Research

In accordance with its Mission Statement, Kyoto University seeks to advance the global frontiers of knowledge through research efforts founded on its institutional ideals of academic freedom and autonomy, and address complex global issues through the integration of diverse basic and applied research.

As an institution committed to extensive local and international outreach, Kyoto University seeks to contribute to a harmonious global society through its research, international exchange efforts, and engagement with communities around the world.

▲ A researcher conducting an experiment in an open lab Photo by Center for iPS Cell Research and Application, Kyoto University

Enhancing Research Capabilities

As one of the world's leading research institutions, Kyoto University is engaged in diverse initiatives to continually enhance its research capabilities. Emphasis is placed on advancing academic fields in which the university has particular strengths, developing new interdisciplinary fields, and promoting collaboration beyond national and regional boundaries.

A World-Leading Hub for International Research Collaboration and Knowledge Exchange Kyoto University Institute for Advanced Study

The Kyoto University Institute for Advanced Study (KUIAS) was established in 2016 to pursue cutting-edge research, foster leading researchers of the next generation, and concentrate the collective wisdom of distinguished researchers from Japan and around the world. In 2017, Kyoto University's Institute for Integrated Cell-Material Sciences (iCeMS), which seeks to develop innovative new fields that integrate materials science and cell science, was incorporated into KUIAS as one of its research centers. One of the key features of KUIAS is that it employs world-renowned researchers as distinguished professors, and provides a platform for high-level domestic and international research collaboration and exchange. There are currently four distinguished professors employed at the institute.

• KUIAS kuias.kyoto-u.ac.jp/e/

• iCeMS www.icems.kyoto-u.ac.jp/en/

Prof. Shigefumi Mori

Algebraic Geometry, Birational Geometry

Mori was awarded the Fields Medal in 1990 "for the proof of Hartshorne's conjecture and his work on the classification of three-dimensional algebraic varieties." In 2015, he became the first president of the International Mathematical Union to be elected from an Asian institution.



Primatology, Comparative Cognitive Science

Through his groundbreaking research on chimpanzees in the Ai Project, and his fieldwork in the Republic of Guinea, West Africa, Matsuzawa established the new academic field of comparative cognitive science.



Inorganic Chemistry, Chemistry of Coordination Space

Kitagawa developed porous materials (MOF) with numerous nano-sized pores. His discoveries are anticipated to be key in the invention of new materials for the absorption of carbon dioxide, which causes global warming, as well as in innovative medical applications.



Molecular Immunology

Honjo defined the mechanistic principle of vaccination-induced antibody memory through the discovery of AID (activation-induced cytidine deaminase), which engraves antigen memory in the immunoglobulin gene. He also discovered the protein PD-1, which suppresses the function of immune cells, and developed its application for cancer treatment using mouse models. Cancer therapy using PD-1 blockade is now approved for many types of cancer.

Fostering Next-Generation Researchers The Hakubi Project

A five-year project that recruits outstanding young researchers from around the world, and provides them with the ideal environment to advance their studies. The project aims to cultivate world-leading researchers who will pioneer new paths in their respective academic fields, and spearhead next-generation research.

www.hakubi.kyoto-u.ac.jp/eng/eng.html



▲ Hakubi Center and Sikkim University 2nd Joint Workshop on Human Sustainability



Cutting-Edge Research Fields

Regenerative Medicine and Advanced Medical Research

Kyoto University is committed to pursuing research to promote human health and wellbeing, and to advancing medicine and healthcare in the context of rapidly aging modern societies. Major fields of medical research include regenerative medicine focusing on iPS cells, led by Nobel Prize laureate Dr. Shinya Yamanaka, translational research, and new drug discovery based on cutting-edge research in the university's areas of strength, such as cancer, immunology, and genetics. The research for medical application is undertaken in close cooperation with the Kyoto University Hospital.



derived from human iPS cells

Photo by Asuka Morizane, Center for iPS Cell Research and Application, Kyoto University

Fusing Chemistry and Life Science

Kyoto University is at the forefront of new horizons in research that combine chemistry and nanotechnology with life science. These new fields are anticipated to herald innovative developments in a wide range of industries and sectors, including energy, new materials, medicine, and healthcare, and contribute significantly to the resolution of global-scale issues.

• iCeMS www.icems.kyoto-u.ac.jp/en/



▲ iCeMS develops a unique research field in the mesoscale realm between nanoscale science (left: chemistry and physics) and macroscale science (right: cell biology).

