JST

Japan Science and Technology Agency

STRATEGIC BASIC RESEARCH PROGRAMS

2024-2025 Research Programs Introduction

Aiming to Create Innovation in Science and Technology

What are Strategic Basic Research Programs ?

The purpose of Strategic Basic Research Programs is to promote challenges to basic research to overcome the problems facing our country and to produce creative and innovative technology seeds (new technology seeds) based on new scientific knowledge that will lead to scientific and technological innovations to transform society and the economy. For this purpose, we establish virtual research institutes (set up for a limited period of time across several organizations) consisting of researchers from various universities, colleges, enterprises, public institutions, etc. The researchers construct networks with other researchers and relevant parties from industry and society in general—who will be among the beneficiaries of the results of the research—in order to advance research under the supervision of a program officer (e.g. Research Supervisor) who will head the institute.

Strategic Objectives established by the national government to achieve solutions for key issues Japan is facing

Construction and operation of research institutes

〈Program Director oversees the overall system and considers management direction〉
〈Establishment of Research Areas and Program Officers (Research Supervisor [Directors for ERATO], etc.) best-suited for achieving objectives〉
〈Identification of researchers with exceptional pioneering qualities and originality, based on the Program Officer's judgment〉
〈Flexible, dynamic decision-making on research plans and research funding allocation in accordance with research progress achieved and other factors〉

《Research Programs》

Creating the Seeds for New Technology (CREST, PRESTO, ERATO, ACT-X)

ALCA-Next (Advanced Technologies for Carbon-Neutral)

Cutting-edge Research and Development on Information & Communication Sciences (CRONOS)

CREST

Team-type research to produce excellent achievements leading to scientific and technological innovation

Research period: 5 years and 6 months or less
Research budget: Total of 150-500 million yen / team

PRESTO

Individual-type research to develop the sources of scientific and technological innovation

Research period: 3 years and 6 months or less
Research budget: Total of 30-40 million yen / project

ERATO

Large-scale group research led by excellent leaders toward creating new tides of science and technology

Research period: 5 years and 6 months or less
Research budget: Total of 1.2 billion yen / project

ACT-X

Individual-type research that supports "the establishment of an individual," i.e., young researchers with unique and challenging ideas

Research period: 2 years and 6 months or less
Research budget: Total of 4.5-6.0 million yen / project
＊In the acceleration phase, maximum research funds of approximately 10 million yen / year

ALCA-Next

Advanced Technologies for Carbon-Neutral

Generating innovative technologies that will contribute to the realization of carbon neutrality

Research period: 3.5 years for the small phase, 3 years for the accelerated phase, and up to 5 years for full-scale R&D
Research budget: Up to 25 million yen / year and project (small phase), up to 75 million yen / year and project (accelerated phase), and up to 76 million yen / year and project (full-scale R&D)

CRONOS

Cutting-edge Research and Development on Information & Communication Sciences

R&D program aimed at advancement of Japan's information and communication technology through Grand Challenges

Research period: 5 years and 6 months or less
Research budget: Total of 220-300 million yen / project

Toward the Creation of Innovation in Science and Technology

CREST

CREST
CORE RESEARCH FOR
EVOLUTIONARY SCIENCE
AND TECHNOLOGY

Team-type research to produce excellent achievements leading to scientific and technological innovation

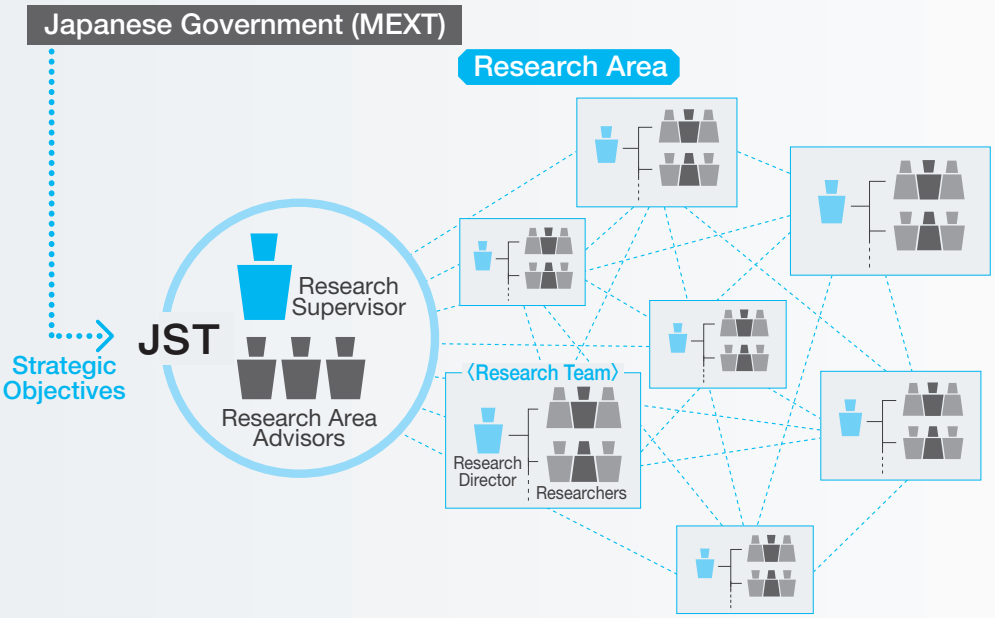
Overview

The purpose of CREST is promoting unique, internationally high-level basic research to address the important problems facing our country and to produce creative, conspicuous, and innovative technology seeds (new technology seeds) based on new scientific knowledge that contributes to scientific and technological innovation that can transform the society and economy.
Under the management principles of the Research Area specified by the Research Supervisor, the best teams led by top-level researchers in our country selected by the Research Supervisor train the young researchers in a team while advancing the progress of research.

Characteristics

- To achieve Strategic Objectives, a Research Supervisor can flexibly design a Research Area at his/her discretion including specifying the number of the research projects in the Research Area and the size of the budget for each research project and introducing the stage gates during the period of a research as well as some reorganization of a team.
- Research Supervisors call for research proposals based on the Research Areas they manage, adopting 10 to 20 research projects in each area. Research Supervisors consider the field of science and technologies and the balance between the science and scientific and technological innovation, which constitute the portfolio of the whole Research Area. For this purpose, we call for proposals several times separately and criteria for accepting proposals are clarified each time in the application requirements. When calling for research proposals, the requirements may include the participation of researchers from industry and/or the fields of culture and social science to advance basic research with a specific goal. Furthermore, the requirements may include the organization of teams from different academic fields for more challenging research projects.
- We will adopt the best teams and Research Directors to maintain a high level of research internationally. In order for top-level researchers to produce results by collaborating with other researchers, we support each research project using a fund typically worth several hundred million yen.
- In order to maximize achievements, our Research Supervisors adopt a flexible management approach by giving instructions on changing, accelerating, or cancelling research projects depending on their progress. We assign about ten Research Area Advisors to support Research Areas by giving advice and performing evaluations in terms of science and technology. In addition, we have experts who can give advice from a legal point of view such as lawyers and experts from industry when needed.
- In each research project, the development of post-doctoral researchers and students in the team is also an important mission as well as the realization of proposals.

