of new industries and assist industries’ efforts to strengthen their competitiveness.

- **Universities, Research institutions, etc.**
  - University seeds

- **Industry (Companies)**
  - Industry needs

- **Industry–Academia Collaborative R&D Program**

*Funding Program
by universities to realize benefits for the

and the use of such research output; matching these seeds with the needs of the industrial sector; and supporting collaborative research and development (R&D) between industry and academia based on the IP and seeds held by universities.

**innovation**

To achieve these goals, JST specifically focuses on strengthening basic research and R&D infrastructure through dialogue between industry and academia, as well as by implementing large-scale R&D projects through industry-academia consortia.
Programs to promote the utilization of high-quality research output from universities and public research institutions: Formulation of IP strategies and the pursuit of patents.

Development of Plans and Proposals Related to IP Strategies

Through a process of opinion exchange and surveys involving universities and research institutions, JST works to identify and clarify key issues relating to IP. These issues are discussed by the Intellectual Property Strategy Committee, which is convened under the auspices of JST’s Center for Intellectual Property Strategies (CIPS)*. Based on these discussions, the committee generates plans and makes policy proposals related to IP strategy.

In a period when the number of patent applications by universities has increased steeply, JST aims to bolster its contribution to the generation of innovation by working to maximize the utilization of Japan’s research output-based IP.

* CIPS was established in April 2009 with the objectives of producing IP strategies for Japan and conducting a range of programs, including support for IP-related activities at universities and public research institutions.

CIPS’ main activities include:
- developing IP strategies
- helping universities acquire patents
- managing science and technology commons
- promoting patent licensing

Patent Acquisition Support

Supporting the first step in converting research output to IP

JST’s senior patent investigators* support universities, technical colleges, TLOs and other institutions nationwide aiming to acquire patents based on research output.

- Support for improving patent applications: Provision of support to universities, technical colleges and TLOs, including patent consulting and preliminary examination of technology
- Support for foreign patent applications: Provision of assistance to universities, technical colleges and TLOs to help cover costs related to foreign patent applications
- Support for creating patent portfolios: Provision of support in building patent portfolios based on a high-value core patent

* Senior patent investigators possess extensive experience working in private-sector companies in such areas as R&D, and are required to maintain strict confidentiality while engaged in this specialized work.
Support for improving patent applications

Senior patent investigators at six JST regional patent-acquisition support offices throughout Japan (Hokkaido, Tohoku/ Kanto/Koshinetsu, Chubu, Kansai, Chugoku/Shikoku and Kyushu) provide a range of personnel-based support services to university IP offices, including patent consulting and prior-art search.

<table>
<thead>
<tr>
<th>Process flow leading up to patent application</th>
<th>Support services (examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness programs</td>
<td>Support for holding IP seminars</td>
</tr>
<tr>
<td>Research</td>
<td>Patent consulting</td>
</tr>
<tr>
<td>Invention</td>
<td>● Registration procedures for invention</td>
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<tr>
<td></td>
<td>● Advice on obtaining patents</td>
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<td></td>
<td>● Prior-art search</td>
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<tr>
<td>Registration of invention</td>
<td>Evaluation of invention</td>
</tr>
<tr>
<td></td>
<td>● Evaluation of patentability (including prior-art search)</td>
</tr>
<tr>
<td>Evaluation committee</td>
<td>● Evaluation of utility</td>
</tr>
</tbody>
</table>

Support for foreign patent applications

For foreign patent applications undertaken by universities, technical colleges, TLOs and other public research institutions, JST provides a range of specialized support, including assistance with costs, evaluation and advice.

**Content of support**

- Assistance in covering patent-related costs, including attorney fees, translation costs and local agent fees. (Patent Cooperation Treaty (PCT) application international filing fees must be covered by the applicant.)
  1. Foreign patent applications based on claim of priority
  2. Procedures from designated-country transition to acquisition of rights
- Support for technology evaluation and patentability evaluation
  Inventions are evaluated by the IP Judging Committee, which comprises eminent experts from outside JST. The committee provides an evaluation report along with its decision on whether or not JST will provide patent application support for the invention.
- Licensing support
  JST’s J-STORE database, a comprehensive source of information on research output, includes information on unreleased patents as well as published patents. Inventors may register their applications on the database and JST provides support for publicity activities.

CIPS–Support for improving patent applications: j-sup@jst.go.jp
CIPS–Support for foreign patent applications: kenri@jst.go.jp


**Support for developing patent portfolios** *(Commenced in FY2010)*

To promote the building of patent portfolios based on high-value core patents, JST appoints a senior patent investigator who provides advice on related patents from the stage of filing a Japanese patent application through the acquisition of effective rights, and also gives priority support for foreign patent applications.

