

2023

Research Center for Advanced Science and Technology The University of Tokyo



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Advanced Science and Technology
The University of Tokyo

Message



Science and Technology Enabling All Citizens of the Earth to Collaborate with One Another and Coexist with Nature

Director

M. Sugiyama

Infectious diseases, climate change, and other complex, global-scale problems that confront us today have called into question the assumption that people can control the natural world through advancements in science and technology. We need to establish a new approach that enables all global citizens to collaborate with one another and coexist with nature.

The problems facing humanity extend spatially from the level of local communities to nation-states and ultimately to the entire planet. We need to start doing whatever we can to resolve these problems right now, at the same time as we put into place measures that address their impact several decades into the future. To tackle these spatial and temporal multiscale challenges, we must transcend boundaries, such as those between the humanities and social sciences and between science and engineering, so that we can “connect” technologies across multiple disciplines.

RCAST is a community of exceptional researchers across 44 areas organized under six research categories: materials, information, environment and energy, social sciences, chemical biomedicine, and barrier free. These researchers work closely together and cooperate flexibly to tackle complex problems through creative collaboration with local stakeholders. This collaborative work is already yielding a variety of constructive answers. The RCAST approach is to form multidisciplinary teams tailored to work on a specific problem, rather than specializing in one discipline. We are convinced that this approach is exactly what is needed to resolve global-scale problems.

RCAST also mobilizes versatile and multilayered connections: researchers take the lead on the issue being addressed and are supported through connections of trust with their colleagues and with the RCAST organization as a whole.

I believe that to make these kinds of connections it is important to act with empathy rather than just logic. Genuine connections are formed when colleagues working together to solve a problem share a sense of inspiration. Moreover, to connect all the people of the world with the achievements of science and technology and to put these achievements to practical use, it is essential for people to empathize with the idea of building a better society through technology. RCAST strives to be a community filled with empathy. In ancient Greece, before society began to grow more fragmented and complex, no distinction was made between scientists and artists. In the same way, the RCAST campus brings together not only researchers but also a wide range of artists, generating dialogue through reason and emotion on a daily basis. Moreover, people with disabilities are routinely hired as researchers and staff. RCAST is a trailblazing experiment toward the realization of a future in which diverse people gather, empathize with one another, and connect their individual talents to co-create a better society.

Through bonds of empathy and trust, RCAST will continue to connect science and technology with nature and communities, and connect our planet with future generations.

About RCAST

Since its establishment in 1987, the Research Center for Advanced Science and Technology (RCAST)—the newest research center attached to the University of Tokyo—has aimed to contribute to the development of science and technology by taking on new challenges arising from advances in science and resulting changes in society, and by exploring new areas of advanced science and technology for the benefit of society and humankind. In our more than 40 laboratories, we have been conducting a wide variety of research from basic to applied fields, ranging from advanced research in science and technology to the social sciences as well as the barrier-free social systems of the future. To address multifaceted issues, we make versatile and multilayered connections and the entire center supports not only single researchers but all researchers across research fields. RCAST will continue to take bold steps to realize a better society and co-create the future.



Interdisciplinary Research

Solving increasingly complex social issues requires fresh perspectives. Since RCAST was founded over 35 years ago, science and engineering, which advance science and technology, have co-existed with the humanities and social sciences, which deal with ethics, thought, and social systems. We are developing fields where there is no prior research.

Social Science

6 Fields

- Strategic Planning
- Political Administrative System
- Policy Research on Science and Technology
- Religion and Global Security
- Rule-making Strategies
- Global Consensus Making Policy

Information

11 Fields

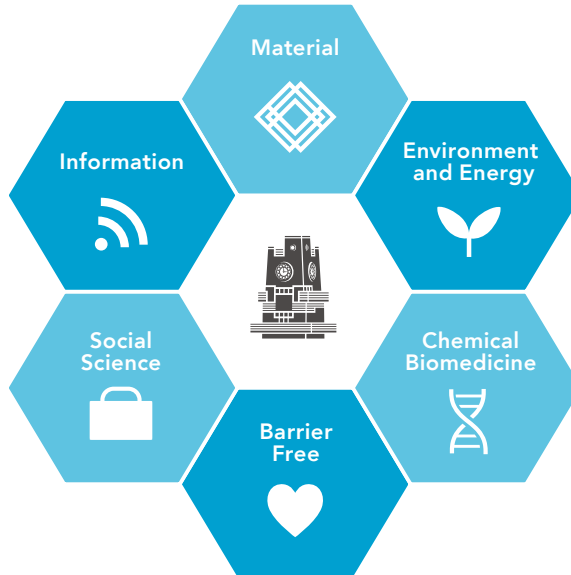
- Artificial Intelligence
- Information Devices
- Mathematical Physics of Emergent Systems
- Information Somatics
- Networked Biophotonics and Microfluidics
- Machine Intelligence
- Advanced Art Design
- Photonic Imaging
- Aerospace Mobility
- Animal Linguistics
- Advanced Data Science