Research Framework



Department of Strategic Basic Research · CREST Section
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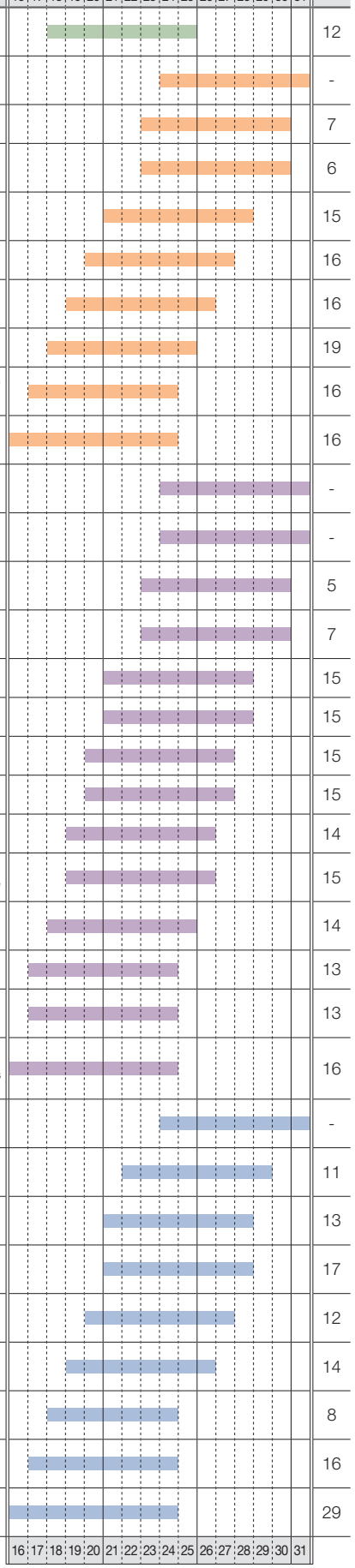
On-going Research Areas

Research Areas 33　Research Projects 400

abbreviation	Research Area	Research Supervisor (※ 1 Program Supervisor) Deputy Research Supervisor (※ 2 Research Supervisor)		Projects
Innovative Reactions	Innovation in Chemical Reactions through Active Control of Electrons and Ions for Production	Ilhyong Ryu	Project Professor, Organization for Research Promotion, Osaka Metropolitan University/ Chair Professor, National Yang Ming Chiao Tung University, Taiwan	12
The Power of Life	Elucidating the Power of Life through Innovative Measurement and Analysis Techniques	Noboru Mizushima	Professor, Graduate School and Faculty of Medicine, The University of Tokyo	-
yuCell	Cell Control	Atsushi Miyawaki	Laboratory Head, Center for Brain Science/ Advanced Photonics, RIKEN	7
Carbon-Blue X	Exploring the Potential of Ocean Blue Carbon Through Investigation of Ocean and Carbon Cycling Interactions	Shin-ichi Ito	Professor, Atmosphere and Ocean Research Institute, The University of Tokyo	6
MultiSensing	Research on Multi-Sensing Biosystems and Development of Adaptive Technologies	Ryouzo Nagai (※1) Atsushi Iriki (※2)	President, Jichi Medical University(※1) Senior Researcher, Innovation Design Office, RIKEN (※2)	15
Cell Dynamics	Spatiotemporal Dynamics of Intracellular Components	Toshiya Endo	Professor, Faculty of Life Sciences, Kyoto Sangyo University	16
Multicellular Interaction	Development of Technology Platforms for Quantitative Analysis of Spatiotemporal Multicellular Interaction	Michiyuki Matsuda	Researcher, Graduate School of Biostudies, Kyoto University	16
Genome Programming	Large-Scale Genome Synthesis and Cell Programming	Haruhiko Siomi	Professor, Keio University School of Medicine	19
Extracellular Fine Particles	Elucidation of Biological Mechanism of Extracellular Fine Particles and the Control System	Yoshinobu Baba	Director General, Institute for Quantum Life Science, National Institutes for Quantum Science and Technology	16
Opt Bio	Development and Application of Optical Technology for Spatiotemporal Control of Biological Functions	Ryoichiro Kageyama	Director, Center for Brain Science, RIKEN	16
Materials Development and Recycling	Creation of Innovative and Integrated Technologies for Materials Development and Circular Processes and Development of Their Scientific Basis	Tomonaga Okabe	Professor, Graduate School of Engineering, Tohoku University / Director, Research Center for Green X-tech, Tohoku University	-
Photonics Synergy	Frontier Exploration via the Synergy of Photonics / Optics with Information, Communication, Sensing, and Material Technologies	Yoshiaki Nakano	Professor, Graduate School of Engineering, The University of Tokyo	-
Nano-Material Semiconductors	Fundamental Technology for Semiconductor-Device Structures Using Nanomaterials	Riichiro Saito	Emeritus Professor, Tohoku University	5
Quantum Frontiers	Exploring Quantum Frontiers Through Quantum-Classical Interdisciplinary Fusion	Nobuyuki Imoto	Project Professor, Office of Senior Professor, The University of Tokyo	7
Degradation and Stability	Precise Material Science for Degradation and Stability	Atsushi Takahara	Research Professor, Research Center for Negative Emission Technology, Kyushu University	15
Exploring Unknown Materials	Exploring Innovative Materials in Unknown Search Space	Hiroshi Kitagawa	Professor, Graduate School of Science, Kyoto University	15
Precise Arrangement toward Functionality	Precise Arrangement towards the Functionality of Molecular Systems	Nobuo Kimizuka	Professor, Graduate School of Engineering, Kyushu University	15
Information Carriers	Integrated Devices and Systems Utilized by Information Carriers	Toshiro Hiramoto	Professor, Institute of Industrial Science, The University of Tokyo	15
Innovative Optics and Photonics	Creating Innovative Optics and Photonics Based on Creative Principles	Satoshi Kawata	Professor Emeritus, Osaka University	14
Nanomechanics	Elucidation of Macroscale Mechanical Properties Based on Understanding Nanoscale Dynamics for Innovative Mechanical Materials	Kohzo Ito	Fellow, Research Center for Macromolecules and Biomaterials, National Institute for Materials Science	15
Topology	Creation of Core Technology Based on the Topological Materials Science for Innovative Devices	Masahito Ueda	Professor, School of Science, The University of Tokyo	14
Thermal Control	Creation of Innovative Core Technologies for Nano-enabled Thermal Management	Shigeo Maruyama	Professor, School of Engineering, The University of Tokyo	13
Revolutional Materials Development	Revolutional Material Development by Fusion of Strong Experiments with Theory/Data Science	Hideo Hosono	Honorary Professor & Institute Professor, MDX Research Center for Element Strategy, Tokyo Institute of Technology	13
Intelligent Measurement Analysis	Development and Application of Intelligent Measurement-Analysis Methods through Coalition between Measurement Technologies and Informatics	Yoshiyuki Amemiya Genshiro Kitagawa	President, JASRI In charge of CREST Emeritus Professor, The Institute of Statistical Mathematics, Research Organization of Information and Systems / Emeritus Professor, SOKENDAI In charge of PRESTO	16
Prediction Mathematical Foundation	Creation of Mathematical Foundation for Prediction and Control	Motoko Kotani	Principal Investigator & Professor, AIMR, Tohoku University / Executive Vice President for Research, Tohoku University	-
Innovative Measurement and Analysis	Creating Innovative Measurement and Analysis Systems Aiming to Solve Social Issues	Takashi Washio	Professor, Faculty of Business and Commerce, Kansai University	11
Society 5.0 System Software	Creation of System Software for Society 5.0 by Integrating Fundamental Theories and System Platform Technologies	Yasuo Okabe	Professor, Academic Center for Computing and Media Studies, Kyoto University	13
Bio-DX	Innovation of Life Science through Digital Transformation Focused on Data-Driven and AI-Driven Technologies	Yasushi Okada	Team Leader , Center for Biosystems Dynamics Research, RIKEN/Professor, Graduate School of Medicine, The University of Tokyo	17
Trusted quality AI systems	Core Technologies for Trusted Quality AI Systems	Akiko Aizawa	Professor, Digital Content and Media Sciences Research Division, National Institute of Informatic, Research Organization of Information and Systems	12
Mathematical Information Platform	Creating Information Utilization Platform by Integrating Mathematical and Information Sciences, and Development to Society	Naonori Ueda	Deputy Director, RIKEN Center for Advanced Intelligence Project/Visiting Fellow, NTT Communication Science Laboratories	14
Computational Foundation	Technology for Computing Revolution for Society 5.0	Shuichi Sakai	Project Professor & Vice President, Institute for Future Initiatives, The University of Tokyo	8
Symbiotic Interaction	Creation and Development of Core Technologies Interfacing Human and Information Environments	Kenji Mase	Emeritus Professor, Nagoya University	16
Artificial Intelligence	Development and Integration of Artificial Intelligence Technologies for Innovation Acceleration	Minoru Etoh	Professor, Open and Transdisciplinary Research Initiatives, Osaka University	29



