

VIKTIG INFORMATION FÖR ANSÖKANDE TILL  
NAGASAKI UNIVERSITY  
TRANSDISCIPLINARY SUMMER SCHOOL ON THE ENVIRONMENT

- Ranka 5-8 projekt i ett Worddokument i ansökan till LTH
- Blir du nominerad kommer du att göra 1-4 projekt, beroende på hur långa projekten är
- Projektens längd varierar från 1-4 veckor
- En del av projekten kommer eventuellt inte att ges sommaren 2020
- Schema samt vilka projekt som ges kommer att fastställas i mars/april 2020

**Information of 2019 Summer School Internship Host Laboratory  
Faculty of Environmental Science, Nagasaki University, Japan  
April, 2019**

**INDEX**

<b>Environmental Policy Major .....</b>	<b>3</b>
Fukami Lab (Tourism and Environmental Education) .....	4
Goto Lab (Landscape Planning) .....	5
Hamasaki Lab (Environmental Governance) .....	6
Hattori Lab (Evolutionary Ecology) .....	7
Hosaka Lab (Environmental Sociology) .....	8
Katayama Lab (Urban and Regional Planning) .....	9
Kikuchi Lab (Environmental Law and Policy) .....	10
Kuroda Lab (Sociology for region and environment) .....	11
Matsumoto Lab (Environmental/Energy Economics and Policy) .....	12
Nishikubo Lab (Environmental Law and Policy) .....	13
Ota Lab (Ecosystem Services) .....	14
Seki Lab (Environmental Philosophy) .....	15
Shigetomi Lab (Environmental System) .....	16
Suk Lab (Environmental Business and Management) .....	17
Takeshita Lab (Energy, Environmental, and Economic Systems Analysis) .....	18
Toda Lab (Environmental Sociology, Environmental Thought and Peace Studies) .....	19
Tomozawa Lab (History of environmental philosophy in Japan) .....	20
Wadachi Lab (Environmental Politics) .....	21
Watanabe Lab (Landscape and Regional Planning) .....	22
Yamamoto Lab (Environmental Economics) .....	23
Yoshida Lab (Environmental Planning and Disaster Risk Management) .....	24
<b>Environmental Conservation and Planning Major .....</b>	<b>25</b>
Asakura Lab (Solid Waste and Resource Engineering) .....	26
Iguchi Lab (Conservation Ecology) .....	27
Iima Lab (Phycology) .....	28
Kagabu Lab (Environmental Water Science) .....	29
Kawamoto Lab (Satellite Climatology) .....	30
Muto Lab (Morphodynamics and Stratigraphy) .....	32
Nagae Lab (Environmental Toxicology) .....	33
Nakagawa Lab (Environmental Groundwater Science) .....	34
Nakayama H Lab (Environmental Bioengineering) .....	35
Nakayama T Lab (Atmospheric Environmental Science) .....	36
Nishiyama Lab (Soil Science) .....	37
Okada Lab (Neuroethology and Ecotoxicology) .....	38

Shirakawa Lab (Green Chemistry).....	39
Taimura Lab (Environmental Physiology) .....	40
Takao Lab (Environmental Analytical Chemistry) .....	41
Takasu Lab (Biogeochemistry and Marine Environmental Science) .....	42
Takatsuji Lab (Radiation Biophysics) .....	43
Yamaguchi M Lab (Plant and Atmospheric Environment) .....	45
Yamaguchi N Lab (Animal Ecology).....	46
Yamashita Lab (Environmental Toxicology & Pharmacology) .....	47

## **Environmental Policy Major**

The educational objective of the Environmental Policy Major is to foster human resources including administrative officers, business professionals, researchers, journalists who complete with knowledge of social/economic system, environmental conservation/administration, human culture/civilization and international relations so as to enable human society to enjoy sustainable development in harmony with natural environment.