**Support requirements**
- Foreign applications are being undertaken for the core patent, and a clear plan is in place to build a patent portfolio, etc.
- JST calls for candidates once a year whereby it selects and approves candidates.

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**Science and Technology Commons** *(Commenced in October 2010)*

To promote the utilization of patents, JST is working to increase the value of patents

- JST invites information on patents held separately by universities and companies, and builds patent portfolios and patent maps. This patent information is provided in an easily viewable form through a Web site operated by JST.
- This system enables patents to be freely used at the research stage. (At the practical application stage, the execution of a license agreement is required.)
- JST provides support to cover testing costs used for such purposes as supplementing data on patented technology and prototype manufacture.
- By linking information to a JST database, including J-STORE and J-GLOBAL, JST also provides science and technology information from such sources as related research papers.

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[Diagram showing the process of IP utilization, including patent holder, science and technology commons, and companies, with various options for information provision, gathering patents, and R&D through such public funding programs as A-STEP.]
**Licensing**

Promoting patent licensing from universities and public research institutions to industries

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**J-STORE** (JST Science and Technology Research Result Database for Enterprise Development)

**J-STORE is a database (principally in Japanese) open to the general public free of charge, comprising patents and unpublished patents—held by universities, JST and other parties—which are available for licensing to companies.**

J-STORE is accessible via the Internet and provides details on research output produced by universities, public research institutions, JST and other organizations.

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**Patent information**

- Unpublished patent information
  - Unpublished patents up to 18 months after the filing of a patent application
- Disclosed patent information
- Foreign patent applications

**Information on science and technology seeds (seeds)**

**Research reports**

**JST expert’s recommendation (“Technical Eye”)**

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**CIPS–Licensing:** license@jst.go.jp

**J–STORE:** j-store@tokyo.jst.go.jp

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http://jstore.jst.go.jp/EN
New Technology Presentation Meetings

**JST aims to foster new links between academia and industry through technology presentations given by inventors based on their own perspective of practical applications.**

To promote the return of benefits from research output achieved by universities and JST to society as a whole, inventors present their own perspectives on the potential for commercial applications for their new technologies to companies. In addition, opportunities are provided for direct dialogue with individual inventors. Companies may ask questions relating to presentation themes and discuss requests relating to joint research and the adoption of technologies. Approximately 60 New Technology Presentation Meetings are held each year. In FY2009, almost 30,000 people attended these meetings, which led to 1,264 dialogue consultations between inventors and companies.

Innovation Japan: University Technology Exhibitions

**Supporting the matching of research output from universities and public research institutions with industry**

To promote the practical application of research output from universities and public research institutions, JST organizes national-scale university knowledge fairs with the aim of matching high-quality technology seeds with the needs of industry.

- Exhibits of university research output from the most advanced technology fields
- Holding of New Technology Presentation Meetings in which researchers themselves present their research results
- Holding of Open Innovation Seminars

Exhibition dates: September 29 (Wed)–October 1 (Fri), 2010
Place: Tokyo International Forum
Organizers: JST, New Energy and Industrial Technology Development Organization (NEDO)
Visitors: About 26,000 people; corporate researchers, senior managers and marketing managers; university researchers, etc.
University exhibits: 360 booths
New Technology Presentation Meetings: 205
Fields: Environment, new energy / energy conservation, nanotechnology, agri-bio, medicine and healthcare, forestry, manufacturing, IT

Technology Seeds Integrated Search System e-seeds.jp

**A one-stop site providing information on research output from universities and research institutions throughout Japan (In Japanese only)**

e-seeds.jp is a search Web site developed with the objective of facilitating the utilization by society of research output generated by universities and public research institutions. The Web site, which is available free of charge, enables users to carry out integrated searches for collections of science and technology seeds (seeds) and research information produced by universities and public research institutions. The Web site also provides direct links to research laboratories and industry–academia collaborative offices. In addition to keyword-based searches, users may specify such search parameters as region and research institution.
Open Innovation Seminars

Communicating the needs of companies to universities

At Open Innovation Seminars, companies communicate their research-related needs to universities, including issues that require short-term solutions and issues on which companies wish to conduct collaborative research. The main objective of Open Innovation Seminars is to facilitate the generation of new technology. More than 220 consultations were carried out at seven Open Innovation Seminars in FY2009, which attracted approximately 1,200 participants.