■ Green Innovation ■ Life Innovation ■ Nanotechnology & Materials ■ Information and Communication Technology

As of July 2024

PRESTO

PRECURSORY RESEARCH FOR EMBRYONIC SCIENCE AND TECHNOLOGY

Individual-type research to develop the sources of scientific and technological innovation

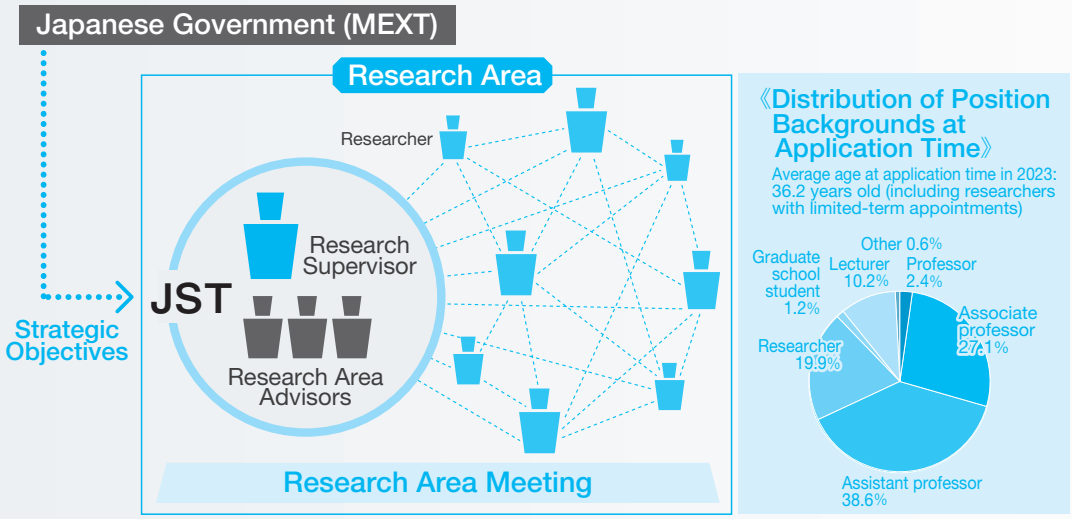
Overview

The purpose of PRESTO is promoting unique and challenging, internationally high-level basic research to address the important problems facing our country and to produce creative and innovative technology seeds (new technology seeds) based on new scientific knowledge as a source of scientific and technological innovation that can transform society and the economy. For this purpose, under the management principles of the Research Area specified by the Research Supervisor, young researchers selected by the Research Supervisor form a network with researchers inside and outside of the Research Areas to promote challenging and independent research.

Characteristics

- Research Supervisors call for research proposals based on the Research Areas they manage, adopting 30 to 40 research projects in each area. Research Supervisors consider the balance between the science and scientific and technological innovation as they establish networks of researchers with different viewpoints in a Research Area or across Research Areas by accepting a variety of researchers and portfolios. For this purpose, we call for proposals several times separately and criteria for accepting proposals are clarified each time in the application requirements.
- Approximately 40 million yen has been allocated to support each research project, which is sufficient to enable young researchers to pursue/conduct their independent projects. Moreover, we give support to help young researchers become independent as well as organize the research environment.
- We expect young researchers to not only produce results but also develop themselves as researchers. For this purpose, in PRESTO, Research Supervisors and Research Area Advisors give advice and guidance through area meetings held once or twice a year, and visits to the laboratories of PRESTO researchers. Furthermore, we provide a variety of support services to promote research, including exchanges with overseas researchers and opportunities that let young researchers review their research from the viewpoint of science in society depending on necessity.
- In order to maximize achievements, our Research Supervisors adopt a flexible management approach by giving instructions to PRESTO researchers on changing, accelerating, or cancelling research depending on their progress. We assign about ten Research Area Advisors to support Research Areas by giving advice and perform evaluations in terms of science and technology. In addition, we have experts who can give advice from a legal point of view such as lawyers, and other experts from industry when needed.