## **Fukami Lab (Tourism and Environmental Education)**

- Name of the Laboratory:  
Tourism and Environmental Education Laboratory
- Name of the Professor:  
Assoc. Prof. Satoshi FUKAMI (fukami@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Tourism Geography, Ecotourism, Geopark, World Heritage, Small Islands, Japanese Geopolitics
- Summary of the Laboratory:

Satoshi FUKAMI researches the relations between tourism, environmental study and regional community. The research is executed from human geographical point of view, using methods of field work and practical activities. The research observes the residents' consciousness and environmental conservation of nature and cultural heritages as resources for tourism, studying the sustainable regional community building through field work approaches such as interviews, questionnaire survey, participant observation. The researches about Yakushima-Island concerned with issues on principles, realities of ecotourism and world heritage, or geo tourism and regional revitalization issues in Japan and other East Asian countries are our latest research interests.

Certainly there are different methods for environmental conservation policies on regional level, yet the main aim of this paper is to think about better approaches for tourism and environmental study. We think that present research provides information on regional conservation activities of environment and optimal usage of resources.
- Skills you will obtain:
  - Fieldwork techniques in tourism study
  - Knowledge on Japanese ecotourism and geotourism
  - Especially welcome study abroad students able to communicate in Japanese

JLPT-N1

## Goto Lab (Landscape Planning)

- Name of the Laboratory:  
Landscape Planning and Design
- Name of the Professor:  
Prof. Seiko GOTO (gotos@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Landscape Architecture, Garden History, Horticulture Therapy, Therapeutic gardens
- Summary of the Laboratory:  
Seiko Goto is a Professor whose teaching covers Environmental Planning, Landscape Design, History of Landscape Architecture, and History of Japanese gardens. She is an academic expert in Japanese garden history and the healing effects of its design. She has also published extensively on these subjects. The mission of her lab is to advance researches on the physical and psychological effects of designed landscape. To understand the complexities of design practices in the natural and built environments, students are given opportunities to learn planning and design skills of landscape architecture and get involved in ongoing landscape problems of Nagasaki City.
- Skills you will obtain:  
Landscape planning and design methods, historical research methods, physiological research methods

## **Hamasaki Lab (Environmental Governance)**

- Name of the Laboratory:  
Environmental Governance Laboratory
- Name of the Professor:  
Assoc. Prof. Hironori HAMASAKI (h-hamasaki@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
multi-level governance of water , water resources management and policy  
stakeholder coordination/partnership, decision & policy-making, consensus building,  
sustainability science for water governance
- Summary of the Laboratory:  
His research aims at seeking for good governance to solve actual environmental problems, especially focusing on water resources management issues. Basically, his methodology is qualitative, such as policy analysis, social network analysis, and SWOT analysis through interview or workshop, and also, quantitative, such as contingent valuation method (CVM) through questionnaire survey.  
His current research topics are i) transboundary, environmental and social impacts of large scale hydropower dams in Mekong River Basin, ii) climate change impacts on water resources and adaptation policy for sustainable society, and iii) survey on a relation between farmers' behavioral pattern and awareness of water use, and how the change of decision-making influences water management in southern part of Turkey  
In his laboratory, undergraduate students are usually required to read literatures and acquire basic knowledge about environmental governance and other related fields. As his laboratory also aims at problem-solving-oriented research, it's a must that students go to the field, interview with stakeholders and assess what's really going on.
- Skills you will obtain:
  1. Basic understanding of environmental (and water) governance
  2. Basic skill for effective, efficient literature review and interview/fieldwork method

## Hattori Lab (Evolutionary Ecology)

- Name of the Laboratory:  
Laboratory of Evolutionary Ecology
- Name of the Professor:  
Assist. Prof. Mitsuru HATTORI (mhattori@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Adaptation, Biological interaction, Floral ecology, Pollination ecology
- Summary of the Laboratory:  
Research in our laboratory centers around evolutionary ecology. Our studies aim to understand how organisms are adapted to their environments, particular in floral adaptation to pollination by insects and prey adaptation to their predators. We have mainly been conducting field observations and field experiments for gaining insight into adaptive evolution. The purpose of this internship program is to learn the nature of pollination by insects in Nagasaki.
- Skills you will obtain:
  - ▶ Knowledge on pollination and floral ecology
  - ▶ Skill of field observation of pollination by insects
  - ▶ Date handling in pollination and floral ecology