Presenters: Companies
Audience: Universities, TLO coordinators, researchers, etc.
Place: Mainly at JST’s Tokyo Headquarters
Allotted time: 10–30 minutes per theme
Content: Technology seeds that companies are seeking from universities, research content, fields and issues into which companies wish to conduct collaborative research

Individual consultations in separate meeting rooms
Consultants: Universities, TLO coordinators

Creating new opportunities for cooperation between industry and academia.
Outcomes include:
- Consultations between companies and university researchers
- Technology consultations
- Collaborative research

Portal Site for Industry–Academia–Government Collaboration

A portal site for information related to industry–academia–government collaboration in Japan

The “Industry–Academia–Government Guidepost” Web site gathers together a comprehensive range of information relating to industry–academia–government collaboration to enable all interested parties to meet their information needs through this one-stop portal site. The site is open to the general public via the Internet free of charge.

Provision of information relating to industry–academia–government collaboration

Industry–Academia–Government Collaboration Data Book
- This publication gathers together statistics and data useful in activities related to industry–academia–government collaboration. It uses charts and tables to provide user-friendly information.

Event information
- Provision of timely information on upcoming events related to industry–academia–government collaboration and IP.

Department of Industry–Academic Collaboration: scett@jst.go.jp (Open Innovation Seminars)
webmaster@sangakukan.jp (Portal Site)
Utilizing university IP to drive innovation

http://sangakukan.jp/journal/ (In Japanese only)

An interactive online journal whose objective is to promote and facilitate smooth collaboration between industry, academia and government.

Journal articles covering a broad array of fields
Industry–academia–government collaboration, entrepreneurship, IP, human resource development, management of technology (MOT) and education, government budgets and policy, international collaboration, overseas trends, collaborative R&D, commercialization, etc.


Industry–academia–government collaboration support database
http://sangakukan.jp/shiendb/ (In Japanese only)

A valuable online database to support the parties involved in industry–academia–government collaboration.

Extensive range of available information
- Program and project database (Approximately 2,800 entries)
  - R&D support programs conducted by national and regional government agencies
  - Financial assistance programs operated by foundations and other bodies
  - Venture capital
- Database of personnel involved in industry–academia–government collaboration (Approximately 1,900 entries)
- Institution database (Approximately 1,600 entries)

Human Resource Development Program for Personnel Involved in Technology Transfer

Developing personnel capable of playing a leading role in the technology transfer of research output

This training program was established with the objectives of enhancing the specialist skills of people involved in technology transfer programs at universities and TLOs and building a network of human resources. Approximately 1,000 people took part in 28 programs within six courses in FY2009.

- In addition to lecture-based learning, this program includes case studies and group discussions. The program emphasizes two-way communications between participants and lecturers as well as among participants.
  - Participants acquire practical knowledge based on case studies, beginning with basic knowledge on the flow of procedures for an entire technology transfer project.
  - This program is useful in bolstering practical, specialized skills through the examination of technology transfer failure and success cases as well as through feedback given on case studies presented by each participant.

General Consulting Service for Technology Transfer

A one-stop consulting service

JST provides a free-of-charge consulting service for companies, universities, public research institutions and TLOs, covering a wide range of matters related to technology transfer and industry–academia–government collaboration. Consultations—available via telephone, e-mail and interview—including such areas as general information on JST programs and other public-sector programs, referrals to potential partners and collaborating organizations, technology content and progress status, and licensing.

Department of Industry–Academic Collaboration: mekiki@jst.go.jp (Human Resource Development Program)
consul@jst.go.jp (General Consulting Service)
Competitive Funding Program

**A-STEP (Adaptable & Seamless Technology Transfer Program through Target-driven R&D)**

**Promoting industry–academia collaborative R&D based on the research output and IP generated by basic research**

**Objectives**

This program supports collaborative industry–academia R&D based on the results of high-quality basic research (research output, IP, etc.) to ensure that the benefits of research are passed onto Japanese society. Depending on the R&D phase and objectives of each particular project, A-STEP combines the optimal R&D funding and period to enable seamless pursuit of medium- to long-term R&D. Through this approach, the program aims to bridge the gaps between academic research results and industry to realize highly effective and efficient innovation.

**Overview**

**Fields:** All fields of natural science

A-STEP comprises 10 types of support at the feasibility study (FS) stage and full-scale R&D stage.

- **FS stage**
  - Investigation of technology transfer potential; validation of potential as a technology seed that will meet the needs of companies; and validation of potential to become the technology seed for a university-launched start-up company

- **Full-scale R&D stage**
  - R&D in preparation for the establishment of a university-launched start-up venture that aims for the practical application of technology seeds; and R&D during the practical verification and testing phase through joint R&D by an industry–academia partnership

**Unique characteristics of A-STEP**

- **One-stop support**
  - A-STEP unifies such functions as consultation services for universities and companies and front-office services for the receipt of applications. By contacting the A-STEP office, all relevant information can be acquired.

