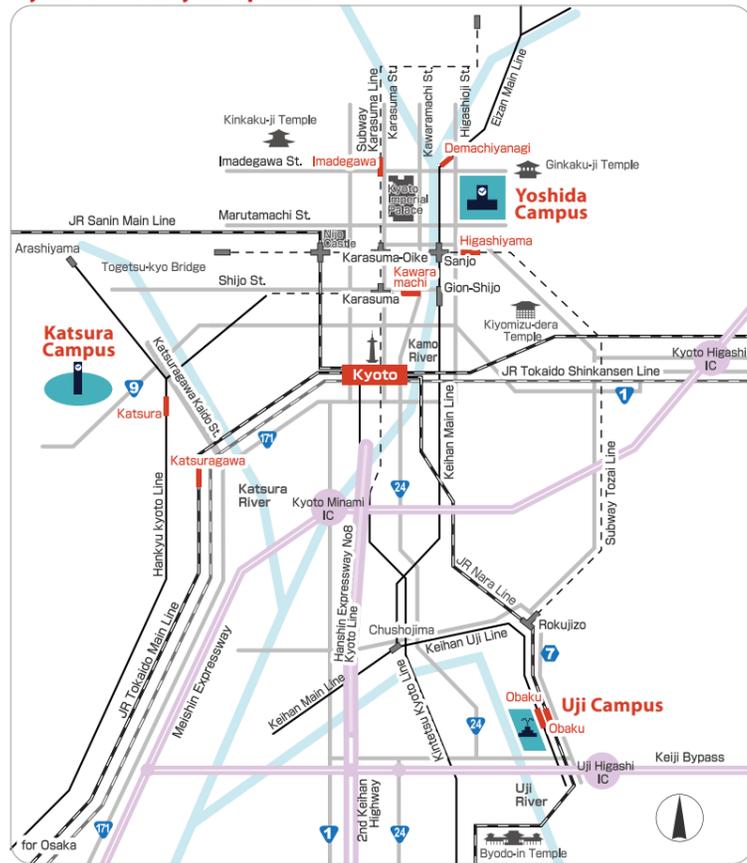


Kyoto University Campuses



Kyoto University Katsura Campus



 Kyoto University Global COE Program
Global Center for Education and Research on Human Security Engineering for Asian Megacities

Contact Information
Urban Human Security Engineering Education and Research Center
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 Phone: +81-75-383-3412/3413
 Fax: +81-75-383-3418
 Web: <http://hse.gcoe.kyoto-u.ac.jp>

Graduate School of Engineering
 Civil and Earth Resources Engineering www.ce.t.kyoto-u.ac.jp/en
 Urban Management www.um.t.kyoto-u.ac.jp/en
 Environmental Engineering www.env.t.kyoto-u.ac.jp/en
 Architecture and Architectural Engineering www.ar.t.kyoto-u.ac.jp/en
Graduate School of Global Environmental Studies www.ges.kyoto-u.ac.jp/english
Disaster Prevention Research Institute www.dpri.kyoto-u.ac.jp/web_e/index_e.html



Kyoto University Global COE Program Global Center for Education and Research on Human Security Engineering for Asian Megacities



Human Security Engineering



Mumbai



Bangkok



Hanoi



Shenzhen



Kyoto



Bandung



Singapore



Kuala Lumpur



Message

Program leader

Yuzuru Matsuoka

Professor
Department of Environmental
Engineering, Graduate School of
Engineering, Kyoto University

Kyoto University launched a Global Center of Excellence (GCOE) Program entitled "Global Center for Education and Research on Human Security Engineering for Asian Megacities" in the Graduate School of Engineering (the departments of Civil and Earth Resources Engineering, Urban Management, Environmental Engineering, and Architecture and Architectural Engineering), the Graduate School of Global Environmental Studies, and the Disaster Prevention Research Institute in academic year 2008. GCOE is a program funded by the Japanese Ministry of Education, Culture, Sports, Science and Technology in an aim to "strengthen and enhance the education and research functions of graduate schools, to foster highly creative young researchers who will go on to become world leaders in their respective fields through experiencing and practicing research of the highest world standard." Basic human needs, environmental pollution, disasters, and how to secure the self-sustained capacity to deal with these issues are major challenges in Asian megacities. Yet attempts to deal with these problems in the past several decades have been a string of failures. One main reason for this is the rapid expansion of cities. More importantly, however, the introduction of technologies and systems for dealing with these risks has been carried out bit by bit, and even where technologies and systems were adopted, the importance of providing human resources and communities to manage them was overlooked. Based on this awareness, our program is founded on civil engineering, architecture, environmental engineering, and disaster prevention studies while it is based on a thoroughly field-oriented approach. By focusing concentration on the complementary co-evolution of engineering technologies, urban management, and systems design, we will elevate the elemental studies we have developed until now toward a more comprehensive discipline that encompasses urban management strategies and policies, and promote research and education based on this new discipline. Specifically, we have started conducting activities that include working together with universities, research institutions, and private enterprises at overseas bases located in seven countries throughout Asia, as well as in our headquarters in Kyoto to foster 20 doctoral students per academic year. We look forward to contact from those of you interested in this GCOE program.

Program Overview

During the five-year program that commenced in academic year 2008, Kyoto University will establish a new discipline called "Urban Human Security Engineering," and create a network of bases for education and research to foster next-generation researchers and high-level practitioners on an Asia-wide scale. Through this program, we will make a large contribution to solving human security issues in Asian megacities.

Establishing the discipline of "Urban Human Security Engineering"

We define "Urban Human Security Engineering" as the building of a system of technologies (techniques) for designing and managing cities that enable their inhabitants to live with dignity, in comfort, and free from the potential threats of uncleanliness, unhealthiness, and large-scale disasters and environmental destruction as provided for in the Millennium Development Goals. In order to establish this discipline, we will seek to integrate the four existing fields of urban governance, urban infrastructure management, health risk management, and disaster risk management into one discipline and strive for complementary collaboration across the study and research areas. We will also disseminate this new discipline through the publication of a textbook series in the English language.