## Hosaka Lab (Environmental Sociology)

- Name of the Laboratory:  
Environmental Sociology Laboratory
- Name of the Professor:  
Prof. Minoru HOSAKA (hosaka@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Sociology, Social Research, German Greens
- Summary of the Laboratory:  
Environmental sociology analyzes the environmental problems with sociological knowledge and with using social research. Our research theme is mainly studies of environmental conservation consciousness by using quantitative research. Professor Hosaka is conducting studies on environmental conservation consciousness by using quantitative research (related field : social psychology) . Then, we can probably get social research skills such as methods for measurement of consciousness, manipulation of variables, collection of empirical data, and analysis of data (for example by using correlation analysis, some form of general linear model, and factor analysis. ) Moreover, we are conducting qualitative research on the background of the success in German Greens (related field : political sociology, qualitative research).
- Skills you will obtain:
  - 1) **Knowledge on environmental sociology**
  - 2) **Skill for social research**

## Katayama Lab (Urban and Regional Planning)

- Name of the Laboratory:  
Urban and Regional Planning Laboratory
- Name of the Professor:  
Assoc. Prof. Kensuke KATAYAMA (kenkata@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Spatial Policy and Planning, Regional Governance, *Machidukuri*
- Summary of the Laboratory:

Assoc. Prof. Katayama is conducting researches on urban and regional planning system and policies to make, share and implement the future spatial vision through the collaborative process among governmental sectors, private sectors and citizens.

His current research interests are in:

  - 1) Transformation of spatial planning and policies under the globalization and decentralization particularly in European Countries;
  - 2) Formulation process of regional governance in city-regions; and
  - 3) Sustainable regeneration in city centers and rural areas in the age of declining population.

During internship program in this laboratory, students will make presentations on the urban and regional problems and planning policies in their countries and discuss with laboratory members to understand the commonalities and differences between their countries and Japan. Students will be able to join the field trip in Nagasaki City to understand the situations and urban planning policies concretely.
- Skills you will obtain:
  - Theoretical concept to consider the environmental dimension in urban and regional planning;
  - Perspective to compare the situation of their countries and Japan; and
  - Specific efforts for sustainable regeneration in Nagasaki City

## Kikuchi Lab (Environmental Law and Policy)

- Name of the Laboratory:  
Environmental Law and Policy.
- Name of the Professor:  
Prof. Hidehiro KIKUCHI (hkikuchi@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Environmental Law, Japanese policy making process, Global environmental agreements
- Summary of the Laboratory:

Hidehiro KIKUCHI graduated from the Faculty of Laws, Tohoku University in 1989 to work for the Ministry of the Environment, Government of Japan. He has also worked at the Ministry of Foreign Affairs (1991-1992), the Ministry of Trade and Industry (1995-1997), the Embassy of Japan in China (2000-2004), as Secretary for Minister of Environment, Mr. Masatoshi WAKABAYASHI (2006-2007), and in the Cabinet Office (2011-2013)

He attempted to analyze the policymaking process when Japan concluded some international environmental conventions, such as “the Convention on International Trade in Endangered Species on Wild Fauna and Flora (CITES)” in 1973 and “Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal” in 1993.
- Skills you will obtain:
  - Knowledge on Japanese Environmental Law and Policy.

## Kuroda Lab (Sociology for region and environment)

- Name of the Laboratory:

Sociology for region and environment

- Name of the Professor:

Assoc. Prof. Satoru KURODA (skuroda@nagasaki-u.ac.jp)

- Keywords of the Laboratory:

Environmental Sociology, Regional Sociology

- Summary of the Laboratory:

We research on the three main points that will be the key to solving the environmental issues and read various environmental activities.

- 1, What are the relationships that exist between changes in the natural environment and changes in human populations? (Environmental recognition)
- 2, How do local communities form agreements with respect to associated natural environments? (Consensus-building)
- 3, How should communities promote resource management? (Sociological argument about the environmental policy)

We have carried out fieldwork in the Yoshi (reed) field located at the Kitakami river estuary, region in Miyagi prefecture, Japan. Our goal is to determine what level of sustainability current management practices in the region can achieve though understanding changes in both natural and societal systems. March, 11, 2001 East-Japan Earthquake: The East-Japan Earthquake resulted in, a large-scale tsunami being generated off the coasts of Iwate, Miyagi, and Fukushima prefectures. Our research is involved in both research and practical efforts related to the implementation of community reconstruction efforts on the Kitakami river estuary Miyagi prefecture, Japan.