- **Seamless R&D support**
  - At the full-scale R&D stage, in which applicants may freely combine several types of support into one application, A-STEP provides seamless, medium- to long-term support through “stage-gate evaluation” whereby each type of post-evaluation and pre-evaluation for the next type are carried out together. This approach facilitates the pursuit of R&D that has produced strong results without having to reapply for further support. The system also helps us to provide a seamless connection between R&D output and further R&D, thereby enabling the rapid utilization of results.

- **Optimizing flexible R&D**
  - At the selection stage, in cases where it is judged that an earlier stage support type is preferable over the support type being applied for, it is possible to continue with selection based on a revamped plan and proceed to R&D execution in accordance with the advice of the evaluation board. This is designed to facilitate the creation of a flexible R&D environment in which researchers and companies are encouraged to boldly make their R&D plans as effective and efficient as possible.

**Number of applications approved (FY2010)**

- **FS stage:**
  - Exploratory Research: 859
  - Seeds Validation: 82
  - Start-up Validation: 5

- **Full-scale R&D stage:** Not yet determined

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### A-STEP Support Content

#### Feasibility Study (FS) Stage

<table>
<thead>
<tr>
<th>Support Type</th>
<th>Exploratory Research</th>
<th>Seeds Validation</th>
<th>Start-up Validation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support objective</td>
<td>Broad exploration of the potential for technology transfer of output from university research from a commercial perspective</td>
<td>The output from academic research is seen to hold potential technology seeds. The applicant pair, comprising the academic researcher and a company, verify the potential for future practical application.</td>
<td>Verification of the potential for a start-up venture based on the output of academic research</td>
</tr>
<tr>
<td>Applicant requirements</td>
<td>University or other research institute-based researcher</td>
<td>Joint application by university or other research institute-based researcher and a company</td>
<td>Joint application by university or other research institute-based researcher and an indirect support institution</td>
</tr>
<tr>
<td>R&amp;D period (in principle)</td>
<td>Single fiscal year</td>
<td>Up to one year</td>
<td></td>
</tr>
<tr>
<td>Total R&amp;D funding (including indirect expenses)</td>
<td>Standard amount: ¥1.3 million</td>
<td>Standard amount: ¥8 million</td>
<td></td>
</tr>
</tbody>
</table>

#### Full-scale R&D Stage

<table>
<thead>
<tr>
<th>Support program type</th>
<th>Young Entrepreneur</th>
<th>Start-up Venture</th>
<th>High-risk Challenge</th>
<th>Promoting R&amp;D</th>
<th>Practical Application</th>
</tr>
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<tbody>
<tr>
<td>Program sub-type</td>
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<tr>
<td>Support objective</td>
<td>R&amp;D support for young researchers who have a strong desire to start a business venture based on the practical application of their own research output</td>
<td>R&amp;D support for the establishment of a high-growth start-up venture based on technology seeds from academic research</td>
<td>Support for high-risk R&amp;D projects. Covers the R&amp;D phase up to verification testing of technology seeds from academic research</td>
<td>Support for practical application development relating to technology seeds from academic research. Covers R&amp;D-focused small start-up ventures</td>
<td>Support for practical application development for novel drugs, etc., based on seeds from academic research</td>
</tr>
<tr>
<td>Applicant requirements</td>
<td>A young researcher on a limited-period contract, etc., and a venture start-up support organization, such as a university</td>
<td>Three parties: Academic researcher, entrepreneur and indirect support institution</td>
<td>Company and academic researcher</td>
<td>Company (paid-in capital of ¥1,000 million or less) and academic researcher</td>
<td>Company and academic researcher</td>
</tr>
<tr>
<td>R&amp;D period (in principle)</td>
<td>Up to three years</td>
<td>Up to two years</td>
<td>Up to four years</td>
<td>Up to five years</td>
<td>Up to seven years</td>
</tr>
<tr>
<td>Total R&amp;D funding (including indirect expenses) (in principle)</td>
<td>Up to ¥45 million. Separately, up to ¥3 million as venture start-up support expenses</td>
<td>Up to ¥150 million. Separately, up to ¥15 million as indirect support expenses</td>
<td>Up to ¥20 million</td>
<td>Up to ¥200 million (matching fund)</td>
<td>Up to ¥300 million</td>
</tr>
<tr>
<td>Contract fund</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>¥100 million to ¥2,000 million</td>
</tr>
<tr>
<td>Payment of royalties based on product sales</td>
<td></td>
<td></td>
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Department of Industry–Academic Collaboration: a-step@jst.go.jp
Achievements to Date in the Utilization of University IP