Human Security Engineering

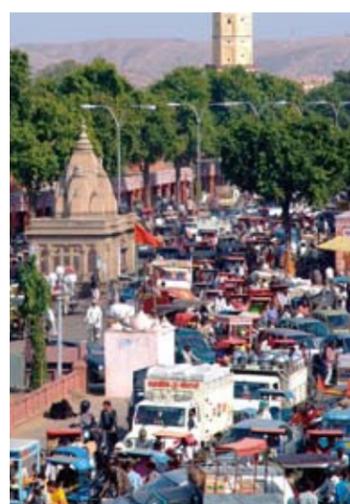
- Urban governance
- Urban infrastructure management
- Health risk management
- Disaster risk management

Educating next-generation researchers and high-level practitioners to ensure human security in megacities

We will foster next-generation researchers and high-level practitioners through a network of international education and research comprised of the bases we have established and developed throughout Asia until now. We will contribute greatly to the resolution of human security issues in Asian megacities by proposing roadmaps along with concrete urban management strategies to several megacities, which will allow them to escape the aforementioned threats. Specifically, we will conduct the following activities:

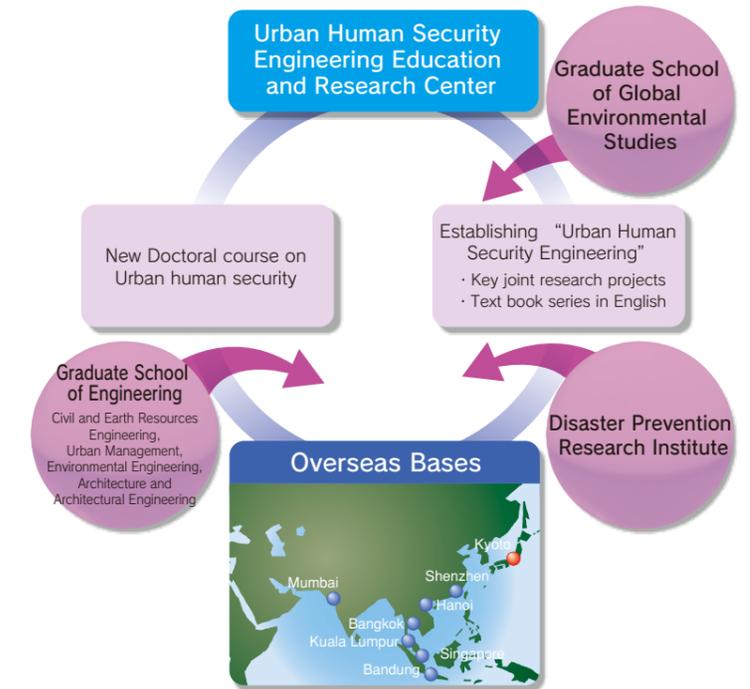
- 1 Human Resource Development:**
establish a new doctoral program (20 students per year)
- 2 Research Activities:**
promote key joint research projects, and organize many international symposia and workshops
- 3 Management of Overseas Bases:**
operate the "Urban Human Security Engineering Education and Research Center," and establish and develop a network of overseas bases for activity and cooperation

By posing specific challenges that concern megacity human security, the existing areas of civil engineering, architecture, environmental engineering, and disaster prevention research, which have progressed independently of each other until now, will regain their effectiveness and social usefulness to create a new worldwide academic trend of "human security engineering originating in Asia" that reaches beyond the boundary of engineering to include urban management and governance.



Organization Structure

Under the President of Kyoto University, the GCOE executive committee of the entire university, and the Base management committee which determines concrete action policies, we have established a system in which every program member involved has a clear sense of control and responsibility and cooperates with each other to flexibly manage the following three areas: Human Resource Development, Research Activities, and the Management of Overseas Bases. The Graduate School of Engineering (Civil and Earth Resources Engineering, Urban Management, Environmental Engineering, and Architecture and Architectural Engineering), the Graduate School of Global Environmental Studies, and the Disaster Prevention Research Institute will devote our combined efforts to deploy education and research activities.



Program Members (As of April 2010)

Affiliated department	Name	Specialized field
Graduate school of Eng. (Dept. of Environ. Eng.)	Prof. Yuzuru Matsuka	Environ. Systems eng.
Graduate school of Eng. (Dept. of Architecture and Architectural Eng.)	Prof. Teruyuki Monnai	Architecture and environ. eng.
Graduate school of Eng. (Dept. of Urban Management)	Prof. Hiroyasu Ohtsu	Construction eng. Systems
Graduate school of Eng. (Research Center for Environmental Quality Management)	Prof. Hiroaki Tanaka	Environ. quality evaluation
Disaster Prevention Research Institute	Prof. Hirokazu Tatano	Disaster prevention economics
Graduate school of Eng. (Dept. of Urban Management)	Prof. Eiichi Taniguchi	Urban management systems
Graduate school of Global Environ. Studies (Dept. of Technology and Ecology)	Prof. Shigeo Fujii	Water environ. Control
Graduate school of Eng. (Dept. of Urban Management)	Prof. Toshifumi Matsuka	Geological eng.
Graduate school of Eng. (Dept. of Urban Management)	Prof. Kiyoshi Kobayashi	Planning and management systems
Graduate school of Global Environ. Studies (Dept. of Technology and Ecology)	Assoc. Prof. Rajib Shaw	Environ. disaster prevention management
Graduate school of Eng. (Dept. of Architecture and Architectural Eng.)	Prof. Yasuhiro Hayashi	Regenerative preservation of built environ.
Graduate school of Eng. (Dept. of Environ. Eng.)	Prof. Minoru Yoneda	Environ. risk analysis
Graduate school of Eng. (Dept. of Civil and Earth Resources Eng.)	Prof. Kunitomo Sugiura	Structural mechanics
Disaster Prevention Research Institute	Prof. Tomoharu Hori	Water resources eng.
Graduate school of Global Environ. Studies (Dept. of Technology and Ecology)	Prof. Takeshi Katsumi	Environ. infrastructure eng.
Graduate school of Eng. (Research Center for Environmental Quality Management)	Prof. Yoshihisa Shimizu	Control of environ. Quality
Graduate school of Eng. (Dept. of Civil and Earth Resources Eng.)	Prof. Masashi Kawasaki	Landscape and environ. Planning
Environment Preservation Center	Prof. Shin'ichi Sakai	Environ. preservation eng.
Graduate school of Eng. (Dept. of Urban Management)	Prof. Junji Kiyono	Earthquake disaster prevention systems
Graduate school of Global Environ. Studies (Dept. of Global Ecology)	Prof. Sadahiko Itoh	Urban supply systems
Disaster Prevention Research Institute	Prof. Keiichi Toda	Urban flood control
Graduate school of Eng. (Dept. of Civil and Earth Resources Eng.)	Prof. Hitoshi Gotoh	Waterfront environ. eng.
Graduate school of Eng. (Dept. of Architecture and Architectural Eng.)	Assoc. Prof. Kiyoko Kanki	Housing and environ. Design