- Skills you will obtain:

- Knowledge of Current status of various environmental and environmental activities
- Skills for Fieldwork (society and environment)

## Matsumoto Lab (Environmental/Energy Economics and Policy)

- Name of the Laboratory:  
Laboratory of Environmental and Energy Economics/Policy
- Name of the Professor:  
Assoc. Prof. Ken'ichi MATSUMOTO (kenichimatsu@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Climate change; energy; economic analysis; quantitative analysis; environmental economics and policy
- Summary of the Laboratory:  
We analyze environmental, energy, and resource issues and the related policies quantitatively using economic models (e.g., computable general equilibrium models), simulation models (e.g., agent-based models), econometric and statistical methods, and other quantitative methods (e.g., various indicators). Our special interests and specialized fields are climate change and energy issues. See our website for more details (<http://www.matsumoto-lab.net/en>). You can do something related to our laboratory, depending on your interests. We have two Ph.D. students, four master students, three research students, and six bachelor students.
- Skills you will obtain:  
Economic analysis; statistical methods; use of database and data handling; computer skills (depending on your topic)

**Note: Please think of what you want to do during your time at this laboratory. Laptop PC is necessary.**

## **Nishikubo Lab (Environmental Law and Policy)**

- Name of the Laboratory:  
Laboratory for Environmental Law and Policy

- Name of the Professor:  
Prof. Hirohiko NISHIKUBO (h-nishikubo@nagasaki-u.ac.jp)

- Keywords of the Laboratory:  
Environmental Law, Environmental Policy

- Summary of the Laboratory:

The aim of our laboratory is to develop and improve environmental law and policy in order to solve various environmental issues we face both in Japan and all over the world.

During internship program in our laboratory, students will work on a short-term project to understand Japanese environmental law and policy and compare them with environmental law and policy of their own country. In order to fully accomplish the goal of the project, students are requested to have sufficient ability in Japanese language. If students do not have such ability in Japanese, but they have enough ability in English, it is possible for them to understand the gist of Japanese environmental law and policy by using documents such as “OECD environmental performance reviews Japan” and so on which are written in English.

The project may involve interviews with staffs in charge of environmental protection in local governments such as Nagasaki Prefecture, or Japanese National Government. The project may also involve field trips to areas of environmental concern and protection, for example, National Parks, wetlands, hot springs, etc.

- Skills you will obtain:
  - Knowledge on Japanese environmental law and policy
  - Knowledge on current situation about environmental issues in Japan
  - Skills of analytical thinking on environmental issues

## Ota Lab (Ecosystem Services)

- Name of the Laboratory:  
Ecosystem Services and Biodiversity Conservation Policy
- Name of the Professor:  
Assoc. Prof. Takahiro OTA ([takahiro@nagasaki-u.ac.jp](mailto:takahiro@nagasaki-u.ac.jp))
- Keywords of the Laboratory:  
Ecosystem services, Payments for ecosystem services, Biodiversity offset and offset banking, Forestry, Sato-umi, Conservation, Sustainability assessment, Social marketing, Social network analysis, Cultural evolution, Loquat farming, Honey bee pollination, Social-ecological system, Gaming for environmental education
- Summary of the Laboratory:  
Research topics of the lab is creation of an effective and efficient policy for biodiversity conservation. We are interested in development of useful tools for value assessment of various ecosystem services (benefits that human obtain from nature). This concept is essential to promote well informed and accepted conservation policy (e.g. Payments for Ecosystem Services). We refer to broad academic knowledge and methods to attain this aim, from ecology to philosophy.
- Skills you will obtain:  
Assessment knowledge about various ecosystem services (both natural and social science aspects)  
Broad knowledge about biodiversity conservation policy (PES, offset banking, environmental tax, protected area and law)