**Commenced FY1958**

<table>
<thead>
<tr>
<th>Year</th>
<th>Project Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1959</td>
<td>Contract development Synthetic crystal University of Yamanashi / EPSON TOYOCOM CORPORATION</td>
</tr>
<tr>
<td>1972</td>
<td>Contract development High-intensity red LED (GaAlAs) Tohoku University and others / STANLEY ELECTRIC CO., LTD.</td>
</tr>
<tr>
<td>1987</td>
<td>Contract development Magnetic material amorphous metals Tohoku University / Hitachi Metals, Ltd. and others</td>
</tr>
<tr>
<td>1988</td>
<td>Contract development GaN blue LED Nagoya University / Toyoda Gosei Co., Ltd.</td>
</tr>
<tr>
<td>1991</td>
<td>Contract development Biocompatible polymer with phospholipid polar group The University of Tokyo, Tokyo Medical and Dental University, NOF CORPORATION</td>
</tr>
</tbody>
</table>

**Available FY2009: Approved projects and technology fields**

<table>
<thead>
<tr>
<th>Technology Field</th>
<th>Number of Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug development</td>
<td>14%</td>
</tr>
<tr>
<td>Medical technology</td>
<td>23%</td>
</tr>
<tr>
<td>Information and communications</td>
<td>10%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>12%</td>
</tr>
<tr>
<td>Inorganic chemistry</td>
<td>13%</td>
</tr>
<tr>
<td>Organic chemistry</td>
<td>11%</td>
</tr>
</tbody>
</table>

**Number of projects approved by support type**

- **FS stage:**
  - Seeds Validation: 171
  - Start-up Validation: 25
- **Full-scale R&D stage:**
  - Start-up Venture: 8
  - Promoting R&D: 20
  - High-risk Challenge: 43
  - Practical Application (Development by SME Start-up): 13
  - Practical Application (Drug Development): 1
  - Practical Application (Contract Development): 1

**Direct market effect (product sales) generated by JST program results:** ¥630,000 million (approximate total) / Cumulative royalties: ¥19,100 million (calculated based on a royalty rate of 3%)
Achievements to Date in the Utilization of University IP

**Support for patent applications**
- Overseas: 7,842 applications

**Human resource development and training**
- Number of sessions held: 178 (total of 4,523 participants)

**Linkage system**
- Cumulative number of projects supported: 164
- J-STORE
  - Number of database entries: 23,020

**Technology transfer consulting**
- 3,065 cases
- e-seeds.jp
  - (166 institutions; 59,252 seeds)

**University trade exhibitions**
- Held six times
  - Total number of participants: Approximately 240,000 people
  - Number of matching cases: 1,530

**New Technology Presentation Meetings**
- Held 244 times
  - Total number of participants: 144,549
  - Number of matching cases: 1,100

**Open Innovation Seminars**
- Held 13 times
  - Total number of participants: 2,192
  - Number of matching cases: 12

**Basic Research Program / Licensing**
- Cumulative number of patents licensed: 2,970 / 1,510 companies

Data as of the end of July 2010

Cumulated royalties: ¥19,100 million
Based on a royalty rate of 3%, this converts to product sales of approximately ¥630,000 million (Market effect)

**Breakdown**
- **Licensing**
  - Cumulative royalties: ¥3,700 million
  - Market effect: Approximately ¥120,000 million

- **Contract development**
  - Cumulative royalties: ¥15,400 million
  - Market effect: Approximately ¥510,000 million

Number of start-up venture companies established on the basis of output from JST programs: 248*1

*1 Data as of the end of November 2009

Patents, etc., held (including overseas): 8,599*2

*2 Data as of the end of June 2010

**Summary**
- **1998 Comprehensive support programs for creation of regional innovation**
  - Development of environmental technology by titanium oxide
  - Kanagawa Academy of Science and Technology, and others
  - Air purifiers and construction materials that utilize the breakdown effects of photocatalysts

- **2000 Contract development**
  - Water-18O for positron emission tomography (PET)
  - Tokyo Institute of Technology / TAIYO NIPPON SANSO CORPORATION
  - Water for PET cancer diagnosis

- **2002 Start-up venture program**
  - Retinoic acid nanoparticles
  - NANOEGG Research Laboratories, Inc. (Start-up venture company)
  - Expected to be effective not only in cosmetics but also in drug applications

- **2003 ERATO Ogata Fine Polymer Project / Licensing**
  - Manufacturing technology for high-quality graphite
  - Panasonic Electronic Devices Co., Ltd. (formerly Matsushita Electronic Components Co., Ltd.)
  - Development of high-value-added graphite materials from polyamide and other high polymers

- **2004 Contract development**
  - Artificial hip joint with long-term reliability
  - Chubu University, Japan Medical Materials Corporation
  - Enhancement of quality of life (QOL) for osteoarthritis and rheumatism patients
  - Surgical masks and air purifiers using antibodies