Human Resource Development

We have established the “Interdisciplinary Engineering Course Program - Human Security Engineering Field” in the Graduate School of Engineering, and the “Human Security Engineering Advanced Course” in the Graduate School of Global Environmental Studies, and in April 2009 have begun offering these educational programs in which students can acquire comprehensive knowledge about the most advanced contents of Human Security Engineering. The programs are aimed at 20 students in our doctoral courses every year. All the lectures are conducted in English, and short and long-term internships are carried out in accordance with the thoroughly field-oriented approach. We also utilize the RA/PD systems and the program-specific faculty system to enhance financial aid for doctoral course students and young researchers.

What is the “Human Security Engineering Education Program” ?

(Educational objective: To foster creative, international and independent human resources with education in four related academic fields)

This program is intended for doctoral students to acquire interdisciplinary and solid education in the core fields that support urban human security engineering and in four related fields (urban governance, urban infrastructure management, health risk management, and disaster risk management). It will foster researchers and advanced engineers who have the ability to integrate and apply their knowledge toward ensuring urban human security according to the purpose, and the ability to deepen and advance the technologies. Specifically, this program aims to foster human resources who have **creativity** (in addition to a wide range of knowledge about human security engineering for Asian megacities, the ability to go beyond the boundaries of existing specialized fields); **internationality** (the ability to present and debate research in English, perform education and research activities overseas, and build an international human network); and **independence** (the ability to plan research, lead education and research, secure research funds, and solve problems in the field). To achieve this educational objective, the Human Security Engineering Education Program provides an educational program in English consisting of an Introduction to Human Security Engineering, basic subjects in the

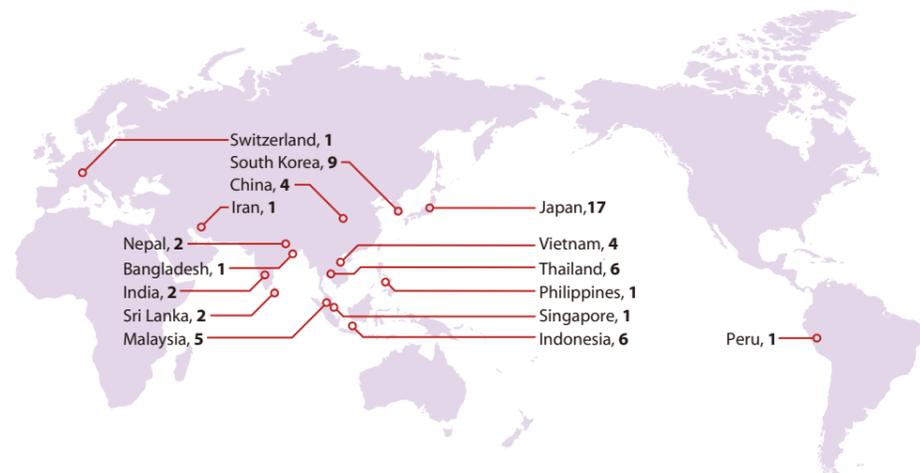
four related academic fields, overseas internships, and others. The Graduate School of Engineering (Department of Urban Management, Department of Civil and Earth Resources Engineering, Department of Environmental Engineering, Department of Architecture and Architectural Engineering), Graduate School of Global Environmental Studies, and Disaster Prevention Research Institute participate in the program as departments responsible for instruction. All the lectures will be given in English.



Subjects Available for the HSE Program

Human Security Engineering (Core subject)	Lectures on Urban Infrastructure Management 1	Management of Global Resources and Ecosystems
Urban Governance	Lectures on Urban Infrastructure Management 2	Environmental Ethics and Environmental Education
Lectures on Urban Governance 1	Global Environmental Economics	Disaster Risk Management
Lectures on Urban Governance 2	Lecture on Environmental Risk Management Leader	Lectures on Disaster Risk Management 1
Global Environmental Law and Policy	Lectures on Health Risk Management 1	Lectures on Disaster Risk Management 2
Urban Infrastructure Management	Lectures on Health Risk Management 2	Internship for Human Security Engineering
Governance for Regional and Transportation Planning	Environmental Engineering for Asia	Advanced Capstone Project

The number of currently enrolled students and their origins (As of December 2009)



Internship

This educational program emphasizes a thoroughly field-oriented approach and overseas internship programs to foster researchers who will go on to be active across the globe, and provides financial aid for such projects.

Internship for Human Security Engineering (Short term)

The internship aims to develop the practical capability to secure urban human security, in addition to acquiring the expert knowledge and ability to develop new research fields by carrying out research activity related to human security engineering and presenting research results at international conferences. Specific examples include participating in internships at domestic or overseas companies or research institutes which conduct the operation of international projects, conducting field surveys at overseas bases, and attending academic conferences and research presentations as well as various seminars, symposia, and lectures held overseas.

Advanced Capstone Project (Long term)

This class aims to develop the abilities for international collaboration, field investigation, and on-site planning and problem solving through long-term investigation and research activities related to human security engineering with a thorough hands-on policy in foreign countries. Specific examples include field research at overseas bases and participation in international projects overseas. As a rule, participants will stay at the location abroad for at least two months.



Comments from the past participants



Development of estimation method for the Emission Accounting System of Global Agricultural activities
Tomoko Hasegawa
 Department of Environmental Engineering, Graduate School of Engineering
 Place of stay: The International Institute for Applied Systems Analysis (IIASA), Austria
 Term: June 1, 2009 - August 31, 2009

I was in the research group called Integrated Modeling Environment (IME) led by Dr. Marek Makowski. I worked on developing a robust method to estimate an emission accounting system of global agricultural activities. I discussed my research with researchers in not only the IME but also other research groups. We had many discussions, and they gave me good supervision and appropriate suggestions. I had a very nice and valuable time.