## Seki Lab (Environmental Philosophy)

- Name of the Laboratory:  
Laboratory of Environmental Philosophy
- Name of the Professor:  
Assoc. Prof. Yoko SEKI (yokoseki@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
*Kyosei* (co-existence)
- Summary of the Laboratory:  
    *Kyosei* (共生) term isn't only one of the Buddhist terminologies, but it is also Japanese unique concept that shows how to live with others. Philosophy, it is the foundation of ethics, exactly means western philosophy derived from Aristotle's philosophy. So environmental philosophy and ethics were imported learning and it was uniquely accepted in Japan.  
    But there are many ideas or thoughts in the world comparable to Western philosophy. *Kyosei* is one of them, of course. We're thinking about relationships between human and nature with this term, *Kyosei*.  
    **【Requirements for Acceptance】**  
    You have basic knowledge of philosophy or ethics of university general education level and you are interested in Japanese thought or language.
- Skills you will obtain:  
Knowledge related to linguistic meaning



## Shigetomi Lab (Environmental System)

- Name of the Laboratory:  
Laboratory of Environmental System
- Name of the Professor:  
Assoc. Prof. Yosuke SHIGETOMI (y-shigetomi@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
industrial ecology, sustainable consumption and production, life cycle assessment (LCA), environmentally extended input-output analysis (EEIOA)
- Summary of the Laboratory:

Environmental loads as greenhouse gas (GHG) emissions associated with economic activities can be regarded as attributable to satisfaction with final human “consumption.” From this perspective, there have been discussions on environmental management in the nations with “consumption-based accounting” by which the consumer is responsible for the loads from the production of energy, goods, and services related to their final consumption.

The main goal of this laboratory is to explore the way of climate change mitigation and critical resources management through the analysis of consumption-based environmental loads (i.e. carbon footprint) and resources consumption (i.e. material footprint) based on the life cycle perspective. Specifically, the laboratory focuses on the impacts of changes in our lifestyles (consumption patterns) and society on them. Yosuke SHIGETOMI is now seeking to quantify structural changes in the carbon footprint of Japanese households from 1990 to 2005 and identify the key drivers contributing to household carbon footprint.
- Skills you will obtain:  
You could learn the basic knowledge of life cycle assessment with a focus on IOA, and the relationship between our lifestyles and consumption-based environmental loads (environmental footprints).

## **Suk Lab (Environmental Business and Management)**

- Name of the Laboratory:  
Laboratory of environmental business and corporate environmental management
- Name of the Professor:  
Assoc. Prof. Sunhee Suk
- Keywords of the Laboratory:  
Carbon pricing corporate environmental management, environmental business, macro-econometrics, renewable energy, sustainable development
- Summary of the Laboratory:  
In responding to climate change, the business sector, owning the resources and technologies, will play a pivotal role in making a transformational change towards achieving sustainable development, running sound business through green investment and promoting low-carbon and green global value-chain. This laboratory explores the past and present of the company's carbon management and environmental business and studies the future role of the business side for global sustainable development.
- Skills you will obtain:
  - Knowledge on environmental business for low carbon society in the climate change era;
  - Knowledge on the company's environment and carbon management for climate change risk management and response;
  - Field study on the environmental business in urban area or decentralized renewable energy system at a municipal level in Japan.

## **Takeshita Lab (Energy, Environmental, and Economic Systems Analysis)**

- **Name of the Laboratory:**  
Energy, Environmental, and Economic Systems Analysis
- **Name of the Professor:**  
Assoc. Prof. Takayuki TAKESHITA (takeshita@nagasaki-u.ac.jp)
- **Keywords of the Laboratory:**  
Energy system modeling and analysis, energy scenario development, technology assessment
- **Summary of the Laboratory:**  
Using technology-rich, bottom-up type energy system models, we have developed cost-optimal energy demand and supply scenarios and cost-optimal scenarios of energy technology deployment over the period to 2100 for each of 70 world regions under climate stabilization constraints. Such models have also been used to assess the cost-competitiveness of new clean energy technologies (e.g., fuel cells, CCS). We will develop so-called “hybrid models” by linking top-down economic models to bottom-up energy system models to describe the cost-optimal growth path of economic and energy systems. The ultimate goal of my lab is to derive policy recommendations useful to decision makers in the field of energy and environment from our model simulation results.
- **Skills you will obtain:**
  - Mathematical programming
  - Data gathering, processing, and analysis
  - Energy system analysis