4 Social Cooperation Research Departments

- Insect Controlled Space Design
- MobilityZero
- Advanced Art Design Laboratory
- Laser Photonics Sensing

1 Corporate Sponsored Research Program

- Progressive Logistic Science



Material

6 Fields

- Micro Device Engineering
- Quantum Information Physics and Engineering
- Theoretical Chemistry
- High Performance Materials
- Computational Materials Science
- Ultraprecision Manufacturing Science

1 Corporate Sponsored Research Program

- Manufacturing Science for Advanced Optical Components

Environment and Energy

10 Fields

- Energy and Environment
- New Energy
- Climate Science Research
- Co-Creative Community Planning, Design, and Management
- Energy System
- Global Climate Dynamics
- Geochemistry and Environmental Chemistry
- Hydrogen Energy
- Biodiversity and Ecosystem Services
- Planning for Disaster Risk Reduction

3 Social Cooperation Research Departments

- Renewable Fuel Global Network
- The Next Generation of Energy Distribution System
- Smart City:Co-Creating with Citizens

1 Corporate Sponsored Research Program

- Study on Value of Sports (Meiji Yasuda Life)

1 Affiliated facility

- Initiatives for Global Security and Energy Transition

Barrier Free

4 Fields

- Tojisha-Kenkyu
- Inclusive Design Laboratory
- Social Inclusion Systems
- Interdisciplinary Barrier-Free Study

1 Corporate Sponsored Research Program

- Research on Individually Optimal Learning

Chemical Biomedicine

7 Fields

- Metabolic Medicine
- Chemical Biotechnology
- Integrative Nutriomics and Oncology
- Synthetic Biology
- Structural Biology
- Genome Science & Medicine
- Intercellular Communication & Medical Science

2 Social Cooperation Research Departments

- Department of Inflammolgy
- Genome Science & Medicine

R

Research

The only doctoral course at a UTokyo affiliated institute



The Department of Advanced Interdisciplinary Studies was established in 1992 as a doctorate only program. Under RCAST's characteristic interdisciplinary environment, we foster individuals with the will to pioneer unique new fields, without being restricted by conventional frameworks. This program opens the door not only to corporate researchers and engineers, but also to corporate managers and government policymakers with knowledge of advanced science and technology.

This unique approach to organizational management enables quick decision-making to address new challenges

Since its inception, RCAST has maintained a system of organizational management that separates research from administration. As the decision-making unit, the Strategic Management Office deliberates on ways to streamline the internal organization, as well as staffing proposals, budget allocations, and other important matters, then swiftly moves on to execution. This system reduces the time researchers spend on administrative tasks and ensures that their focus is always on research and educational activities.

Rigorous evaluation of RCAST's management strategies RCAST Board external evaluation committee

Chieko ASAKAWA IBM Fellow / Chief Executive Director, The National Museum of Emerging Science and Technology

Ikuo KABASHIMA Governor, Kumamoto Prefecture

Hideaki KOIZUMI Emeritus Fellow, Hitachi, Ltd.

Kazuki SAWA Adviser, Tokyo University of the Arts

Sachiko NAKAJIMA CEO, steAm, Inc. / Musician

Michiharu NAKAMURA President Emeritus, Japan Science and Technology Agency

Mariko FUJII Professor Emeritus, The University of Tokyo

Hiroya MASUDA Director and Representative Executive Officer, President & CEO, Japan Post Holdings Co., Ltd.

Yoichiro MATSUMOTO The Science and Technology Advisor to the Minister for Foreign Affairs

Toshiro MUTOH Honorary Chairman, Daiwa Institute of Research Ltd.