The implementation of the Yonmenkaigi system in Merapi volcano communities
Jong Il Na
 Department of Urban Management, Graduate School of Engineering
 Place of stay: Gadjah Mada University, Indonesia
 Term: June 27, 2009 - August 22, 2009

The objective of my internship in 2009 was to support the plan and evaluation method for disaster risk management of Merapi volcano communities. This was a cooperative project conducted by Kyoto University and Gadjah Mada University in Yogyakarta, Indonesia, and consisted of the following: a pilot project for sand mining management, evacuation drills, and disaster prevention education and events for children and local communities around Merapi volcano.



Evaluation of Seismic Design Motion of Low Seismicity Area
Sherliza Zaini Sooria
 Department of Urban Management, Graduate School of Engineering
 Place of stay: Public Works Department of Malaysia
 Term: July 27, 2009 - September 26, 2009

The activities of the internship included microtremor observations of selected bridges and seismic stations in Kuala Lumpur, Selangor, and Johor. The data collected are structural drawings, design specifications, and guidelines used by practicing designers and the authorities in Malaysia. Apart from teamwork exercise, this internship experience showed me that effective communication and cooperation with the right people guaranteed fruitful outcomes, in my case knowledge, data, and information essential for my research.



Study on the consolidation of Human Security integrated with scenarios towards Low Carbon Society in Malaysia
Janice Jeevamalar Simson
 Department of Environmental Engineering, Graduate School of Engineering
 Place of stay: University Teknologi Malaysia, Johor, Malaysia
 Term: August 23, 2009 - September 28, 2009

The main objectives of my internship were to examine the feasibility of conducting a regional and national level Low Carbon Society (LCS) study which also considers the enhancement of human security in Malaysia, and to collect the relevant data. This internship was beneficial as I was able to identify the kinds of data obtainable in Malaysia, discuss the necessity of the study, and also focus on the direction of my future research.

Research Activities

With the coordination and integration among the following four research fields, we execute a number of key joint research projects aimed at the systematization of human security engineering, the verification of its social effectiveness, the fostering of young researchers, and the generation of policy recommendations. Through frequently-held workshops and the compilation of an English textbook series, we will disseminate the achievements of the projects to the world.

Research Activities

Urban Governance Research field leader Professor Teruyuki Monnai

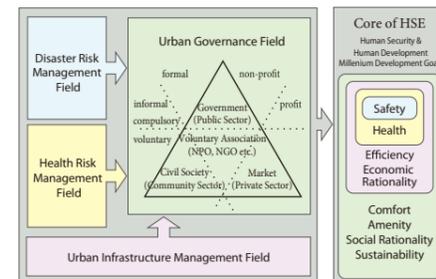
Aims of the Research Field The field of urban governance integrates three research fields: urban infrastructure management, health risk management, and disaster risk management, and seeks a methodology of decision making by which to resolve issues of urban human security through the collaboration of a variety of actors.

Research Features Urban human security engineering (U-HSE) is intended to achieve not only "reduction in vulnerability (to disaster and health risks)" and "satisfaction of basic human needs," but also "improvement of quality of life," which includes the conservation, regeneration and creation of environment, landscape and culture. To attain these objectives, U-HSE takes advantage of engineering and social sciences in order to resolve a wide range of multi-dimensional urban problems touching on such areas as safety, health, efficiency, economic rationality, comfort, amenity, social rationality, and sustainability.

Of prime importance is the need for "multi-layered urban governance" which seeks to solve problems while taking into account the relationships between different environments, such as the natural, sociocultural, artificial, and informational, and which recognizes the multi-scaled nature of those problems, from the architectural/urban to the global.

The recent emergence of multifarious actors has been accompanied by changes in the relationships between them. In addition to the government, market and civil sectors, new actors such as NGOs and NPOs have appeared, focusing attention on the solving of problems by taking a bottom-up approach and through collaboration between the various parties. One of the greatest problems to be identified in urban governance is of how to enhance the ability of communities to solve their problems in ways that draw on those communities' distinguishing features.

Taking a thoroughgoing field-oriented stance, this field, therefore, places value on the process of regions' spontaneous development, and regionally distinctive good governance. Furthermore, it advocates combining various resource allocation schemes, such as market exchange, redistribution, mutual aid and self-support, and incorporating the voices of the most vulnerable members of the community into decision making. In doing so, it seeks a "methodology of urban governance" by which urban infrastructure and social capital can be built up to facilitate assured environmental, economic and social sustainability, and enhancement of the life quality of individuals.

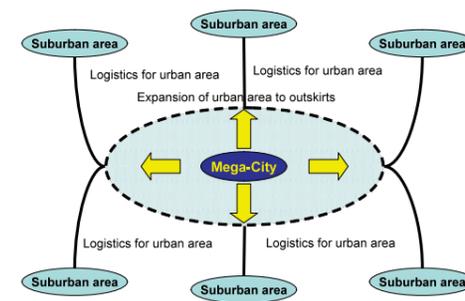


Position of the urban governance field within Urban Human Security Engineering (U-HSE)
※A part of the diagram above was originally created by V.A. Pestoff (The Third Sector in the Welfare Triangle) and has been modified.

Urban Infrastructure Management Research field leader Professor Hiroyasu Ohtsu

Aims of the Research Field The field of urban infrastructure management aims to build a framework of interdisciplinary knowledge related to strategic management in the construction and maintenance of urban infrastructures, not only from the viewpoint of economic efficiency but also of "human security engineering."

Research Features In considering development and maintenance strategies for urban infrastructure in Asian Megacities, this area posits a model of linkage between the mega-city and suburban areas (as shown in the figure on the right). Rapid expansion of urban areas in Asian Megacities cannot be achieved without the supply of various resources (such as food, energy and human resources) from suburban areas. Therefore, the formation of effective (rear-area) logistics support from suburban areas is essential for the development of mega-cities. Based on this viewpoint, studies in the field of urban infrastructure management have two types of focal point: 1) problems due to the expansion of mega-cities themselves, and 2) problems associated with linkage to the suburban areas that support the development of mega-cities.



Linkage model between a mega-city and suburban areas

Health Risk Management Research field leader Professor Hiroaki Tanaka

Aims of the Research Field The field of health risk management aims to identify the environmental problems of Asian countries, evaluate the environmental risks associated with urban human security engineering, such as the adverse effects on human health, the living environment and ecosystem, develop and propose solutions to them, or methods for risk reduction, control and management, and apply those solutions appropriately.