## Toda Lab (Environmental Sociology, Environmental Thought and Peace Studies)

- Name of the Laboratory:  
Environmental Sociology, Environmental Thought and Peace Studies Laboratory  
(<http://todakiyosi.web.fc2.com/>)
- Name of the Professor:  
Prof. Kiyoshi TODA ([toda@nagasaki-u.ac.jp](mailto:toda@nagasaki-u.ac.jp))
- Keywords of the Laboratory:  
Environmental Justice Movement, Anti-Nuclear Movement, Military and so-called peaceful uses of nuclear energy, Positive Peace, Structural Violence
- Summary of the Laboratory:  
Kiyoshi TODA researches the relations between citizens movements, environmental studies and peace studies. The research is executed from sociological and philosophical points of view, using methods of bibliographic survey, field work and practical activities. The research observes activities of environmental and peace movements and policies in Nagasaki and other places. The researches about nuclear power problems (both military and so-called peaceful uses) are published in two books. The researches about environmental justice are also published in two books and translated in Korean. The research about peace education will be published soon.
- Skills you will obtain:
  - Fieldwork techniques for participant observation
  - Knowledge on Japanese environmental movements and peace movements

## **Tomozawa Lab (History of environmental philosophy in Japan)**

- **Name of the Laboratory:**  
History of environmental philosophy in Japan.
- **Name of the Professor:**  
Assoc. Prof. Yuuki TOMOZAWA (ytomozawa@nagasaki-u.ac.jp)
- **Keywords of the Laboratory:**  
Environmental Sociology; Historical studies on Japanese grass-roots movements
- **Summary of the Laboratory:**  

We research on the Japanese experiences of severe environmental damage and grass-roots anti-pollution movements from a historical viewpoint. Generally, "environmental philosophy" means Western thinker's products, but we think it is important that also many untitled citizens have produced their own grass-roots environmentalism and eco-philosophy.

Japan has achieved rapid industrialization and economic growth through 1950s to 70s with enormous cost in human life. Not only the famous case such as Minamata disease, widespread environmental disaster had occurred in other local areas too, and those cases are still less well understood. Against this situation, some general citizens metamorphosed into thinkers. They had struggled to avoid local environmental crisis, seeking alternative ways of changing our society to be eco-friendly and people-friendly. Those efforts give us valuable hints for sustainable society even now.
- **Skills you will obtain:**
  - Knowledge of Japanese experience and citizen's thought about environmental issues
  - Skills for handling historical materials

## Wadachi Lab (Environmental Politics)

- Name of the Laboratory:  
Environmental Politics
- Name of the Professor:  
Assoc. Prof. Yoko WADACHI (ywadachi@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Environmental Politics  
EU Environmental Policy  
Environmental Issues as International Politics
- Summary of the Laboratory:  
Students here study various topics, ranging widely from local pro-environmental actions to international environmental treaty negotiations, with common concerns of problem-solving.  
The research theme of Yoko Wadachi is “the European Integration and the EU Environmental Policy”. She focuses the political aspects of the EU environmental policies.
- Skills you will obtain:  
Knowledge on European Union environmental policy and politics  
Skills of analytical thinking on environmental issues from the point of view of political sciences

## Watanabe Lab (Landscape and Regional Planning)

- Name of the Laboratory:  
Landscape and Regional Planning Research Group
- Name of the Professor:  
Prof. Takashi WATANABE (twatanab@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Open Space, Landscape, Conservation, Restoration
- Summary of the Laboratory:  
We need to change our society from one that values the resource-wasting development, into one that values the sustainable development using local resources to solve environmental problems. In order to facilitate this goal, the Landscape and Regional Planning Research Group (LPRG) aims to develop methodologies for regional planning that utilize both open spaces (e.g., parks, woods, farmlands, etc.) and landscapes.
- Skills you will obtain:
  1. Knowledge on characteristics of landscape in Nagasaki-city
  2. Knowledge on present situation about regional planning in Japan
  3. Skill of spatial analysis (e.g. map-reading etc.)