(Japanese syllabary order)

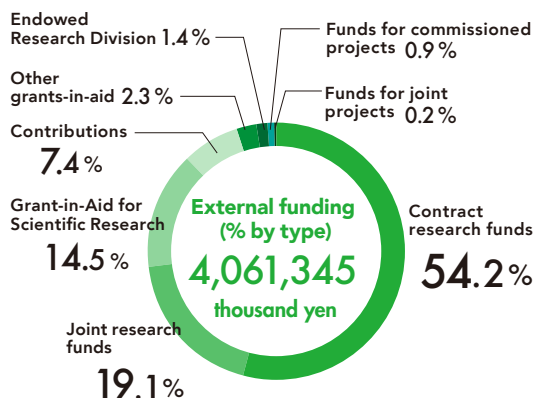
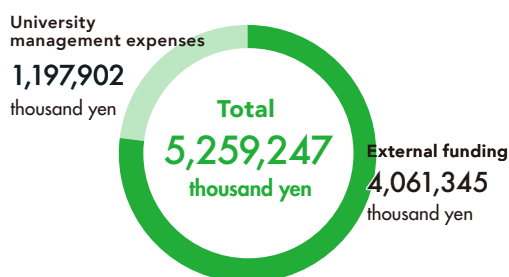
M_{anagement}

RCAST Facts

Financial Data

External funding covers nearly 80 percent of RCAST's operating expenses. This reflects the recognition of RCAST's farsighted research and the results it has produced and shows that it has a lineup of researchers who are capable of securing their own funding.

Fiscal Year 2021



Faculty and Staff

Through external funding, RCAST has created the project researcher/faculty system enabling unique, high-quality human resources to be employed by RCAST on a project basis. This system, originated by RCAST, can make a huge difference in research capabilities.

Academic Staff

Professors	28	Project Professors	4
Associate Professors	12	Project Associate Professors	19
Lecturers	3	Project Lecturers	13
Research Associates, Research Assistants	14	Project Research Associates	28
Project Researchers	47		
Visiting Academic Staff		Other Researchers	267 [※]

※ Other Researchers: Visiting Research Fellows, Co-operative Research Fellows, Joint Research Fellows

Students

Graduate Students	372	Including 106 AIS students
Undergraduate Students	94	

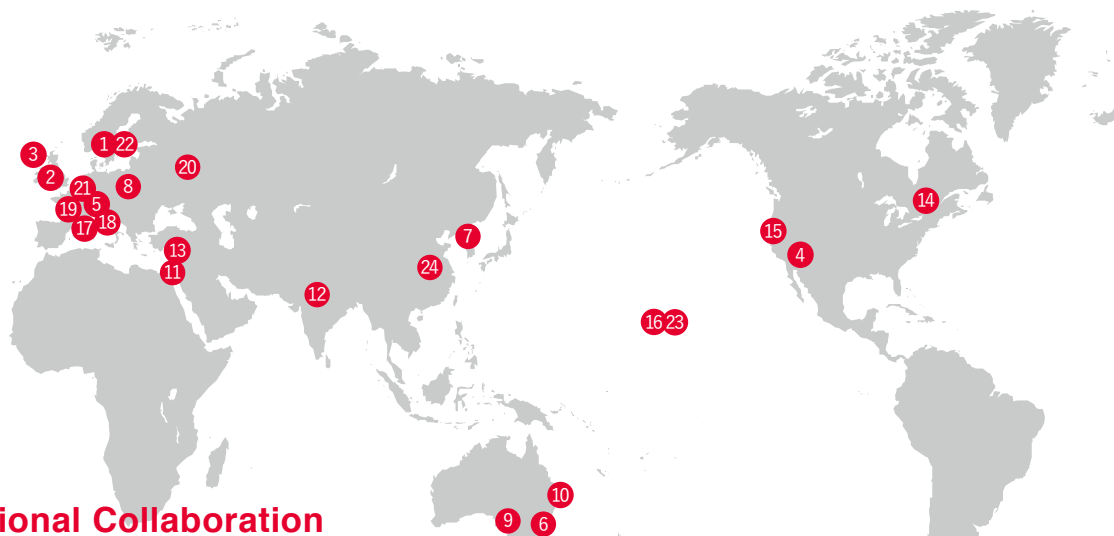
Administrative Staff

Grant Administrative Staff	32
Project Specialists	28

Forming organic connections among researchers across disciplines

We are building a global organizational network that includes establishing satellite offices at collaborating institutions.

Domestically—based on the experience of a partnership agreement with Ishikawa Prefecture that has led to a highly advanced example of joint industry creation by the university and the prefecture—we are pursuing types of co-creation that go beyond industry-academia-government cooperation together with local governments and communities participating in the Co-creation Living Lab.