Research Framework



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On-going Research Areas

Research Areas 34　Research Projects 757

abbreviation	Research Area	Research Supervisor (※ 1 Program Supervisor) Deputy Research Supervisor (※ 2 Research Supervisor)		Fiscal Year 18 19 20 21 22 23 24 25 26 27 28 29	Projects
Material Conversion	Development of Basic Material Conversion Science for Global Environment	Ichiro Yamanaka	Professor, School of Materials and Chemical Technology, Tokyo Institute of Technology		20
Complex Flow	New Fluid Science for Understanding, Prediction and Control of Complex Flow and Transport Phenomena	Susumu Goto	Professor, Graduate School of Engineering Science, Osaka University		33
Controlled Reaction	Controlled Reaction by Electrons or Ions	Yasushi Sekine	Professor, Faculty of Science and Engineering, Waseda University		31
yuCell	Cell Control	Atsushi Miyawaki Takashi Yamamoto	Laboratory Head, Center for Brain Science/ Advanced Photonics, RIKEN Professor, Genome Editing Innovation Center, Hiroshima University		-
Dual Biological Potentials	Multiscale and Interdisciplinary Approaches to Investigate Mechanisms of Resilience and Diversification across Wide Ranges of Spatiotemporal Metrics	Tadashi Uemura	Professor, Graduate School of Biostudies, Kyoto University		-
Blue Biosphere	Exploration of the Blue Biosphere-Climate System towards Carbon Cycle Management	Jota Kanda	Professor, Department of Ocean Sciences, Tokyo University of Marine Science and Technology		10
Aging	Fundamental Understanding of Age-Related Organismal Transformations	Naoki Mochizuki (※1) Masayuki Miura (※2)	Research Institute Director, National Cerebral and Cardiovascular Center (※1) Professor, Graduate School of Pharmaceutical Sciences, Faculty of Pharmaceutical Science, The University of Tokyo (※2)		21
Pandemic Resilience	Social and Technological Framework for Pandemic Resilience	Hitoshi Oshitani	Professor, Graduate School of Medicine, Tohoku University		31
Multisensory Integration	Multisensory Integration in Biological Systems	Ryouzo Nagai (※1) Ryohei Kanzaki (※2)	President, Jichi Medical University (※1) Senior Research Fellow, Research Center for Advanced Science and Technology, The University of Tokyo (※2)		30
Plant Molecules	Function and Regulation of Plant Molecules	Kazuhiko Nishitani	Project Professor, Faculty of Science, Kanagawa University		30
Supra-Assembly of Biomolecule	Dynamic Supra-Assembly of Biomolecular Systems	Hiroyuki Noji	Professor, Graduate School of Engineering, The University of Tokyo		45
Multicellular System	Dynamics of Cellular Interactions in Multicellular System	Yoshiko Takahashi	Professor, Graduate School of Science, Kyoto University		38
Genome Programming	Large-Scale Genome Synthesis and Cell Programming	Haruhiko Siomi	Professor, Keio University School of Medicine		31
Development and Recycling of Materials	Basic Research for the Development and Recycling of Materials	Susumu Kitagawa	Distinguished Professor, Kyoto University Institute for Advanced Study		-
Photonics Synergy	Pioneering the Synergy of Information and Physics Connected by Optics and Photonics	Tetsuya Kawanishi	Professor, Faculty of Science and Engineering, Waseda University		-
Nano Materials Devices	Nano Materials for New Principle Devices	Yoshihiro Iwasa	Deputy Director, Center for Emergent Matter Science, RIKEN		10
Quantum Frontiers	Exploring Quantum Frontiers Through Quantum-Classical Interdisciplinary Fusion	Nobuyuki Imoto	Project Professor, Office of Senior Professor, The University of Tokyo		12
Quantum Cooperation	Quantum Cooperation between Materials and Information	Kensuke Kobayashi	Professor, Graduate School of Science, The University of Tokyo		24
Sustainable Materials	Secure Bonding and Gentle Degradation for Sustainable Material Design	Tadahisa Iwata	Professor, Graduate School of Agricultural and Life Sciences, The University of Tokyo		29
Future Materials	Creation of Future Materials by Expanding Materials Exploration Space	Hiroshi Kageyama	Professor, Graduate School of Engineering, Kyoto University		31
Precise Molecular Arrangement	Precise Arrangement of Atoms and Molecules and Its Properties and Functions	Hiroshi Nishihara	Vice President & Director, Research Institute for Science and Technology, Tokyo University of Science		43
Information Carriers	Information Carriers and Their Integrated Materials/Devices/Systems	Hitoshi Wakabayashi	Professor, Institute of Innovative Research, Tokyo Institute of Technology		30
Innovative Optics and Photonics	Creating State-of-the-Art Science by Innovative Optics and Photonics	Koichiro Tanaka	Professor, Graduate School of Science, Kyoto University		32
Nanomechanics	Nanoengineering on Mechanical Functions of Materials	Takayuki Kitamura	Emeritus Professor, Kyoto University		31
Quantum Software	Technological Foundation of Advanced Quantum Computing and Information Processing	Akihisa Tomita	Professor, Faculty of Information Science and Technology, Hokkaido University		30
Mathematical Sciences for the Future	Exploration of New Science Using Mathematics to Predict and Control the Future	Zin Arai	Professor, School of Computing, Tokyo Institute of Technology		-
R&D Process Innovation	R&D Process Innovation by AI and Robotics: Technical Foundations and Practical Applications	Ichiro Takeuchi	Professor, Graduate School of Engineering, Nagoya University / Team Leader, Center for Advanced Intelligence Project, RIKEN		-
Measurement and Analysis Foundation	Establishing the Solid Foundation for Innovative Measurement and Analysis Process	Isao Tanaka	Professor, Department of Materials Science and Engineering, Kyoto University		13
Human-Centered Interaction	Creating Human-Centered Interaction to Solve Social Issues	Hideaki Kuzuoka	Professor, Graduate School of Information Science and Technology, The University of Tokyo		12
Social Transformation Platform	Co-Creation of the Transformation Platform Technology for Human and Society by Integration of the Humanities and Sciences	Satoshi Kurihara	Professor, Faculty of Science and Technology, Keio University		22
Platform Software	Strengthening ICT Infrastructure for Social Change	Teruo Higashino	Vice-President, Kyoto Tachibana University		29
Trustworthy AI	The Fundamental Technologies for Trustworthy AI	Hiroki Arimura	Professor, Graduate School of Information Science and Technology, Hokkaido University		30
Math-Structure	Elucidating Mathematical Structures in Real/ Virtual World Objects and Their Utilization	Takashi Sakajo	Professor, Graduate School of Science, Kyoto University		31
IoT	Future Led by IoT	Hideyuki Tokuda	President, National Institute of Information and Communications Technology		28

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As of July 2024

ERATO

ERATO
EXPLORATORY RESEARCH
FOR ADVANCED
TECHNOLOGY

Large-scale group research led by excellent leaders toward creating new tides of science and technology

