LARGE-SCALE PROJECTS

National Projects at Kyoto University

The promotion of large-scale research projects is a key policy of the Japanese government. Technology and knowledge to pursue uncharted research frontiers. Kyoto University is commissioned to undertake several large-scale projects each year.



Institute for Integrated Cell-Material Sciences (iCeMS)

Breaking new ground.



Director: **Dr. Susumu Kitagawa** Director of iCeMS/Profssor, Graduate School of Engineering **WEB** www.icems.kyoto-u.ac.jp/e/



iCeMS' main building near the main gate of Kyoto University (top), and iCeMS scientists and staff at the institute annual retreat in September 2013 (bottom)

In 2007, the Institute for Integrated Cell-Material Science (iCeMS) was selected for the World Premier International Research Center (WPI)^{*1} initiative by Japanese science ministry (MEXT). Currently there are nine WPI centers throughout Japan, all of which aim to:

- 1) Advance leading edge research.
- 2) Create new interdisciplinary domains.
- 3) Establish truly international research environments.
- 4) Reform existing research organizations.

The iCeMS nurtures a rich interdisciplinary research environment — consisting of the finest chemists, biologists, and physicists from around the world — to investigate the interface between cells and materials. By focusing on life processes that occur in a mesoscopic domain, a realm that lies between one and hundreds of nanometers, iCeMS strives to create chemicals to control cellular functions and

cell-inspired materials to mimic them. Ultimately, iCeMS' goal is to forge a new field of science.



iCeMS' research building near Hyakumanben

*1 The WPI program was launched in 2007 by MEXT in an effort to build "globally visible" research centers within Japan that boast a very high research standard and outstanding research environment, capable of attracting talented researchers from around the world. (reference : WEB www.jsps.go.jp/english/e-toplevel/index.html)



Project Leader: **Dr. Shuh Narumiya** Professor, Graduate School of Medicine **WEB** www.ak.med.kyoto-u.ac.jp (Japanese Only)



The Innovation Center for Immunoregulation Technologies and Drugs (The AK Project) was established in 2007 through the joint efforts of Kyoto University and Astellas Pharma Inc. Focusing on the immunology area the project aims to develop innovative therapeutics for intractable diseases, and to make a discovery model for game-changing drugs in Japan.



The main site of the AK Project is the Fusion Laboratory in Kyoto University's Medical School, where fifteen groups led by young principal investigators (PI) and three groups from Astellas work together under the guidance of three key researchers from the Medical School, Prof. Shuh Narumiya, Prof. Nagahiro Minato, and Prof. Shimon Sakaguchi. Each group independently searches for unique drug targets. Furthermore, the AK project collaborates with clinical departments to discover biomarkers and verify the clinical significance of drug targets. The satellite laboratory at Astellas conducts high-

throughput screening and compound optimization. Kyoto University's Translational Research Center carries out early clinical trials on drugs developed by the AK project, and the intellectual property (IP) office in the Fusion Lab handles all IP matters on-site. One notable achievement of the project was the discovery of the compound (JTC 801) that ameliorates atopic dermatitis through filaggrin induction in a mouse model. The project aims to stimulate excellent scientific research and drug discovery. Its motto is *Best Drugs on Best Science*.



Effects of JTC801 on atopic dermatitis in Nc/Nga mice [A. Otsuka et al., J. Allergy Clin. Immunol., in press]



Canon-Kyoto University Project (CK Project)

Creating a healthy society.

WEB ckpj.t.kyoto-u.ac.jp/

The Innovative Techno-Hub for Integrated Medical Bio-Imaging Project, or the CK Project, which was launched in 2006, combines Kyoto University's integrated scientific knowledge and clinical research

resources with Canon's technological product-development capabilities. With the participation of Otsuka Pharmaceutical in 2012, the development of new molecular probes has been further accelerated.

The ten-year national project aims to promote innovation for the development of high-performance diagnostic systems, including a new generation of optical coherence tomography (OCT) and the first commercially available photoacaustic mammography (PAM). The project also seeks to develop MRI (magnetic resonance imaging) with integrated molecular probes. There are also plans to develop biomagnetic imaging modalities using high-sensitivity optically pumped atomic magnetometers (AMMs) as detecting sensors without cryogenic cooling, and image diagnosis systems.

The ultimate goal of this project is to create a "healthy society" by promoting cutting-edge research and development, improving quality of life (QOL) and reducing medical expenses for the aging society, while fostering talented researchers in an interdisciplinary research area of medicine and engineering (medico-engineering).





The Graduate School of Advanced Integrated Studies in Human Survivability

Producing the next generation of leaders.



Dean: Dr. Shuichi Kawai Dean/Program-Specific Professor, GSAIS WED www.gsais.kyoto-u.ac.jp/en_top

The Graduate School of Advanced Integrated Studies in Human Survivability (GSAIS), established at Kyoto University in 2013, is a five-year graduate school aiming to produce top-level global leaders who can address complex and diverse social issues with a strong sense of responsibility, humanity and morality. Advanced integrated studies in human survivability is an integrated field of scholarship that studies the means to structuralize knowledge for human survivability. In the GSAIS program, students are expected to develop a sense of mission, ethical perspectives, and high-level management skills to be active as global leaders. The program is supported by the Leading Graduate School Program of the

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Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT).

The GSAIS program is founded on the traditional Buddhist philosophy that human wisdom is acquired through mon-shi-shu (hearing, thinking, and practicing). The school's Japanese name Shishu-Kan is derived from this concept. Along with research work in their own specialization, students are expected to develop the ability to adopt an all-encompassing perspective in various fields through a broad spectrum of professional learning from the humanities to science, in addition to the academic



knowledge acquired from their undergraduate studies. The education and research training is globally focused and is given mainly in English. The curriculum is customized for each student based on their academic background and future goals, and the opportunity to debate with external lecturers invited from the industrial and government sectors is given in the Industry-Government Cooperation Special Seminar (*Jukugi*).

Internship, fieldwork, and project-based research are among the course requirements. Students participate in a one-year overseas internship at an international organization or the overseas office of a Japanese organization. Such internships are made possible through the support of leading international companies, universities, and organizations.

The GSAIS accepts 20 students per year, keeping the student-to-instructor ratio very low. They live in a residential college on campus, which enhances the environment for learning by facilitating student interaction across disciplines, and faculty members are available onsite to provide necessary support and mentoring. Eligible students receive a scholarship from the university as well as a financial support for their research activities.

The Koshibo Residential College

A notable feature of the curricula offered at the Graduate School of Advanced Integrated Studies in Human Survivability (also known as the Shishu-Kan Graduate School) is that it is a residential college. This enables students to share daily life together and discuss a broad range of issues with faculty members and fellow students with different academic backgrounds, thereby cultivating the development of diverse thinking abilities and practical skills.

The unveiling ceremony for the name plaque of the school's first residential facility was held on July 23, 2013. The plaque features the name of the facility, "Koshibo," written in calligraphy by President Hiroshi Matsumoto of Kyoto University. Approximately eighty people, including visitors to the university, attended the unveiling ceremony. The ceremony opened with an address by President Matsumoto, and was followed by a tour of the facility and a discussion session. The name "Koshibo" means "a place where people with expansive aspirations gather."