Research Features In many Asian Megacities, environmental measures lag behind rapid urbanization and economic growth, creating serious health-related problems and environmental damage from water, air, soil, noise, vibration, and other pollution. Supply systems for safe water, sanitation systems, and waste disposal facilities, that form the foundation of daily life, are not in place or are inadequately managed. Without an environment that caters for healthy and comfortable living, conditions make it impossible to assure a diversity of ecological environments. Additionally, there is concern that inefficient and inappropriate use of energy and resources will speed global warming, deplete resources, including water, and hinder future economic growth in industry, agriculture, etc. Since there are various ways of solving those environmental problems depending on the region, new methods and approaches are needed that solve environmental problems by combining various engineering techniques and management tools that are outside the scope of experience and conditions found in Japan. It is therefore important to understand the region, discover what the environmental problems are in cooperation with the stakeholders, investigate the causes, propose appropriate solutions, and implement them. For this purpose, in addition to research at Kyoto University, mainly we conduct investigations and research at overseas fields that are relevant to our research themes, as well as at overseas bases such as the Graduate School at Shenzhen, Tsinghua University and the Hanoi Institute of Technology.

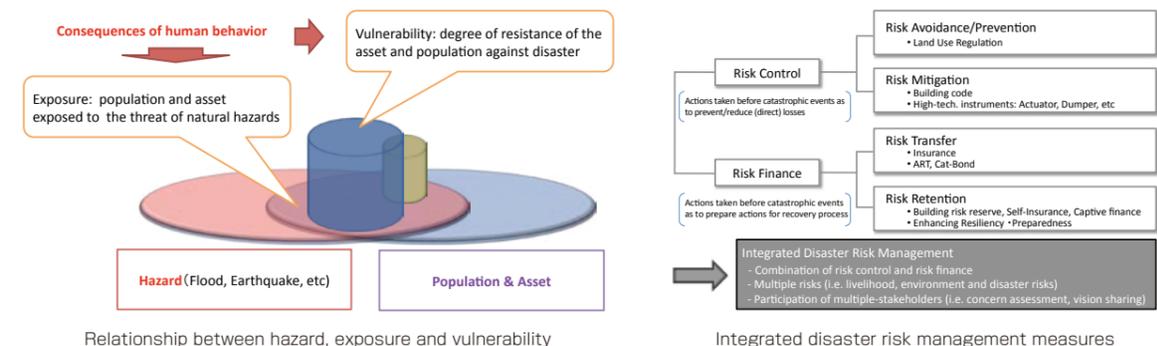


Disaster Risk Management Research field leader Professor Hirokazu Tatano

Aims of the Research Field The field of disaster risk management aims to establish human security engineering as a part of implementation science by building an integrated and interdisciplinary framework for the strategic management of policies for disaster prevention and recovery in Asian Megacities.

Research Features A disaster occurs when the spatial distribution of a natural hazard, such as an earthquake or a flood, overlaps with that of a population and assets (as shown in the figure on the lower left). In recent years, human casualties and economic losses caused by natural disasters in Asia have been increasing, indicating that the population and economic assets of the area are becoming concentrated in disaster-prone areas. To form a city that is more resilient against disasters, it is necessary to establish an integrated disaster risk management policy. The integration of risk management procedures is therefore an important concept when addressing disaster risk management policy for Asian Megacities.

How to integrate our knowledge and wisdom in a practical and adaptive form, share it and bring it to fruition in the context of ongoing urban development is an important research problem. The biggest aims and issues in this field of research are the application to real issues of knowledge accumulated by researchers over the years, the establishment of a methodology to fill the gap between knowledge and practice, and the promotion and development of research that is oriented towards solving problems.



Relationship between hazard, exposure and vulnerability

Integrated disaster risk management measures

Management of Overseas Bases

Key Joint Research Project

This GCOE program implements Key Joint Research Projects that reach across departments and academic fields to tackle concrete problems in base cities. The aim of the projects is to specify human security concepts in accordance with local characteristics, verify the issues to overcome, and promote a common awareness of the need for cooperation between different fields to demonstrate the effectiveness of problems solving studies. We consider these projects to be key projects for the future development of our activities with an eye to cooperating with international institutions and NPOs in each base city, and believe that the results will lead to concrete policy recommendations for Asian cities.