International Collaboration

- | | | |
|---|--|--|
| 1 Stockholm University (Sweden) | 9 The University of Adelaide (Australia) | 15 University of California, Berkeley (USA) |
| 2 Clare Hall, University of Cambridge (UK) | 10 Queensland University of Technology (Australia) | 16 Center on Disability Studies, University of Hawaii at Manoa (USA) |
| 3 University of Glasgow (UK) | 11 The Moshe Dayan Center for Middle Eastern and African Studies (MDC), Tel Aviv University (Israel) | 17 The University of Milano-Bicocca (Italy) |
| 4 Arizona State University, LightWorks (USA) | 12 Council of Scientific & Industrial Research (CSIR) (India) | 18 Politecnico di Milano (Italy) |
| 5 Centre National de la Recherche Scientifique (CNRS) (France) | 13 The Hebrew University of Jerusalem (Israel) | 19 The University of Bordeaux (France) |
| 6 The University of New South Wales (Australia) | 14 Centre for Research in Photonics, The University of Ottawa (Canada) | 20 Moscow State Institute of International Relations (Russia) |
| 7 Advanced Institutes of Convergence Technology (AICT), Seoul National University (South Korea) | | 21 École Polytechnique (France) |
| 8 University of Kassel (Germany) | | 22 Institute for Security and Development Policy (ISDP) (Sweden) |
| | | 23 Pacific Forum International (USA) |
| | | 24 University of Science and Technology of China (CHN) |

※Order by agreement execution

Agreements with Local Governments (Domestic)

- 1 Ishikawa Prefecture and Ishikawa Sunrise Industries Creation Organization
- 2 Obuse Town, Nagano Prefecture
- 3 Kumamoto Prefecture and Kumamoto University
- 4 Karuizawa Town, Nagano Prefecture and Shinshu University Research Center
- 5 Iwaki City, Fukushima Prefecture
- 6 Kunitachi City, Tokyo
- 7 Shiraoi Town, Hokkaido Prefecture
- 8 Wakayama Prefecture
- 9 Eiheiji Town, Fukui Prefecture
- 10 Nanyo City, Yamagata Prefecture
- 11 Kobe City, Hyogo Prefecture
- 12 Iki City, Nagasaki Prefecture
- 13 Kaminokuni Town, Hokkaido Prefecture
- 14 Setagaya City, Tokyo
- 15 Koya Town and Koyasan Shingon Sect Main Temple Kongobu-ji, Wakayama Prefecture
- 16 Kobayashi City, Miyazaki Prefecture
- 17 Kamaishi City, Iwate Prefecture
- 18 Yamaguchi Prefecture
- 19 Izumiotsu City, Osaka Prefecture
- 20 Nagakute City, Aichi Prefecture
- 21 Chino City, Fujimi Town and Hara Village, Nagano Prefecture

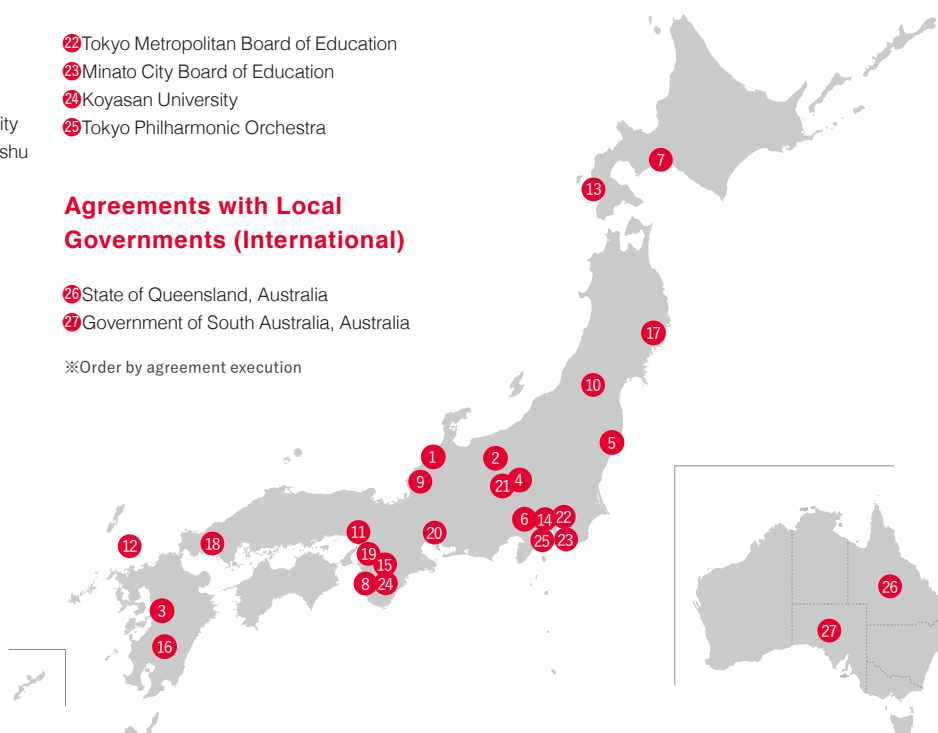
Cooperation with Domestic Educational Institutions