- **2005 Promoting R&D program**
  - Ostrich Pharma Corp. (Start-up venture company)
  - Producing antibodies for therapeutic and industrial use

- **2008 Contract development**
  - Manufacturing technology for high-quality graphite
  - Panasonic Electronic Devices Co., Ltd. (formerly Matsushita Electronic Components Co., Ltd.)
  - Used in such applications as thermal diffusion materials for electronic devices

Department of Industry–Academic Collaboration
INDUSTRY–ACADEMIA COLLABORATIVE R&D PROGRAMS

S-Innovation (Strategic Promotion of Innovative Research and Development)

Based on attractive R&D themes, bringing together academic researchers and private enterprise to generate innovation

Objectives

R&D themes chosen for the S-Innovation program are selected mainly from among the research output of JST’s basic research programs, such as CREST, ERATO, PRESTO and SORST, which aim to create innovative new technologies, and lead to the advancement of science and technology and the emergence of new industries. S-Innovation is based on the seamless, long-term pursuit of R&D toward the practical application of novel technologies. It is envisaged that the innovation resulting from such technologies will form the foundations of future industries.

Overview

Process up to the setting of R&D themes
1. Review of R&D themes
   R&D themes are mainly selected from among the output of such programs as CREST, ERATO, PRESTO and SORST.
2. Holding of workshops
   Academic researchers and people from the industrial sector together discuss such issues as the potential for establishing a theme, and the necessity and direction of theme adoption.
3. Setting of R&D themes
   R&D themes are set and Program Officers (POs) are appointed. The PO is responsible for evaluating and managing theme progress.

Process from call for proposals through approval
4. Call for project proposals
   For each R&D theme set, applications are called from industry–academia collaborative teams comprising companies, universities and other parties.
5. Project selection and approval
   POs conduct selection procedures based on submitted documentation and interviews. For each R&D theme, approximately five projects are approved.

Execution of research
6. A platform (consortium) comprising R&D theme POs work to ensure information is shared among project teams as they strive to realize effective R&D.

Application period
FY2010 R&D themes “Creating science, technology and systems to enrich the aging society” (tentative)

Number of projects approved
Approximately five

<table>
<thead>
<tr>
<th>S-Innovation Support Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of projects approved</td>
</tr>
<tr>
<td>R&amp;D period</td>
</tr>
<tr>
<td>R&amp;D phase</td>
</tr>
<tr>
<td>R&amp;D period by stage (approximate)</td>
</tr>
<tr>
<td>R&amp;D funding (including indirect costs)</td>
</tr>
<tr>
<td>R&amp;D system</td>
</tr>
</tbody>
</table>
## R&D themes and topics (projects) of FY2009

### R&D theme: iPS Cells
**PO:** Dr. Shin-ichi Nishikawa  
(Deputy Director, Center for Developmental Biology, RIKEN)

<table>
<thead>
<tr>
<th>Topic (project)</th>
<th>Main company (industry)</th>
<th>Main university (academia)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction of human hepatic stem cell library for pharmaco-celomics</td>
<td>Sekisui Medical Co., Ltd.</td>
<td>Yokohama City University</td>
</tr>
<tr>
<td>Retinal regeneration by cell transplantation</td>
<td>Japan Tissue Engineering Co., Ltd.</td>
<td>Foundation for Biomedical Research and Innovation</td>
</tr>
<tr>
<td>Development of basic technologies for human ES/iPS cells using genetic and cellular engineering techniques</td>
<td>Sumitomo Chemical Co., Ltd.</td>
<td>Kyoto University</td>
</tr>
<tr>
<td>System development of process and quality controls concerning differentiation of hiPS toward retinal pigment epithelial cells</td>
<td>Shimadzu Corporation</td>
<td>Osaka University</td>
</tr>
</tbody>
</table>

### R&D theme: Photonics Polymer
**PO:** Dr. Seizo Miyata  
(Professor, Tokyo Institute of Technology)

<table>
<thead>
<tr>
<th>Topic (project)</th>
<th>Main company (industry)</th>
<th>Main university (academia)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of fast organic photorefractive polymers for advanced optical communication technology</td>
<td>Dai Nippon Printing Co., Ltd.</td>
<td>Kyoto Institute of Technology</td>
</tr>
<tr>
<td>Development of new device technology based on the nano-ordered structures of polymers</td>
<td>JX Nippon Oil &amp; Energy Corporation</td>
<td>Tokyo Institute of Technology</td>
</tr>
<tr>
<td>Three-dimensional vector memory development project</td>
<td>Nippon Steel Chemical Co., Ltd.</td>
<td>Utsunomiya University</td>
</tr>
<tr>
<td>Optical interconnect device technology using high-performance photonics polymers</td>
<td>Toyota Central R&amp;D Labs.,Inc.</td>
<td>Tohoku University</td>
</tr>
<tr>
<td>Development of quantum photonic technologies with polymer optical nanofibers</td>
<td>ISHIHARA SANGYO Co., Ltd.</td>
<td>University of Electro-Communication</td>
</tr>
</tbody>
</table>