List of projects carried out as of December 2009

Evaluation and management of environmental risk in Asian megacities
Geotechnical engineering for waste reuse and management
Climate and disaster resilience in Asian cities
Policy studies on creation of environment for healthy air in East Asian megacities
Development of bryophyte indicators for urban environments and monitoring based on public participation
Monitoring and forecast of food production and water use using satellite data and crop model
Study on urban impacts to living environment in old historic quarters of Vietnam
A study of environmentally sound water and sanitation system focusing on co-treatment and recycling of waste and wastewater
Research on community-based environmental management in Asian megacities
The development of environmental vulnerability index using geospatial analysis
Field research on the changes of local livelihood and indigenesness under influence of urbanization in remote villages of central Vietnam
Evaluation and management of environmental risk in Asian megacities (Part 1)
Evaluation and management of environmental risk in Asian megacities (Part 2)
Evaluation and management of environmental risk in Asian megacities (Part 3)
Evaluation and management of environmental risk in Asian megacities (Part 4)
Study on the consolidation of human security integrated with scenarios toward low carbon societies in Malaysia
Waste management scenarios to avoid the open dumping
Epidemiological study of traffic noise on health
Study on dynamics of trace elements in Asian megacities -particularly around the children's environment-
Development of an integrated drinking water treatment process using membrane filtration in cities of southern China
Risk management of greenhouse gas and hazardous component discharged from landfill site in Asia region
Quantitative evaluation of the co-benefit of low carbon society policies to the mitigation of air pollution in the megacities in China
Asian urban governance
A methodology for communication survey for the measurement of social capital
Research on the infrastructure development systems contributing to making the cityscapes in Asian megacities
Reallocation of urban space in Asian megacities based on safety, amenity and health
Urban infrastructure management
Introduction of self-sustaining technologies for small infrastructures using local materials
Maintenance strategy for concrete, steel and hybrid structures in Asian megacities
Prediction, mitigation, and monitoring of the damages to earth structures and slopes caused by torrential rains and earthquakes in South East Asia
Application of environment accounting system for infrastructure projects
Environmental impact assessment on waste treatment in Bangkok, Thailand
Evaluation of environmental accounting on Bangkok subway construction project
Research and education project on energy supply and demand at Asian megacities
Research on urban energy supply
Time-series analysis of urban heat island effect and energy consumptions in Asian megacities with satellite data
Research and education project on active fault evaluation to mitigate earthquake/tsunami disasters at Indonesian megacities
Urban food security system (water resource system and integrated river basin management)
Water resources vulnerability analysis in Southeast Asia with an index of potential food production
Urban transport and logistics for human security in Asian megacities
Introduction of self-sustaining technologies for small infrastructures using local materials
Advanced logistics on disaster and usual cases in Asian megacities
A study of traffic safety and control system for road network in Asian megacities
Research and educational project on casualty mitigation strategy against urban disaster in Indonesia
Development of river bank protection system in flood disaster mitigation and evaluation of its application
Enhanced earthquake risk assessment by using soil structure modeling in Indonesia
Education project on urban disaster mitigation in Bangkok
Education and research project on risk governance of water-related disasters in Asian megacities
Education and research project on tsunami and earthquake disaster risk management in Asian megacities
Implementation strategies for integrated disaster risk management in Asian hot-spot mega cities: Mumbai
Implementation strategies of disaster risk management in Asian megacities: focusing on Hanoi in Vietnam
Implementation strategies of disaster risk management in Asian megacities: focusing on Chinese megacities
Implementation strategies of disaster risk management in Asian megacities: focusing on Malaysian megacities
Strategy for disaster mitigation of buildings in Asian historic cities
Urban governance for conservation and regeneration of dwelling environments and townscape in Asian historic cities

With the “Urban Human Security Engineering Education and Research Center” (HSE center) in the Katsura Campus, Kyoto and the network of overseas bases acting as central figures, the graduate schools of Kyoto University associated with human security engineering will continue to establish new bases in the future with the aim to form a closer international research and education network.

HSE Center (Urban Human Security Engineering Education and Research Center)

The Urban Human Security Engineering Education and Research Center (HSE Center) has been established adjacent to the entrance of the C1 Building on the Katsura Campus of Kyoto University. One program-specific associate professor, one program-specific assistant professor, six program-specific researchers (PDs), and two program-specific administrative staff are currently stationed at the center.

This center fills the role of a hub office for the program's overseas bases: two overseas activity bases (Shenzhen and Hanoi) where program-specific faculty members are stationed, and five overseas cooperation bases (Bangkok, Singapore, Bandung, Mumbai, and Kuala Lumpur) where local staff assist in managing. The center is equipped with a remote meeting system for communicating with those bases.

Program leaders hold weekly PD meetings to check the progress of GCOE education and research activities and the management conditions of overseas bases, and strive to support the various activities of project promoters in Japan and overseas. The center receives visits of many faculty, students, and representatives from the overseas bases, and it fulfills the role of the headquarters of the GCOE project. The number of overseas partnership institutions that go into partnership with the center on education and research has been increasing.



Overseas Bases

Shenzhen Overseas base leader Professor Hiroaki Tanaka

Shenzhen Shenzhen is a major city in southern China located at roughly the southern center of the Guangdong Province and immediately to the north of Hong Kong. It was the first city in China to be allowed to create a special economic zone under the policies of reform and openness in 1980. The city has a total area of about 1,952 km² and the area of the special economic zone is about 396 km², which accounts for 20% of the total area. With a total population estimated to reach 14 million, it is one of the so-called Asian megacities undergoing rapid economic growth.

Tsinghua University The Graduate School at Shenzhen, Tsinghua University, was jointly founded by Tsinghua University and the Shenzhen Municipal Government in June 2001 as the only branch school of the Tsinghua University (whose main campus is located in Beijing). The school was relocated to its present campus in the university town of Shenzhen at Xili in October 2003. It consists of five faculties (Information Science and Technology, Engineering, Logistics and Management, Science and Liberal Arts, and Life Science), 130 faculty members and 1,800 graduate students. Under the principle of “One university, one brand,” it shares the same culture, style, and high aims as the Beijing campus and cultivates professionals with leadership, international vision, entrepreneurial spirit, and extensive knowledge.

Joint Research Projects Because Tsinghua and Kyoto Universities collaboratively established the Cooperative Research and Education Center for Environmental Technology in October 2005, two faculty members from Kyoto University and supporting staff stay in the base where many advanced analytical equipments including LC/MS/MS and experimental facilities are available. At the present collaborative research and educational activities have been more developed since this GCOE project started. Joint research projects include technological development for environmental preservation required in the areas around Shenzhen city, field surveys in the areas around Shenzhen city, and risk assessment and environmental management. Additionally, a wide range of research is conducted regarding themes set by individual faculty member:

- Development of integrated water treatment technologies mainly using membrane treatment in the cities of southern China
- Establishment of frameworks for reduction of greenhouse gas emission and hazardous substances risk management emitted and discharged from the landfill sites in the Asia region
- Risk assessment and management of environmental pollution in megacities



Hanoi Overseas base leader Professor Shigeo Fujii

Hanoi Hanoi is the capital of Vietnam with a population of 6.2 million (including suburb areas, as of 2007). As shown by its description in Chinese, “河内” or “River Inside,” the city is located in the delta of the Red River, which flows through the northern part of Vietnam. The city is developing quickly and, at the same time, facing various types of problems related to urbanization, such as water environment pollution, poor sanitary conditions, waste disposal issues, air pollution, flooding, and traffic jams.

Hanoi University of Technology (HUT) The Hanoi University of Technology (HUT) was founded in 1956 as the first national technical college in Vietnam and is located at the southern part of Hanoi. It consists of 14 faculties, seven research institutes and 18 centers, and has a high reputation as one of the leading universities in Vietnam that offers almost all fields of science and engineering. About 1,650 faculty members educate 40,000 undergraduate students and 2,000 graduate students. The university has a high reputation particularly in the engineering fields, and actively conducts research activities in addition to providing advanced education.