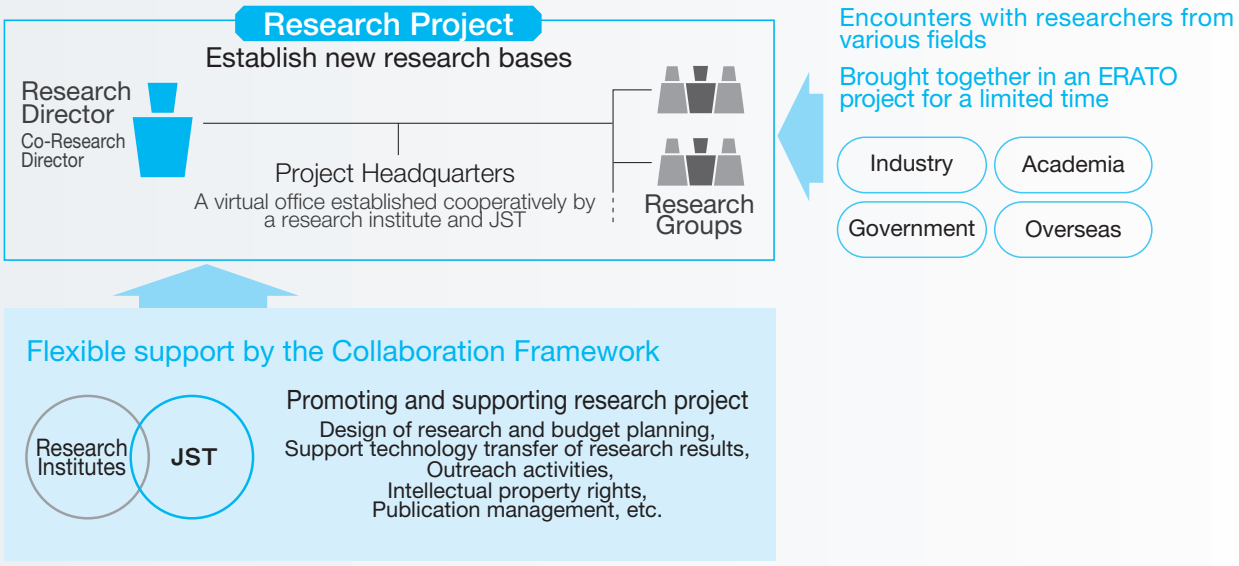
Overview

Exploratory Research for Advanced Technology (ERATO) is a research funding program with a long history, first launched in 1981. The program aims to promote challenging basic research through the integration of different fields across existing research areas and/or on new approaches with a large amount of research funds, and thus promote the formation of the new tides of science and technology that lead to scientific and technological innovation in the future and contribute to the accomplishment of Strategic Objectives. For this purpose, there are characteristics that enable Research Directors, as the managers in all aspects, to design Research Areas (research projects) based on unique concepts and organize three to four research groups comprising different fields and/or functions by gathering researchers with different specialties and/or research projects to develop new fields.

Characteristics

- ERATO is a research system with "human" cores, in which the uniqueness and leadership of Research Directors are significant, while the young researchers involved are encouraged to exercise a certain amount of discretion.
- The Research Directors design Research Areas (research projects) based on unique concepts and deal with the development of new fields. It is possible to have one or two Co-Research Director(s) who manages the project in cooperation with the Research Director.
- The efforts to bring together excellent researchers from various fields, backgrounds, organizations, and nationalities are significant. Each project establishes three to four research groups in different fields and/or functions with the Research Director at the core. The projects contribute not only to the development of new fields but also to the development of young researchers. Those who participated in the past projects are active in various fields.
- JST, in cooperation with the organizations to which the Research Directors belong, along with its dedicated staff, support the establishment of new research organizations and the management of research bases that are independent from existing organizations.
- ERATO allows a flexible management approach toward research projects, enabling changing budgets and plans depending on the progress of research.

Research Framework



Department of Research Project
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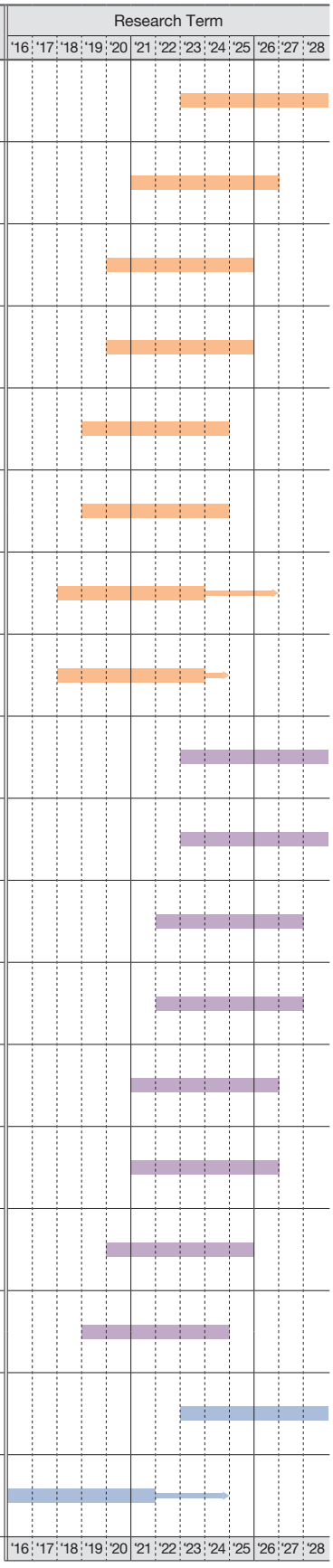
On-going Research Projects

Project Name	Research Director	
SATO Organoid Design	Toshiro SATO	Professor, Keio University School of Medicine
ARITA Lipidome Atlas	Makoto ARITA	Professor, Keio University Faculty of Pharmacy / Team Leader, RIKEN Center for Integrative Medical Science
SUZUKI RNA Modification	Tsutomu SUZUKI	Professor, Graduate School of Engineering, The University of Tokyo
UEDA Biological Timing	Hiroki R. UEDA	Professor, Graduate School of Medicine, The University of Tokyo / Team leader, RIKEN Center for Biosystems Dynamics Research/ Distinguished Visiting Professor, Institute of Life Science, Kurume University
KURUMIZAKA Chromatin Atlas	Hitoshi KURUMIZAKA	Professor, Institute for Quantitative Biosciences, The University of Tokyo
FUKATSU Evolving Symbiosis	Takema FUKATSU	Prime Senior Researcher, Bioproduction Research Institute, National Institute of Advanced Industrial Science and Technology (AIST)
	Co-Research Director Shinji FUKUDA	Project Professor, Institute for Advanced Biosciences, Keio University
	Co-Research Director Chikara FURUSAWA	Team Leader, Center for Biosystems Dynamics Research, RIKEN
IKEGAYA Brain-AI Hybrid	Yuji IKEGAYA	Professor, Graduate School of Pharmaceutical Science, The University of Tokyo
HAMACHI Innovative Molecular Technology for Neuroscience	Itaru HAMACHI	Professor, Graduate School of Engineering, Kyoto University
SAGAWA Information-to-Energy Interconversion	Takahiro SAGAWA	Professor, Graduate School of Engineering, The University of Tokyo
SEKIGUCHI Three-nucleon Forces	Kimiko SEKIGUCHI	Professor, School of Science, Tokyo Institute of Technology
UCHIDA Magnetic Thermal Management Materials	Ken-ichi UCHIDA	Distinguished Group Leader, Research Center for Magnetic and Spintronic Materials, National Institute for Materials Science / Professor, Department of Advanced Materials Science, Graduate school of Frontier Science, The University of Tokyo
SHIBATA Ultra-atomic Resolution Electron Microscopy	Naoya SHIBATA	Professor, Institute of Engineering Innovation, School of Engineering, The University of Tokyo
KATAOKA Line X-ray and Gamma-ray Imaging	Jun KATAOKA	Professor, School of Advanced Science and Engineering, Faculty of Science and Engineering, Waseda University
NOZAKI Resin-Degradation Catalyst	Kyoko NOZAKI	Professor, Graduate School of Engineering, The University of Tokyo
YAMAUCHI Materials Space-Tectonics	Yusuke YAMAUCHI	Distinguished Professor, Department of Materials Science and Engineering, School of Engineering, Nagoya University / Professor, The University of Queensland /Satellite PI MANA Principal Investigator (PI), National Institute for Materials Science
MAEDA Artificial Intelligence in Chemical Reaction Design and Discovery	Satoshi MAEDA	Director, WPI-ICReDD, Hokkaido University / Professor, Faculty of Science, Hokkaido University
	Co-Research Director Satoru IWATA	Professor, Graduate School of Information Science and Technology, The University of Tokyo / Project Professor, WPI-ICReDD, Hokkaido University
KOJIMA Market Design	Fuhito KOJIMA	Professor, Department of Economics, The University of Tokyo
HASUO Metamathematics for Systems Design	Ichiro HASUO	Professor, Information Systems Architecture Science Research Division, National Institute of Informatics



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⇒ Additional Research Period: Depending on the project's development and the host research institution's commitment, an extension period, "Additional Research Period," can be granted up to three years continuously after the original five-year project period.