- 22 Tokyo Metropolitan Board of Education
- 23 Minato City Board of Education
- 24 Koyasan University
- 25 Tokyo Philharmonic Orchestra

Agreements with Local Governments (International)

- 26 State of Queensland, Australia
- 27 Government of South Australia, Australia

※Order by agreement execution

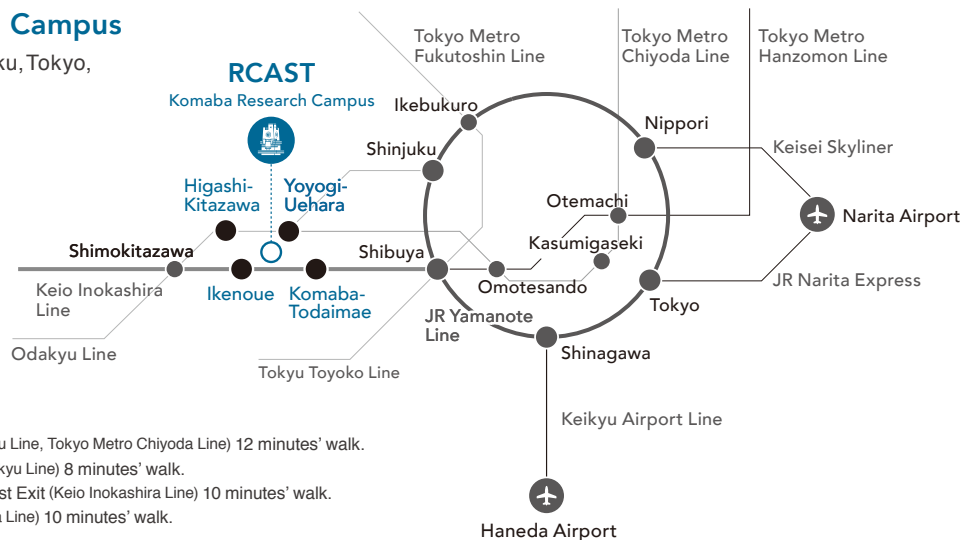


Collaborations Cooperations

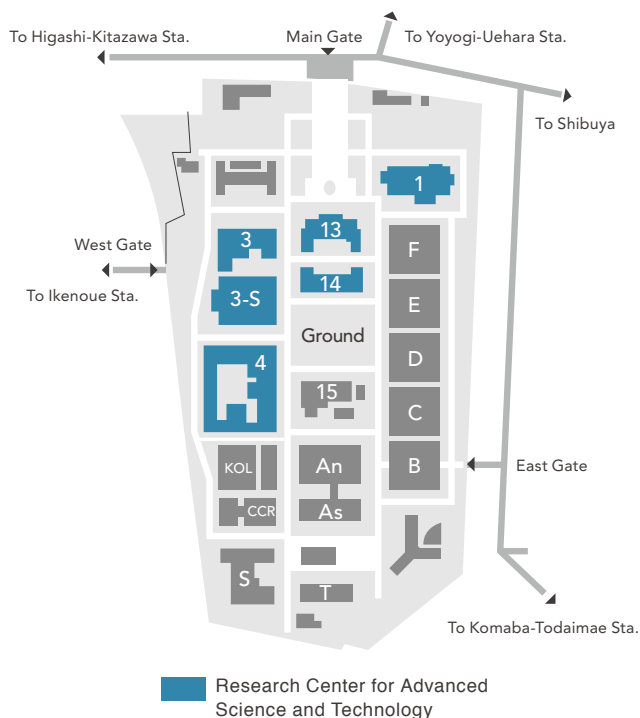
Access

Komaba Research Campus

4-6-1 Komaba, Meguro-ku, Tokyo,
153-8904



Komaba Research Campus



The Research Center for Advanced Science and Technology shall aim to contribute to the development of science and technology by expeditiously taking on new challenges arising from the advancement of science and changes in society thereby exploring new areas of advanced science and technology for humankind and society.

Article 2,
Rules for the Research Center for Advanced Science and Technology,
The University of Tokyo

Financial support for research challenges



RCAST is targeting new frontiers in every research field and taking on the challenge of helping to resolve the many problems that society faces today. Your support is needed to further advance the research and accelerate the pace for resolving social issues.

<https://www.rcast.u-tokyo.ac.jp/donation/>



<https://www.rcast.u-tokyo.ac.jp/en/>

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