## Yamamoto Lab (Environmental Economics)

- Name of the Laboratory:  
Laboratory of Environmental and Development Economics
- Name of the Professor:  
Assoc. Prof. Yuki Yamamoto (y-yamamoto@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Environmental Economics; Environmental Policy; Policy Evaluation; Forest Preservation; Development Economics.
- Summary of the Laboratory:  
The main objective of this laboratory is to find out what factors promote households' environmental behavior in developing countries. To achieve our objective, we obtain data from field survey and/or field experiment which is based on the economics approach. Students will be able to learn how to conduct household survey and experiment in rural villages, especially in Indonesia and Nepal. The data obtained from the survey is used for statistical analysis to evaluate household behavior.  
  
Specific research topics are
  1. Forest fire prevention in Central Kalimantan, Indonesia,
  2. Water provision with a small solar power system in Nepal,
  3. Impact evaluation of forest fire on health in Indonesia,
  4. Household survey in non-electrified islands of Indonesia.
- Skills you will obtain:
  1. Household survey in developing countries
  2. Field experiment
  3. Econometrics



## Yoshida Lab (Environmental Planning and Disaster Risk Management)

- Name of the Laboratory:  
Environmental Planning and Disaster Risk Management
- Name of the Professor:  
Assoc. Prof. Mamoru YOSHIDA (yoshida-m@nagasaki-u.ac.jp)
- Disaster Risk Reduction  
Disaster Risk Governance  
Urban and Environmental Planning
- Summary of the Laboratory:  
This laboratory aims to tackle issues on disaster risk reduction while promoting personal or community preparedness to avoid citizen's excessive dependence on governments in emergencies. The laboratory use the framework of economics or psychology, and models citizen's behavior about disaster risk reduction with field survey or questionnaire survey data. In addition, the laboratory establishes workshop framework including hazard map arrangement to promote cooperation among community members in case of disasters.
- Skills you will obtain:
  - Hazard map arrangement
  - Town watch considering areas potentially damaged by natural disasters

## Environmental Conservation and Planning Major

The educational objective of the Environmental Conservation and Planning Major is to foster human resources including internationally-minded persons who are competent to take an active part in a wider range from environmental issues concerning the quality-of-life to global environmental problems or measures, and technical experts, administrators and researchers who have ability to work on the environmental conservation on a global scale.

## Asakura Lab (Solid Waste and Resource Engineering)

- Name of the Laboratory:  
Laboratory of Solid Waste and Resource Engineering
- Name of the Professor:  
Assoc. Prof. Hiroshi ASAKURA (asakura@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Solid waste, landfill site, acceleration of stabilization, hydrogen sulfide gas

- Summary of the Laboratory:

Laboratory of Solid Waste and Resource Engineering is in charge of developing and verifying waste treatment technologies that are proper for environmental protection, highly efficient and reliable in terms of energy and cost and investigating their implementation by considering regional characteristics.

The main intermediate treatment process for solid waste is an incineration in Japan. A calorific value of combustible solid waste is important for appropriate operation of incinerator. The calorific value can be estimate by a simple alternative examination.

Acceleration of stabilization brings reduction of a maintenance cost for landfill facility and risks of environmental pollution. Main drastic reaction of stabilization in a landfill layer is a microbial decomposition of organic matter. The microbial activity can be increased by appropriate air supply into the waste layer. The obtainable volume of air supply can be estimate by an examination of permeability of landfilled waste.

- Skills you will obtain:
  - **Estimate of a calorific value of combustible solid waste**
  - **Measuring of oxygen consumption rate and gas generation from solid waste**

### Iguchi Lab (Conservation Ecology)

- Name of the Laboratory:

Laboratory of Conservation Ecology

- Name of the Professor:

Prof. Kei'ichiro IGUCHI (keyichi@nagasaki-u.ac.jp)

- Summary of the Laboratory:

There is intrinsic value of biodiversity including the complexity of ecological systems and the resilience created by evolutionary processes. Human-caused extinctions and the loss of ecosystems are unacceptable. We believe maintaining and restoring biodiversity are responsibility of humans. Our ecological approach mainly targets on freshwater fishes to understand the function of biodiversity. Through short-term stay in summer, you will learn how to quantify biodiversity among local populations of aquatic organisms.

## Iima Lab (Phycology)

- Name of the Laboratory:

Laboratory of Phycology

- Name of the Professor:

Assoc. Prof. Masafumi IIMA (iima@nagasaki-u.ac.jp)

- Keywords of the Laboratory:

Marine macroalgae, Freshwater macroalgae, Seaweed, Taxonomy

- Summary of the Laboratory:

The aim of research in our laboratory is to conserve endangered species of marine and freshwater macroalgae.