### R&D theme: Organic Electronics
**PO:** Dr. Yoshio Taniguchi  
(Professor, Shinshu University)

<table>
<thead>
<tr>
<th>Topic (project)</th>
<th>Main company (industry)</th>
<th>Main university (academia)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of polymer-based flexible displays: Innovation with new high-performance polymer semiconductors and their printed AM-TFTs</td>
<td>Sumitomo Chemical Co., Ltd.</td>
<td>Hiroshima University</td>
</tr>
<tr>
<td>Development of new solar cells consisting of flexible nano-porous titania sheet</td>
<td>Nippon Steel Chemical Co., Ltd.</td>
<td>Kyushu Institute of Technology</td>
</tr>
<tr>
<td>Development of printed and flexible OLED panels for general lighting</td>
<td>Dai Nippon Printing Co., Ltd.</td>
<td>Yamagata University</td>
</tr>
<tr>
<td>Printable durable organic solar cells: Development of fundamental technology for commercialization</td>
<td>Mitsubishi Chemical Corporation</td>
<td>The University of Tokyo</td>
</tr>
</tbody>
</table>

### R&D theme: Superconductivity System
**PO:** Dr. Ken-ichi Sato  
(Fellow, Sumitomo Electric Industries, Ltd.)

<table>
<thead>
<tr>
<th>Topic (project)</th>
<th>Main company (industry)</th>
<th>Main university (academia)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of advanced HTS* SQUID system for biological diagnosis and nondestructive evaluation</td>
<td>Hitachi, Ltd.</td>
<td>Kyushu University</td>
</tr>
<tr>
<td>R&amp;D of key hard technology for large scale superconducting rotational machines</td>
<td>Kawasaki Heavy Industries, Ltd.</td>
<td>Yokohama National University</td>
</tr>
<tr>
<td>R&amp;D of fundamental technologies for accelerator magnets using high Tc superconductors</td>
<td>TOSHIBA Corporation</td>
<td>Kyoto University</td>
</tr>
<tr>
<td>Development of the next-generation NMR technology using HTS* materials</td>
<td>JEOL Ltd.</td>
<td>National Institute for Materials Science</td>
</tr>
<tr>
<td>Development of a new generation of high-efficient railway technologies using high Tc superconductors</td>
<td>Railway Technical Research Institute</td>
<td>National Institute for Materials Science</td>
</tr>
</tbody>
</table>

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*HTS: High-Temperature Superconductors

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**Department of Industry–Academic Alliance:** s-innova@jst.go.jp
Creating a platform for dialogue to drive innovation

Development of Advanced Measurement and Analysis Systems

Development of technology and systems for advanced measurement and analysis that will bolster the infrastructure for creative and original R&D

Objectives
To build the infrastructure that will support creative and original R&D activities—essential to the generation of innovation—JST is promoting the development of systems and technology for advanced measurement and analysis.

Overview
In the field of measurement and analysis systems, JST calls for proposals in the following four programs.

- **Technology Development Program for Advanced Measurement and Analysis (Program-T)**
  This program seeks to develop novel and creative technologies for advanced measurement and analysis so as to rapidly improve the performance of such systems.

- **System Development Program for Advanced Measurement and Analysis (Program-S)**
  This program seeks to develop systems needed for advanced measurement and analysis in frontier research areas. It assembles development teams that closely interface with industry, academia and government; operates under an authoritative team leader; and carries out R&D ranging from enabling technologies to applied development and prototyping.

- **Software Development Program for Advanced Measurement and Analysis (Program-SW)**
  This program seeks to develop application, database and platform software for the purpose of promoting the practical application and adoption of advanced measurement and analysis prototype systems.

- **Prototype Validation / Practical Realization Program for Advanced Measurement and Analysis (Program-P)**
  This program seeks to develop prototypes up to the practical realization stage by verifying, improving, optimizing or generalizing the prototype. It assembles development teams that closely interface with industry, academia and government; operates under an authoritative team leader drawn from industry; and includes the participation of world-leading users of measurement and analysis systems in the development team.