ACT-X

Individual-type research that supports "the establishment of an individual," i.e., young researchers with unique and challenging ideas

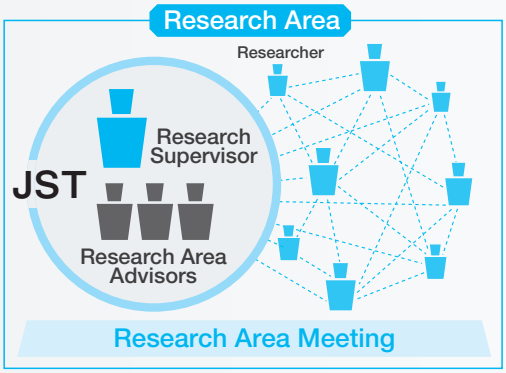
Overview

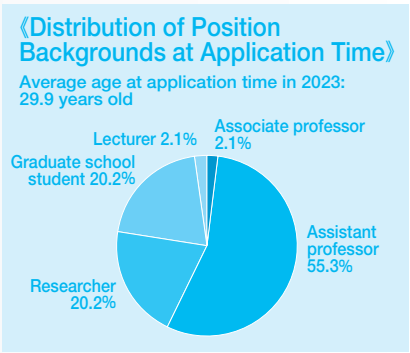
The purpose of ACT-X is finding and developing superior young researchers to address important problems facing our country. Under the management principles of the Research Area defined by the Research Supervisor, we find researchers who have challenging ideas. We give aid to research aimed at creating new values that lead to scientific and technological innovation. With advice and guidance from the Research Supervisor and Research Area Advisor, young researchers advance based on their unique ideas. As they communicate with researchers from different fields inside or outside the Research Area, young researchers attempt to establish themselves as researchers while forming a network of researchers.

Characteristics

- We support young researchers (including graduate school students) who have had their doctorate for less than 8 years (or researchers who are bachelor's degree holders for less than 13 years; excluding periods of maternity leave and parental leave.
- Research Supervisors call for research proposals based on the Research Areas they manage, adopting 60 to 90 research projects in each area. We consider the balance between science and technology fields when accepting a variety of researchers. Thus, we give them support by forming networks of researchers with different viewpoints in a Research Area or across Research Areas. For this purpose, we call for proposals several times separately. Our criteria for accepting proposals are clarified each time in the application requirements.
- 4.5-6.0 million yen has been allocated to support each research project, which is sufficient to enable young researchers to begin working on their unique and challenging ideas, and pursue their independent research projects.
- In order to maximize achievements, our Research Supervisors adopt a flexible management approach by giving instructions to ACT-X researchers on changing, accelerating, or cancelling research depending on their progress. We assign about ten Research Area Advisors to support Research Areas. We also have experts who give advice and perform evaluations in terms of science and technology. In addition, we have experts from industry who can give advice from a variety of viewpoints. To help young researchers establish themselves as independent entities, we assign each ACT-X researcher to a Research Area advisor who also plays the role of a mentor. Furthermore, Research Supervisors and Research Area Advisors give advice and guidance through area meetings held once or twice a year, and by visiting the laboratories of ACT-X researchers.

Research Framework





On-going Research Areas

Research Area	Research Supervisor		Fiscal Year '19 '20 '21 '22 '23 '24 '25 '26 '27 '28 '29	Projects
Cyberinfrastructure for AI empowered society	Shinji SHIMOJO	Professor, Faculty of Software and Information Technology, Aomori University		-
Life and Information	Yuji SUGITA	Chief Scientist, RIKEN Cluster for Pioneering Research		-
Trans-Scale Approach Toward Materials Innovation	Masayuki TAKEUCHI	Director, Research Center for Macromolecules and Biomaterials, National Institute for Materials Science		22
Innovations in Mathematical and Information Sciences to Build the Next-Generation AI	Takahiro HARA	Dean/Professor, Graduate School of Information Science and Technology, Osaka University		30
Life Phenomena and Materials	Yoko TOYOSHIMA	Emeritus Professor, The University of Tokyo		40
Hardware in Future for Resilience of Real Space	Shuji TANAKA	Professor, Graduate School of Engineering, Tohoku University		63
Environments and Biotechnology	Nobuhiko NOMURA	Professor, Faculty of Life and Environmental Sciences, and Director, Microbiology Research Center for Sustainability, University of Tsukuba		70
AI powered Research Innovation / Creation	Yasuo KUNIYOSHI	Professor, Graduate School of Information Science and Technology, The University of Tokyo		71
Life and Chemistry	Mikiko SODEOKA	Deputy Director, Center for Sustainable Resource Science, RIKEN		60
Frontier of mathematics and information science	Ken-ichi KAWARABAYASHI	Professor, Principles of Informatics Research Division, National Institute of Informatics/ Professor, Graduate School of Information Science and Technology, The University of Tokyo		86

→ Accelaration Phase Only

As of July 2024

Department of Strategic Basic Research · ACT-X Section

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AIP Network Laboratory

Virtual Laboratory Integrating Researches in AIP Project

Overview

As a research organization executing the AIP Project* supported by MEXT, JST promotes unique research activities leading to new innovations utilizing the framework of our Strategic Basic Research Programs. We combine multiple research areas to build a virtual laboratory (i.e. a network laboratory) and unlock the potential of the AIP Project by closely collaborating with RIKEN.

* The AIP (Advanced Integrated Intelligence Platform) Project is an initiative leveraging innovative AI technologies to conduct integrated research and development activities on big data, IoT, and cyber security. The project is executed by JST and RIKEN.

Characteristics

● Integration of Research Areas

AIP Network Lab is to fund prominent researchers to support innovative research projects and to maximize the outcome in the strategic basic research program. It also promotes joint researches across research areas in a wide range of research phases, including topic selection and research promotion.

● Integrated Operation with RIKEN

AIP Network Lab actively shares research results and researchers with RIKEN AIP Center to enable consistent research and development activities from basic research to real-world applications.

● Direction of Laboratory

1 Find and support innovative frontier researches in AI related areas and demonstrate their presences.
2 Actively disseminate research results internationally and contribute to the progress of AI related research areas.
3 Support collaborative research within the AIP Network Lab. and create new value.
4 Work on the entire lab to develop and educate young researchers.