Kyoto University-Hanoi University of Technology Research and Education Program on Environment Studies In December 2008, the Graduate School of Engineering, Graduate School of Global Environmental Studies, Graduate School of Energy Science and Graduate School of Informatics of Kyoto University, and the Hanoi Advanced School of Science and Technology, Institute of Environmental Science and Technology, Faculty of Information Technology, and Institute of Heat Engineering and Refrigeration of the Hanoi University of Technology established the Kyoto University-Hanoi University of Technology Research and Education Program on Environment Studies. This program is the base of our GCOE program in Hanoi. The Hanoi base has an office and a laboratory in the Institute of Environmental Science and Technology and is preparing equipment that will allow for basic analyses and experiments. Two faculty members from Kyoto University and a few local staff are stationed at this base.

The base has already received students from Kyoto University through the internship program, and is currently conducting research from such various standpoints as aquatic environment, urban sanitation, waste, the atmosphere, architecture, climate change and disaster prevention, environmental governance and resident participatory environmental improvement using Hanoi and its periphery as research fields. These schools of Kyoto University also have agreements for research cooperation with the Vietnamese Academy of Science and Technology Institute of Environmental Technology and the Hanoi University of Civil Engineering, both located in Hanoi, through which the base plans to conduct aggressive research activities as a base in cooperation with these universities and/or other related universities and organizations.



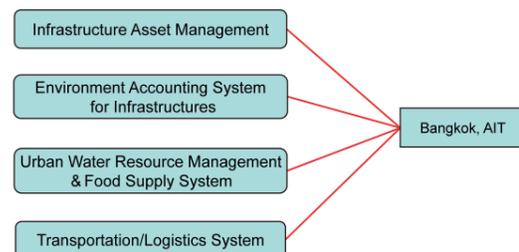
Bangkok Overseas base leader Professor Hiroyasu Ohtsu

Bangkok The Bangkok Metropolitan Area (BMA) comprises Thailand's capital Bangkok and its surrounding area. The Bangkok Metropolitan Region (BMR) consists of the BMA and five adjacent provinces. The population of the BMR is 9.64 million (as of 2004), and its area is 7,758 km² or 15.5% of the total area of Thailand. The BMA, which is the central area of the BMR, has an area of 1,569 km² and a concentration of urban functions, business functions, industrial areas, and high density residential areas.

Asian Institute of Technology (AIT) The Asian Institute of Technology (AIT), one of the overseas cooperation bases of the GCOE program “Global Center for Education and Research on Human Security Engineering for Asian Megacities,” promotes innovative engineering and sustainable development in the Asia-Pacific region through higher education and research activities. Since its establishment in 1959, the AIT has played a role as a pioneering postgraduate educational institute in the Southeast Asia region and actively conducted joint research with public and private sector institutions in the region, as well as with some of the world's leading universities. Recognized as an international and multicultural establishment, the AIT campus is located 40 km north of Bangkok. The internationality of the AIT is demonstrated in the following figures:

- 2,000 students from more than 40 countries
- 15,000 graduates from more than 80 countries
- 23,000 short-term interns from more than 70 countries
- 130 world-class faculty members from more than 20 countries
- 588 research staff from more than 30 countries
- More than 200 international joint research projects

Joint Research Projects Through the GCOE program, we currently collaborate with the AIT in conducting the research projects shown in the figure on the right, mainly in the research field of urban infrastructure management.



Joint research projects with the Asian Institute of Technology (AIT) in the urban infrastructure management field



Singapore Overseas base leader Professor Eiichi Taniguchi

National University of Singapore (NUS) The National University of Singapore (NUS), established in 1905, is one of the top 30 universities in the world today (ranking 30th in the QS World University Rankings 2008), and the top five universities in Asia. As one of the largest universities in Asia, having three campuses with 14 faculties and departments, the NUS proposes international education and research efforts with a focus on vision for experts in Asia in line with the concept of this GCOE program. The university is well known for its strategic and robust research activities in the engineering field, and is also an active participant in such international networks related to academia and research as the Association of Pacific Rim Universities (APRU) and the International Alliance of Research Universities (IARU). These networks further enhance the NUS's presence as a leading university in the world.

Kyoto University GCOE-NUS CMS Joint Research Center The Kyoto University GCOE-NUS Joint Research Center (JRC) is the base of cooperation between Kyoto University and the NUS Center for Maritime Studies (CMS) in this GCOE program. The JRC provides the infrastructure required for exchange between the researchers of both universities. Faculty members, post-doctorates, and doctoral students of both universities participate in the activities of the JRC.

Joint Research Projects The JRC conducts research focused on traffic and physical distribution, especially that focused on human security such as physical distribution systems that deal with responding to natural disasters, transportation of hazardous substances, security issues related to transportation, traffic safety regarding physical distribution, and vehicle allocation with concern to the risks of residents. Joint seminars are also held regularly in Kyoto and Singapore to share experiences, ideas and the progress on researches. In addition, the JRC fosters human resources with strong technical knowledge about human safety in connection to traffic and physical distribution, and prepares the publication of textbooks to share their knowledge with the world.



Bandung Overseas base leader Professor Toshifumi Matsuoka

Bandung Surrounded by mountains, Bandung is a comfortable city to live in with a cool climate throughout the year. The city also has the characteristics of an educational city with many universities, and this makes it a particularly highly favored city in terms of both education and sightseeing. In the past, the city was widely known as “Paris van Java” for its beauty.

Bandung Institute of Technology (ITB) The Bandung Institute of Technology (ITB) is located 180 km southwest of Jakarta in the West Java provincial capital of Bandung. The government of the Netherlands, the colonial master of Indonesia in the early 20th century, required many engineers and founded the ITB in 1920 (then, De Technische Hoogeschool [TH]). At the time, there was only one department (de Faculteit van Technische Wetenschap) and one faculty (de afdeling der Weg en Waterbouw). The university was renamed the ITB in 1959 and became the first technical college in Indonesia. In 2000, it was approved as an incorporated institution by Act No. 155 enforced by the Indonesian government. This allowed it to develop more than ever before as a university that promotes research. Today, it sets four objectives: excellent education, intellectual contribution, industrial cooperation, and community activities.

The ITB promotes the enhancement of technical capacity and sustainable development in the Pacific area of Asia through higher education, research and social activities. It focuses on challenges that share the spirit of this GCOE program, such as internationalization, networking, and the development of the most advanced technologies, in addition to global challenges that reflect the socioeconomic situation of Indonesia.