Number of projects approved (FY2010)

<table>
<thead>
<tr>
<th>Program</th>
<th>Program-T</th>
<th>Program-S</th>
<th>Program-SW</th>
<th>Program-P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development phase</strong></td>
<td><strong>Development period</strong></td>
<td><strong>Development funding (including indirect costs)</strong></td>
<td><strong>Development system</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Program</strong></td>
<td><strong>Program-T</strong></td>
<td><strong>Program-S</strong></td>
<td><strong>Program-SW</strong></td>
<td><strong>Program-P</strong></td>
</tr>
<tr>
<td><strong>Development of component technology</strong></td>
<td>In principle, up to 3.5 years</td>
<td>Not specified</td>
<td>In principle, up to 3.5 years</td>
<td>In principle, up to 2.5 years</td>
</tr>
<tr>
<td><strong>Development of measurement and analysis systems</strong> that meet the needs of leading-edge research and shop floor-level manufacturing (monozukuri)</td>
<td>Not specified</td>
<td>Not specified</td>
<td>Not specified</td>
<td>Not specified</td>
</tr>
<tr>
<td><strong>Application, database and platform software development for the purpose of promoting the practical application and adoption of advanced measurement and analysis prototype systems</strong></td>
<td>Contract fund</td>
<td>Contract fund</td>
<td>Contract fund</td>
<td>Matching fund</td>
</tr>
</tbody>
</table>
| **Carry out applied development for the purpose of verifying, advancing and optimizing the performance of prototype systems through test use by users. Developed to the stage of potential commercialization (at the end of development, build-to-order production is possible)** | Industry–academia collaborative development teams focused on a team leader are formed. (Program-T may be carried out by a single institution from the industrial, academic or governmental sector.) The Program Officer (PO), who is responsible for supporting progress in development projects, and the Business Organizer (BO), who is tasked with supporting projects from a commercialization perspectives and assist the development teams.
Industry–Academia Collaborative R&D Programs
Collaborative Research Based on Industrial Demand

Promoting basic research that will contribute to solutions to technical themes shared across the industrial sector

Objectives
Based on a dialogue between the academic and industrial sectors, universities and other public research institutions carry out basic research that will contribute to solutions to technical themes shared across the industrial sector. As well as accelerating solutions to technical themes in the industrial sector, this program facilitates feedback to basic research projects from the perspective and knowledge of the industrial sector. The program aims to stimulate basic research at universities and bolster Japan’s industrial competitiveness.

Overview

Process from call for proposals for technical themes through setting of technical themes
1. Call for proposals for technical themes
   - Proposals for technical themes are called from industry (industry bodies or companies).
2. Review of technical themes
   - Interviews are held in order to gather knowledge from interested parties in industry and academia.
3. Setting of technical themes
   - Technical themes and Program Officers (POs), who are responsible for managing technical themes, are selected.

Process from call for research project proposals through approval
4. Call for research project proposals for each of the technical themes
   - Proposals for research project proposals are called from university researchers.
5. Research project selection and approval
   - Research projects that will contribute to solutions to technical themes are approved.

Execution of research
6. Establishment of platform (“space for collaborative creativity”)
   - As well as facilitating feedback to basic research projects at universities from the perspective and knowledge of the industrial sector, this platform provides a place for the exchange of opinions between industry and academia so that the output from basic research at universities can be utilized by industry.
Creating a platform for dialogue to drive innovation

Number of themes and projects approved (FY2010)
Technical themes: Approximately 2
Research projects: Up to approximately 10 per technical theme

R&D funding
Approximately ¥300 million per year for each technical theme

R&D period
Approximately 10 years maximum for each technical theme
Approximately 2–5 years for each research project

Collaborative Research Based on Industrial Demand: Support Program Content

<table>
<thead>
<tr>
<th>Number of projects approved</th>
<th>Up to approximately 10 per technical theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;D period</td>
<td>Approximately 10 years maximum for each technical theme (approximately 2–5 years for each research project)</td>
</tr>
<tr>
<td>R&amp;D phase</td>
<td>Basic research driven by the needs of industry</td>
</tr>
<tr>
<td>Research funding (including indirect costs)</td>
<td>Approximately ¥300 million per year for each technical theme (Contract fund)</td>
</tr>
</tbody>
</table>
| Research system             | In addition to universities carrying out basic research, industry and academia keep in close contact for the exchange of opinions through a “Forum for Collaboration and Innovation.”*  
* This refers to a communication platform for the exchange of opinions between industry and academia so that the output from basic research at universities can be utilized by industry.

Department of Industry–Academic Alliance: kyousou@jst.go.jp
JST operates JST Innovation Plazas and JST Innovation Satellites at 16 locations nationwide that have been recognized for their high R&D potential.

- Regional interaction between industry, academia and government
- Nurturing research results
- Coordination among a wide range of programs
PROMOTING TECHNOLOGY TRANSFER AND INNOVATION

Japan Science and Technology Agency

Center for Intellectual Property Strategies
Department of Industry-Academic Collaboration
Department of Industry-Academic Alliance

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http://www.jst.go.jp/tt/EN/

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