Research Collaboration between Japan and the ASEAN Region

Among Japan's universities, Kyoto University has the longest history of engagement in Southeast Asia, dating back to the pre-war era. Throughout that history, the university's researchers have undertaken interdisciplinary research and fieldwork to address contemporary issues in the region, provided support to enhance the region's higher education, and collaborated on research into sustainable development to address various regional issues. Projects include research into the conversion of biomass waste into energy, the highly effective use of tropical plants, and early warning systems for large-scale natural disasters.

• Center for Southeast Asian Studies (CSEAS) en.kyoto.cseas.kyoto-u.ac.jp

 JASTIP jastip.org/en/



Please visit the following website for more information and news about Kyoto University's research activities: • KYOTO U Research News www.kyoto-u.ac.jp/cutting-edge/

A New Hub in North America to Enhance the University's Global Research Profile

Kyoto University San Diego Liaison Office

Aiming to promote international research collaboration and strengthen industry-academia linkage, Kyoto University established a liaison office in San Diego, California, in April 2017. With a particular focus on the bio-venture industry, the office serves as a hub connecting Kyoto University with the US and beyond.

www.kyoto-u.ac.jp/en/about/events_news/ office/kikaku-joho/kikaku/news/2017/17040 1_1.html



Connecting Research Kyoto University Research Administration Office

The Kyoto University Research Administration Office (KURA) provides systematic support to ensure an environment in which the university's researchers can dedicate their energies fully to their research. Comprehensive support is provided—from the planning and operation of research projects, to the publicizing and sharing of research outcomes with society. International research collaboration projects are also supported by university research administrators (URAs) stationed in the university's overseas offices.

www.kura.kyoto-u.ac.jp/en/about/

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Advanced Research to Address Complex Social Issues

Collaboration with Industry and Government



▲ Walking support robot developed in partnership with the Suncall Corporation by the Center of Innovation (COI) Program from Ministry of Education, Culture, Sports, Science and Technology (MEXT) and Japan Science and Technology Agency (JST)



▲ Kyoto University's President Yamagiwa (left) with President and CEO Toshiaki Higashihara of Hitachi, Ltd. (right)

Kyoto University actively promotes the effective utilization and application of its research results in all sectors of society, collaborating with the industrial and governmental sectors in order to share the benefits of the cutting-edge knowledge generated on its campuses, and seek solutions to the complex multi-faceted issues faced by international society.

During the 2016 academic year, the university filed 286 domestic and 398 foreign patent applications.

One recent example of the university's collaboration with an industrial partner is the Hitachi-Kyoto University Laboratory, which is developing innovative technologies, including research into artificial intelligence (AI) and an atomic resolution holography electron microscope. The lab analyzes emerging social issues in order to explore further potential solutions that can be developed collaboration between Hitachi and Kyoto University.

One great strength that Kyoto University has with regards to collaboration with its industrial and government partners is that it has a specialized organization to support such activities. The Office of Society-Academia Collaboration for Innovation (SACI) provides various forms of support for such endeavors, including management of the university's intellectual properties, promotion of industry-government-academia collaborative research, promotion of licensing activities, and support for venture business start-ups by researchers and students.

• Office of Society-Academia Collaboration for Innovation (SACI) www.saci.kyoto-u.ac.jp/en/



International Science Innovation Building

At this facility, stakeholders involved in society-academia collaboration can gather under one roof to collaborate effectively on a day-to-day basis. The building provides rental offices and laboratories that can be leased long-term as bases for society-academia collaboration projects.

Serving the Local Community



▲ Open Day at Kwasan Observatory in Kyoto

Kyoto University's local community projects represent another aspect of its efforts to ensure that the fruits of its education and research activities bring benefit to society. Public lectures, open days at research facilities, environmental conservation, disaster prevention activities, and research collaboration with local institutions such as zoological parks are just some of the ways in which the university connects and contributes to the local community.

▶ The 65th Kyoto University Mirai Forum

Addressing Global Issues



A Research cooperation project for peatlands conservation in Indonesia

Kyoto University engages in research collaboration with institutions around the world to contribute towards the sustainable development goals (SDGs) set by the United Nations. For example, under the Science and Technology Research Partnership for Sustainable Development (SATREPS) and ODA-UNESCO programs, the university pursues problem-solving initiatives around the world. Projects include forest resource management in Cameroon, the establishment of a sustainable aquaculture industry in Chile, the promotion of energy science education in Myanmar, and cooperation with UNESCO's International Hydrological Programme.