Research Areas of AIP Network Laboratory (FY2024)

Laboratory Director : Katsumi EMURA (Fukushima Institute for Research, Education and Innovation, Vice President)

CREST

- Creation of Mathematical Foundation for Prediction and Control (Motoko KOTANI) *
- Creation of System Software for Society 5.0 by Integrating Fundamental Theories and System Platform Technologies (Yasuo OKABE) *
- Innovation of Life Science through Digital Transformation Focused on Data-Driven and AI-Driven Technologies (Yasushi OKADA) *
- Core Technologies for Trusted Quality AI Systems (Akiko AIZAWA) *
- Creating Information Utilization Platform by Integrating Mathematical and Information Sciences, and Development to Society (Naonori UEDA) *
- Creation and Development of Core Technologies Interfacing Human and Information Environments (Kenji MASE) *

PRESTO

- R&D Process Innovation by AI and Robotics: Technical Foundations and Practical Applications (Ichiro TAKEUCHI) *
- Exploration of New Science using Mathematics to Predict and Control the Future (Zin ARAI) *
- Creating Human-Centered Interaction to Solve Social Issues (Hideaki KUZUOKA) *
- Co-Creation of the Transformation Platform Technology for Human and Society by Integration of the Humanities and Sciences (Satoshi KURIHARA) *
- Strengthening ICT Infrastructure for Social Change (Teruo HIGASHINO) *
- The Fundamental Technologies for Trustworthy AI (Hiroki ARIMURA) *
- Future Led by IoT (Hideyuki TOKUDA) *
- Elucidating Mathematical Structures in Real/Virtual World Objects and Their Utilization (Takashi SAKAJO) *

ACT-X

- Life and Information (Yuji SUGITA) *
- Cyberinfrastructure for AI Empowered Society (Shinji SHIMOJO) *
- Innovations in Mathematical and Information Sciences to Build the Next-Generation AI (Takahiro HARA) *
- AI Powered Research Innovation / Creation (Yasuo KUNIYOSHI) *
- Frontier of Mathematics and Information Science (Ken-ichi KAWARABAYASHI) *

* Research Supervisor

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ALCA-Next

ALCA-Next
ADVANCED TECHNOLOGIES FOR CARBON-NEUTRAL

Generating innovative technologies that will contribute to the realization of carbon neutrality

Overview

This program promotes basic research on innovative technologies that are not just extensions of conventional technologies and that will bring about discontinuous innovation, with the aim of contributing to the realization of carbon neutrality by 2050.

Characteristics

- Covering a wide range of research fields that realizing carbon neutrality
- Actively adopting challenging proposals based on unconventional ideas of individual researchers
- Fostering technological seeds by improving the levels of technology maturity (TRL) through "stage-gate evaluation", and etc.
- Accelerating R&D and bridging the gap by collaborating with other projects such as Green Technologies for Excellence (GteX)*

* About GteX: :https://www.jst.go.jp/gtex/en/

ALCA-Next Technology Areas

- Energy Conversion and Energy Storage
- Resource Circulation
- Green Biotechnology
- Semiconductor
- Green Computing and DX
- Full-scale R&D

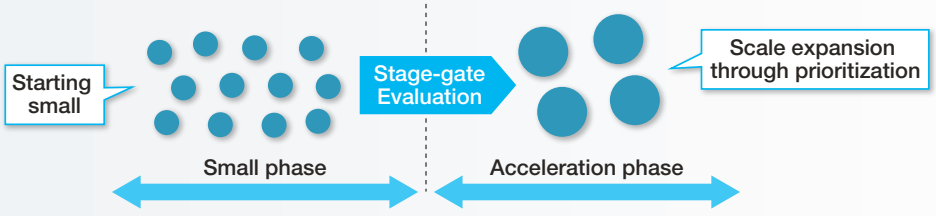
Program Director (PD) , Program Officer (PO)

- Program Director (PD)
  UOSAKI Kohei
  Professor Emeritus, Hokkaido University/Emeritus Fellow, National Institute for Materials Science/Principal Fellow, CRDS, JST
- Program Officer (PO)

Technology Area	Program Officer (PO)
Energy Conversion and Energy Storage	**WATANABE Masayoshi** (Distinguished YNU Professor, Institute of Advanced Sciences, Yokohama National University)
Resource Circulation	
Green Biotechnology	**EZURA Hiroshi** (Professor, Institute of Life and Environmental Sciences, University of Tsukuba)
Semiconductor	**KURODA Tadahiro** (University Professor, Office of University Professor, The University of Tokyo)
Green Computing and DX	
Full-scale R&D	**KONDO Akihiko** (Vice President and Professor, Graduate School of Science, Technology and Innovation, Kobe University)

Stage-gate evaluation

R&D will be conducted in stages, begins at a "small phase" in which a large number of relatively small amount of proposal adopted ("starting small") to an "accelerated phase" in which those proposal narrowed down and concentrated investment is made.



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CRONOS

Cutting-edge Research and Development on Information & Communication Sciences

R&D program aimed at advancement of Japan's information and communication technology through Grand Challenges

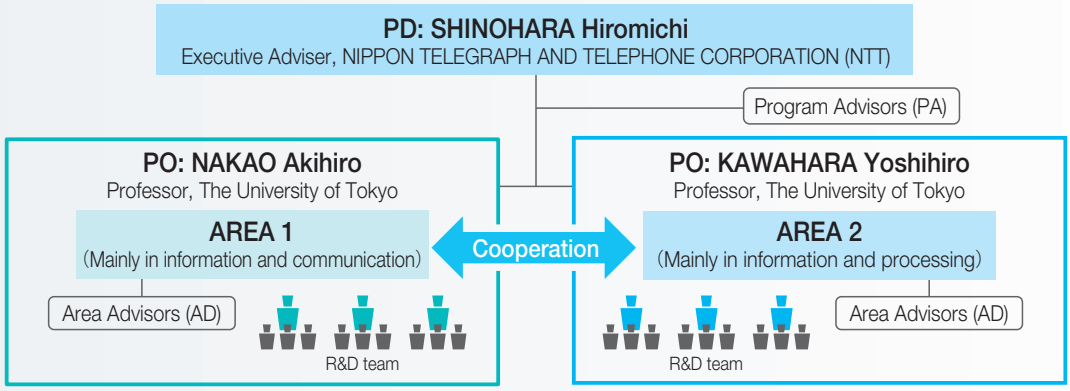
Overview

This program aims to contribute to an advancement of Japan's information and communication sciences through developing innovative technologies in the field and fostering researchers with unique ideas and conceptual skills.

Characteristics

- This program covers a wide range of technical areas in information and communication sciences. Two areas have been set up and the POs manage each area in cooperation with each other.
- We set challenging goals (Grand Challenges) that have the vision to change the conventional wisdom of information and communication science and have a significant impact on social issues, and promote team-based research and development to achieve these goals.
- JST designs Grand Challenges consulting with PD, PAs, POs, and external experts. R&D proposers are also welcome to set.
- This program will engage in fundamental research and Proof of Concept (POC) of the results of that research, which will lead to social change, through an operational scheme that transcends the boundaries between fundamental and applied research.

Program Director (PD)・Program Officer (PO)



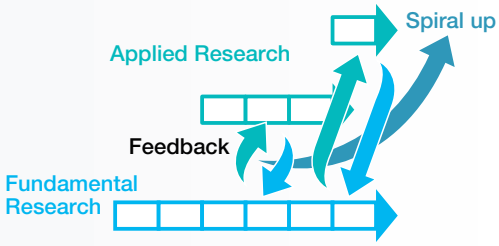
Concept of Grand Challenges

The Grand Challenges include a wide range of technical area. The program aims to create innovative information and communication technologies in various research approaches and to foster advanced research personnel.