Joint Research Projects Joint research projects with the ITB consist of research on human security related to energy in Jakarta and surrounding areas, including the effects of global warming, Carbon Capture and Storage (CCS) technologies, disaster prevention, and data collection related to these themes. Indonesia is a disaster prone country where three tectonic plates collide, and an archipelagic country with the second longest coastline in the world. Although rich in natural resources, it has problems like volcanoes and earthquakes. Research on natural resources and disasters, therefore, is very important in Indonesia. Human security problems related to energy are especially important in cities with an excessive population concentration, such as the capital Jakarta. The problem of increased carbon dioxide emissions is also ever-more pronounced in Jakarta. Studies on the rise in sea level and the increased occurrence of natural disasters due to climate change, as well as on ways of coping with these, are important research issues.



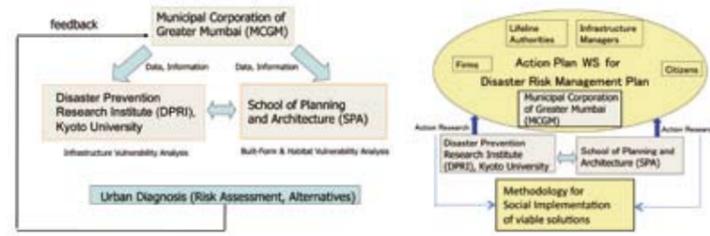
Join Our GCOE Program!

Mumbai Overseas base leader Professor Hirokazu Tatano

Mumbai Mumbai is the capital of the state of Maharashtra located on the west coast of India. Combined with the adjacent cities of Navi Mumbai and Thane, its population reaches 19 million, making it one of the most populous urban areas in the world. Based on international financial flow, Mumbai is one of the top ten business districts in the world in which the headquarters of many financial institutions and Indian companies as well as the offices of various multinational companies are based. It also has the characteristics of a harbor city since its port handles over half the total maritime cargo of India.

Due to a rapid population increase that accompanies economic growth, Mumbai also has a wide range of social problems, such as poverty, unemployment, poor medical services, and a low standard of living and level of education. According to a census of 2001, 54% of the population live in slums, with over 1 million people concentrated in the Dharavi area, the second largest slum in Asia.

KU-GCOE Mumbai Project The Mumbai office collaborates with the SPA (School of Planning and Architecture), whose headquarters is located in New Delhi, to conduct research based on the two phases as shown in Phase 1 and Phase 2. In Phase 1, the city of Mumbai, the SPA and Kyoto University cooperatively conduct integrated urban diagnoses of the city of Mumbai. The SPA and Kyoto University jointly analyze the vulnerability of the city to disasters while laying emphasis on the process of providing feedback to Mumbai regarding its policies. In Phase 2, we propose prescriptive policies based on the analysis results obtained in Phase 1, and test them by putting them into practice. We involve stakeholders who play a part in the formation of a city in many workshops, and attempt to develop implementable action plans and deploy them.



Phase 1: Integrated urban diagnosis Phase 2: Development of Implementable action plan



Kuala Lumpur Overseas base leader Professor Yoshihisa Shimizu

Kuala Lumpur Kuala Lumpur (often abbreviated as KL) is the capital and the largest city of Malaysia. The city proper, making up an area of 244km², has an estimated population of 1.6 million in 2006. Greater Kuala Lumpur, also known as the Klang Valley, is an urban agglomeration of 7.2 million. It is the fastest growing metropolitan region in the country, in terms of population as well as economy. The city is also the cultural and economic center of Malaysia.

The University of Malaya The University of Malaya, the first university of the country, is situated on 309 hectare campus in the southwest of Kuala Lumpur, the capital city of Malaysia. The University of Malaya was formed in October 1949 to help lay the foundations of a new nation by producing a generation of skilled and educated men and women. The university motto, "Ilmu Punca Kemajuan" (Knowledge is the Key to Success) reflects the philosophy of the university in its constant endeavor to seek knowledge in all fields to produce successful graduates and a successful nation.

Promotion of Research and Educational Activities of Kyoto University in Malaysia Since Kyoto University and the University of Malaya have an intensive and long collaboration through the JSPS-VCC (Japan Society for the Promotion of Science-Vice Chancellor Council in Malaysia) Core University Program for almost 25 years, there has been a strong reason the University of Malaya participates and has become one of the important overseas base universities in Asia.



As a doctoral student

In this program, we will provide you practical and unique education and research experience of the highest quality in human security engineering.

Entrance examination

This program will accept 20 students annually. The following students are eligible to apply.

- Doctoral students who have entered the Graduate School of Engineering (Department of Civil and Earth Resources Engineering, Department of Urban Management, Department of Environmental Engineering, Department of Architecture and Architectural Engineering) and who were assigned to the Integrated Engineering Course in the human security engineering field.
- Doctoral students of the Graduate School of Global Environmental Studies who have selected the "Human Security Engineering Advanced Course."
- Doctoral students of the Graduate School of Informatics who have submitted the "Human Security Engineering Education Program – Course Application" to the Director of Human Security Engineering Field and were permitted to take the course by the Director.

In general, you have to pass both of the entrance exam to one of the four engineering departments (Civil and Earth Resources Engineering, Urban Management, Environmental Engineering, or Architecture and Architectural Engineering) or the Graduate School of the Global Environmental Studies organizing this program and this GCOE program's own exam. In the latter exam, your project proposal is evaluated. Each department/graduate school has an admission system for working students. Visit our website (<http://hse.gcoe.kyoto-u.ac.jp>) for more details.

As a partnership institution, organization, and company

In this GCOE program, we will attempt to solve the problems in human security in Asian megacities. For this purpose, your participation is essential, especially for successful key joint research projects (financial aid available), which are intended to tackle locally-oriented issues. Your participation will create better access to the cutting-edge information on this new discipline and the human resource pool of this program, and more opportunities for future collaboration. Please contact HSE Center (contact@hse.gcoe.kyoto-u.ac.jp) for more details.

Typical curriculum

- First year: mostly coursework and internship
- Second year: internship and dissertation study
- Third year: dissertation study

Expected career after graduation

Staff of educational or research institutes such as universities or advanced practitioners in local/central governments or international organizations.

