

## Beyond the boundary of literature and science

While individual laboratories at RCAST conduct research in their respective fields, some have expanded to become research units, pursuing topics across broad interdisciplinary themes which currently include Systems Biology and Medicine, Barrier-Free Systems, Advanced Environmental Energy and Technology, and Advanced Contents.



## Systems Biology and Medicine

Systems Biomedicine focuses on the understanding and prevention of the mechanisms of cancer, vascular and lifestyle-related diseases, and immunological diseases. Scientists in Systems Biomedicine are making advancements in developing therapeutic methods. Systematically obtaining bioinformation from genomes and other sources, this research center then discloses the results of informatic analysis in a web-based database. In addition, they are actively collaborating with a number of companies in the pharmaceutical, chemical, materials and equipment, and information industries as a central institutional mechanism in translational systems biology for such national projects as antibody production. The center is also moving forward with research mainly targeting cancer and arteriosclerosis, the leading causes of death among an aging Japanese population, consisting of continuous systems for discovering new findings and developing new technologies useful to society.

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## Barrier-Free Systems

Barrier-Free Systems consists of human informatics, which develops technology that functions as an assistive substitute for lost or impaired senses and limbs; human-assistive technology, which maintains data that facilitates an understanding of applicable studies and needs of assisted-living equipment practitioners for individuals disabled through age, illness or injury; as well as other barrier-free fields aimed at removing barriers by analyzing the observations of practitioners facing the various barriers that exist in contemporary society. This center gathers human resources with a wide array of expertise in engineering, education, psychology, sociology and assistive technology to pursue interdisciplinary barrier-free research beyond the confines of the academic realm. Furthermore, the center plans to establish a barrier-free doctoral program within the Department of Advanced Interdisciplinary Studies to develop fresh human resources in this field.

## Advanced Environmental Energy and Technology

This center conducts a wide array of pioneering research in the field of environment and energy within a structural framework that integrates science and humanities, including research on "hard" systems involving technologies for cleaning up the environment, consisting mainly of photocatalysts and the development of renewable forms of energy such as next-generation solar cells, as well as "soft" systems from the perspectives of resource and environmental energy policy, environmental economics and environmental sociology. Established in 2007, the New Energy and Industrial Technology Development Organization (NEDO) collaborates with different departments at the University of Tokyo (Graduate School of Arts and the Institute of Industrial Science) in working to build a new educational framework centered around RCAST. In fiscal 2008, RCAST initiated Solar Quest (SQ), an international research center for global energy and environmental technologies, in order to find solutions for environmental and energy issues on a global scale. SQ exercises active leadership in the field by holding international conferences attended by elite global researchers, along with other activities.

## Advanced Contents

The main objective of Advanced Contents is to use various media to record and analyze information on human behavior, then rebuild that information for use in analyzing human behavior, or alternatively to investigate its possibilities for use. A step beyond the sciences and humanities, Advanced Contents is interdisciplinary research which applies information recorded as "points" in time and space to social networks through the fields of information society, which handles technology for extracting context, intelligence engineering, which develops technologies for reconfiguring context through system-based interpretation, and biointelligence systems, which manages technology for visualizing large amounts of collected information for easy provision. In the days ahead, RCAST looks forward to seeing results from the building and modality of contents on future human existence.

International Research Center for Global Energy and Environmental Technologies: Solar Quest



## Making most of the solar energy Achieving a global and sustainable system

We are proud to announce that RCAST has initiated SOLAR QUEST, an international research center for global energy and environmental technologies to address the issues on global environment, energy and resources. SOLAR QUEST carries out innovative R&D projects in close cooperation with industries, universities and research institutes, both domestic and overseas, in aim to establish a global sustainable system by using the abundant solar energy. In 2008, we have also established ENEOS Lab, situated within the campus, in cooperation with Nippon Oil Corporation (ENEOS), and have commenced a project on "Post-silicon solar cells for ultra-high efficiencies", under support by the New Energy and

Industrial Technology Development Organization (NEDO). We will also launch GENNAI (Global Energy Navigating and Nature Apprehension Interdisciplinary: an international association in search for global energy and understanding of nature), to conduct research on strategic planning/inspection for global development of energy and green technologies. The international advisory committee (Chairman: Prof. Hiroshi Komiyama, ex-President of the University of Tokyo) will govern our activities. In addition, we will promote R&Ds on next-generation storage batteries and biomass fuels etc. and provide an international platform for communication and interaction to develop human network and to challenge the global issues on energy and resources.



### Project Leader

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## Nippon Oil Corporation and RCAST form organizational partnership towards building a society in which energy and the environment are in harmony



Nippon Oil Corporation (ENEOS) and the Research Center for Advanced Science Technology, the University of Tokyo commenced comprehensive joint research in October, 2005 with the objective of "building a society in which energy and the environment are in harmony." The agreement has resulted in collaborative research in a number of fields, such as next-generation organic solar cells, materials for high output rechargeable batteries, and biomass, as well as a wide array of people-to-people exchanges, including the dispatch of Nippon Oil personnel to serve as associate professors in RCAST laboratories.

As a part of this comprehensive organizational partnership, Nippon Oil established the ENEOS LABO in fiscal 2008 as a center for collaborative research with RCAST on ultrahigh efficiency solar cells and the development of new energy systems for storage technology. In addition to research by Nippon Oil researchers in residence on "post-silicon high-efficiency solar cells," entrusted to the lab by the New Energy and Industrial Technology Development Organization (NEDO), the ENEOS Lab is currently studying "high-density, low-cost storage technology materials." The ENEOS LABO is working to further improve and expand the research system, including scaling up to 10 the number of Nippon Oil researchers in residence, ultimately striving to build "revolutionary storage cells" and "ultrahigh efficiency solar cells which aim to achieve power-generating efficiency of 40% at a cost comparable to that of thermal power generation" in an effort to halve greenhouse gases by 2050, as proposed by the Japanese government in the "Cool Earth 50" campaign.