①Ideas that change common sense
②Technological breakthroughs based on basic research
③Major impact on social issues
④Evaluation of technological value through Proof of Concept

R&D scheme

The R&D projects in this program consist of "fundamental research" and "applied research" that aims to bridge applications. We will aim to spiral up by going back and forth between fundamental and applied research.



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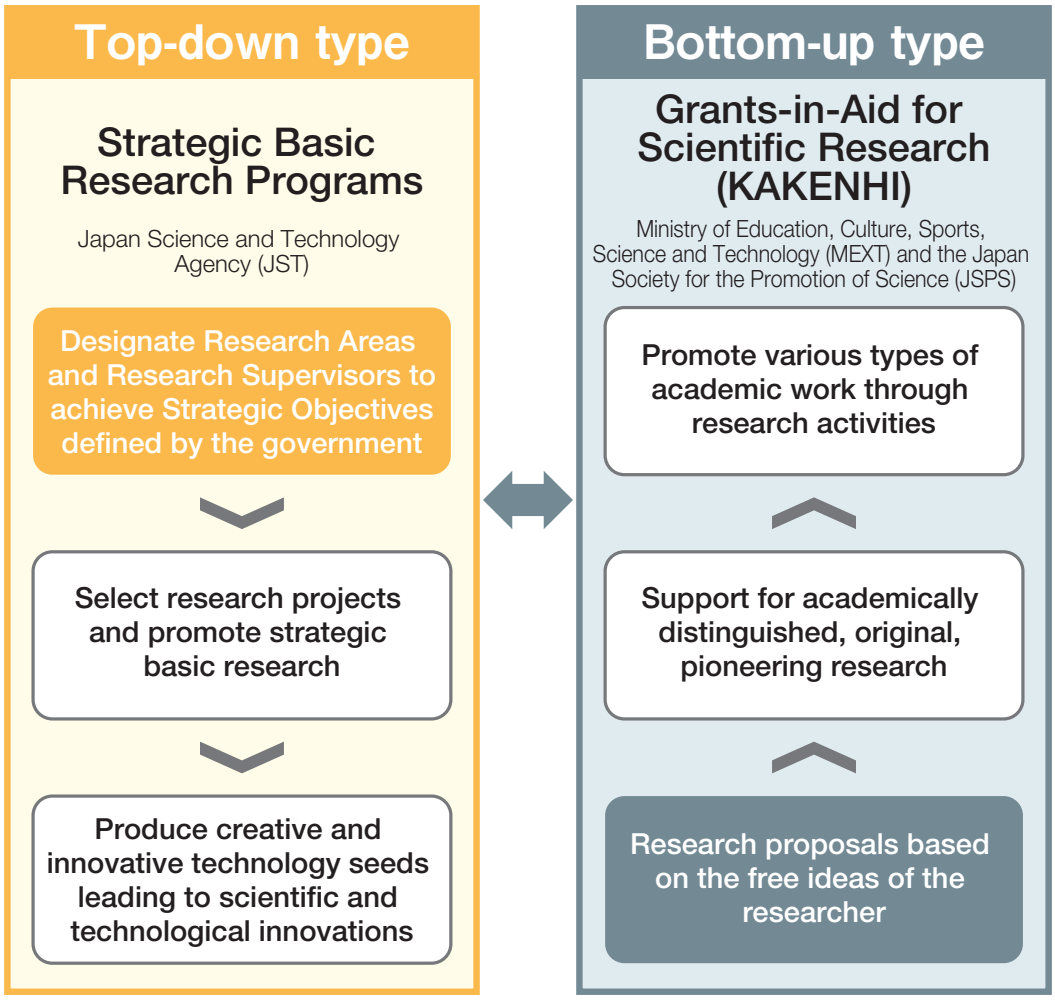
Program Directors for CREST, PRESTO, ERATO, and ACT-X

Yoshiro HIRAYAMA	Director, SIP Research Promotion Center, QST (National Institutes for Quantum Science and Technology) Professor Emeritus, Tohoku University
Michiko IGARASHI	Freelance Journalist
Atsushi KUMANOGOH	Dean, Graduate School of Medicine, Osaka University
Masahiro TATSUMISAGO	President, Osaka Prefecture University
Jun-ichi TSUJII	Fellow, The National Institute of Advanced Industrial Science and Technology
Kazuya MASU	President, Tokyo Institute of Technology

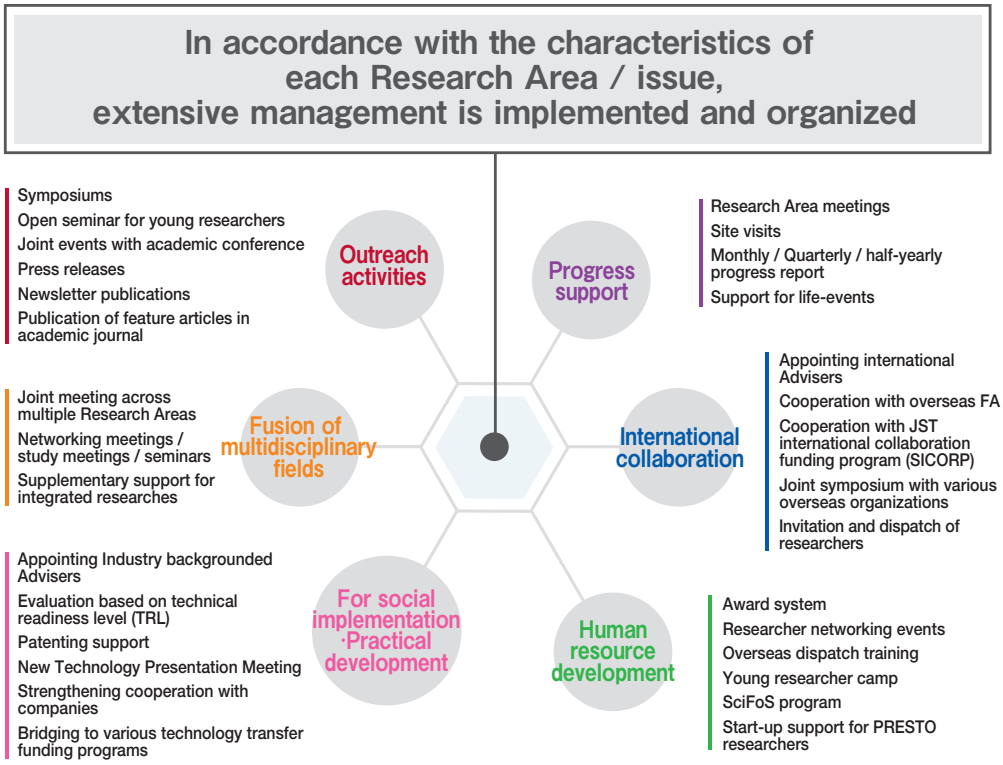
updated April 2024

Feature of SBRP : Top-down research programs



Feature of SBRP : Extensive program management

In Strategic Basic Research Programs, the Research Area is designated together with a Research Supervisor.
To maximize the output of Strategic Basic Research Programs, in accordance with the characteristics of each Research Area, extensive management is implemented and organized, including outreach activities, Progress support, fusion of multidisciplinary fields, international collaboration, social implementation or practical development, and human resource development.



Strategic Basic Research Programs

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■Department of Strategic Basic Research
■Department of Research Project
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