Joint Doctoral Program for Sustainability Research.
Research Advisors

Tokyo University of Foreign Studies

Shinichi TAKEUCHI (Area Studies):
Shinichi Takeuchi specializes in African studies, particularly in themes such as politics, development, peace-building, and international conflict. In this course, he will provide lectures and seminars aiming at building a capacity to analyze contemporary issues using systematic methods. Students are required to conduct critical analyses of methodologies including international politics, comparative politics, and social anthropology. In addition, current global issues of sustainable development, state-building, conflict resolution, and peace-building will be analyzed in the classes through specific case-studies for the purpose of fostering capabilities to deal with contemporary challenges.

Chikako NAKAYAMA (Global Studies):
Chikako Nakayama specializes in economic and social thought, focusing mainly in German-speaking countries since the 20th century, when the balance among politics, economy, and society, and the relation between society and science were fundamentally questioned in the midst of globalization. She will provide lectures and seminars on global studies, analyzing the foundation of sciences with perspectives of social science and humanities, and dealing with global and human economy through the analysis of structures and actors of our contemporary world, such as nation-states, international relations, regions and communities, and NGOs. Sustainable development is an important subject of education and research. She will introduce students to logical and ideological approaches to realize diverse, spontaneous, and sustainable development.

Kazue DEMACHI (Development Economics):
Kazue Demachi specializes in International Economics, International Finance, and Development Economics, focusing on African and Asian countries. In this course, she will provide lectures and seminars on economic development based on statistical analysis. Students are expected to obtain knowledge and views to analyze "sustainability" in terms of the flow of [money/people/goods and services] and correlations between [natural resources and economy]. Through the exercises in data and causality analysis, students are also expected to acquire methods to understand and analyze the issues in the global and local society.

Tokyo University of Agriculture and Technology

Kazuhiko MISAWA (Biomedical Engineering):

To realize qualitative improvement of life, home medical care, and patient welfare, the demand for progress and innovation in medical diagnosis and treatment is increasing every year. Engineering technology (e.g., electronics) in close collaboration with biology and medicine plays a key role in the latest advances in diagnosis/treatment. Based on "ultrafast optical science," my group conducts comprehensive research and development ranging from basic to applied research in biomedical engineering systems. The purpose of this approach is to develop high-quality diagnostic and treatment options for future generations, leading to the creation of new industrial fields.

Hiroko KATORI (Energy Science):

It is necessary to explore complex issues such as securing energy resources and conserving the environment from the perspective of comprehensive fields, not just the field of engineering. Also, in order to propose new technology that leads to the creation of new industries, we need to break down these complicated problems into each element (systems approach) and look at them from a broad angle. The method to clarify the mechanism of the phase transitions in magnetic materials is similar to the method to solve complicated problems related to energy.

To realize a sustainable society using the knowledge of magnetic materials and the research methods acquired from the magnetic phase transition study, we will work on energy related issues. Topics discussed in classes include "Proposal of energy problem solving methods using new principles," "Realization of energy conversion technology using new methods," and "Development of energy efficient and environment-friendly production process."

Atsushi CHITOSE (International Agricultural Development) :

Agriculture plays an important role in enhancing economic development, food security and poverty reduction in developing countries. Creating policies for effective food supply, agricultural development, and rural area development requires a thorough understanding of historical, cultural, institutional, social, economic and environmental issues underlying the agriculture and rural livelihoods of developing countries.

Provided with this perception, we explore the current situations and challenges in agriculture and rural livelihoods as well as the behavior of relevant stakeholders in developing countries. Students are required to proceed with their research from an economic perspective, paying due attention to the fact that poverty, food insecurity, economic performance, resource and energy issues, and environmental problems are all interrelated in a society.

Yoshihiro NOMURA (Biological Resources Functional Chemistry):
A high value-added strategy that capitalizes on the use of biological functionality of agricultural products will play an important role in contributing to agricultural development and increases in farm income. Also, the promotion of an effective use of the unused biological parts that used to be discarded is considered as another possible strategy to raise farm income. These development strategies are assumed to work effectively in developing counties because they are endowed with abundant biological resources.

Given the needs of developing countries in modern society, we conduct advanced research for the development of new applications through utilizing the unused biological resources and reusing the used biological resources. Students are required to conduct their research relying on the chemical analysis of functional elements in agricultural and fishery resources, and further identifying challenges and finding solutions for new product innovation by capitalizing on specific biological functionality.

Terumasa ITO (Biomedical Engineering):
Current biomedical sciences are based on advanced measurement technology for live cells and tissues. In order to bring the technology innovations in this field into our society, we need to not only master the individual expertise but also to have the ability to resolve issues while working in cooperation with others across disciplines. We explore new analysis methods for living cells and tissues using microscopic imaging and laser spectroscopy, in collaboration with our partners from other fields such as agriculture, food and pharmaceutical sciences. In addition to acquiring new scientific findings through the interdisciplinary researches, we aim to introduce our knowledge to the industrial fields.

The University of Electro-Communications

Kayoko YAMAMOTO (Social Systems Engineering):
One of the critical global goals is to create and maintain a safe and prosperous society, and it is urgent to achieve resources development on a global scale and to solve environmental problems such as abnormal climate and disasters in both developed and developing countries. In order to tackle such issues, it is necessary to develop the methods that can utilize a wide variety of information and design a new social system to achieve the global goals. To that end, it is essential to learn various kinds of analytical methods, that are capable of processing big data for the analysis of survey results, including geospatial information, mathematical models, algorithms and computer technology, and statistical techniques. By taking a new approach, we will aim to solve global issues and contribute to creating a safe and secure society.

Tomonori HASHIYAMA (Computer Science, Informatics/Telecommunications Engineering):
The development of computer and network technologies has enhanced the quality of our daily life. Various kinds of interconnected electronic devices will be an important part of the prospective society called “society 5.0.” The aim of our research projects includes further development of Artificial Intelligence to enable human intelligence to acquire a better understanding of the connected world.
Keywords: Intelligent Systems, Human-Computer-Interaction,
Society 5.0, Artificial Intelligence, Machine Learning, Internet of Things

Hiroshi YOKOI (Measurement /Control Engineering):
It is inevitable to solve a broad range of problems caused by aging and poverty and create a comfortable living environment for every one of us.

High-performance intelligent functions and automation based on the development of mechatronics, medical engineering, and measurement/control technology are rapidly being developed and further enhanced in the area of transportation, aerospace, medical care, and various other fields. Measurement and control technology emerged from transverse engineering. It is structured by input, output, and functions of objectives and enables us to grasp (analyze, recognize, and optimize) the connection of objectives as a system.

In order to respond to the needs of modern society, we offer research and education opportunities in mechatronics and medical engineering. This enables the students to systematically understand human characteristics and functions such as sensation/perception and movement.

We will aim to create a society in which robots and human beings live in harmony and improve and support lives of elderly and physically challenged people.

Yoshiko OKADA-SHUDO (Optoelectronics):
Advanced optical engineering will help to achieve a prosperous and secure global society through sustainable development by supporting and developing basic and novel technologies such as next-generation optical communication, high resolution measurement control systems, sensitive precision optical sensor, and next-generation high-speed quantum computing. Students will acquire basic knowledge and application skills related to optical functional materials, optical devices, optical communication and information processing, which form the basis for future optical science and optical technologies. In this course, we will aim to gain the ability to solve various issues in conventional technologies from energy saving to security and create higher social and industrial infrastructures that are needed in society.