Our laboratory studies conservation of marine and freshwater macroalgae.

1. Studies of marine algal flora around Nagasaki city.
2. Studies on the life history and growth characteristics of endangered freshwater green algal species *Blidingia ramifera*. Its growth is greatly dependent on the salinity.
3. Studies of regeneration of natural population of rare marine green algal species *Ulva tanneri*.
4. Conservation study of endangered freshwater red algal species *Nemalionopsis tortuosa*.

During internship program in our laboratory, students will work on a short-term project related with research of marine algal flora around Nagasaki city.

On the other hand students can gain techniques of algal culture in the laboratory.

- Skills you will obtain:

Phycology (identification of seaweeds and isolation and culture techniques of macroalgae)

## Kagabu Lab (Environmental Water Science)

- Name of the Laboratory:  
Environmental Water Science Laboratory (Kagabu Lab)
- Name of the Professor:  
Assist. Prof. Makoto KAGABU (kagabu@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Water Environment, Water chemistry, Stable isotopes, Age dating

- Summary of the Laboratory:

My laboratory aims to elucidate the flow mechanism of groundwater and spring water by adopting water quality analysis (e.g. pH, electric conductivity, major ions, trace metal) and isotopic ratio ( $\delta^{18}\text{O}$ ,  $\delta\text{D}$ ) measurement. In addition, though it will take time to acquire skills, my laboratory can also estimate groundwater age by using anthropogenic gases (e.g. Chlorofluorocarbons, sulfur hexafluoride).

I want to challenge to understand the actual situation of the water environment problem in the specific region from the scientific approach. My lab is still new and there are not many Japanese students, but we take the initiative in on-site investigation, so let's go on the field study together.

Based on the data obtained in the field, I would like to consider water environment issue together. The skills learned in this summer project will be applicable to any region in the world.

- Skills you will obtain:
  - Method of field survey and groundwater sampling
  - Analyses of groundwater quality
  - Knowledge of groundwater contamination/conservation

## Kawamoto Lab (Satellite Climatology)

- Name of the Laboratory:  
Satellite Climatology Laboratory
- Name of the Professor:  
Prof. Kazuaki KAWAMOTO (kazukawa@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Aerosols, clouds, climate, satellite data

- Summary of the Laboratory:

Considerable amounts of tiny particles are suspended in the atmosphere, and they are called aerosols. Aerosols are solid and liquid particles, and they also serve as the nuclei of cloud droplets. Thus a change in the number of aerosol particles can lead to changes in cloud characteristics. Moreover, because raindrops are formed from a collection of cloud droplets, any change in the cloud droplet size may influence the amount and pattern of rainfall.

In our laboratory, the behavior of particles in the atmosphere, including aerosols, clouds, and raindrops, are investigated using satellite data, ground-based data, and numerical meteorological model outputs. In particular, the detailed structure inside the cloud layer is now being extracted by the recently launched space-borne radar onboard CloudSat. In the internship, we plan to conduct climate analyses relevant to aerosols, such as transition study from cloud to rainfall, with above datasets.

- Skills you will obtain:
  - 1) Knowledge on atmospheric science and climatology
  - 2) Skill of computer language (mainly Fortran)
  - 3) Skill of data analysis

Knowledge of Fortran is preferable in our laboratory.

• Kubo Lab (Environmental Safety Science)

● Name of the Laboratory:

Laboratory of Environmental Safety Science

● Name of the Professor:

Assist. Prof. Takashi KUBO (kubo-t@nagasaki-u.ac.jp)

● Keywords of the Laboratory:

Bioassay, Genotoxicity, Comprehensive pollution index, Simple measurement method, Water quality management, Suspended particulate matter

● Summary of the Laboratory:

Huge variety of chemicals exist in the environment. Instrumental analysis for individual substances cannot be sufficient to manage these compounds appropriately. Hence, environmental indices that can evaluate an existence of these compounds comprehensively are needed. Our laboratory, which started on July 2018, focuses on bioassays as one of the comprehensive pollution indices, and tests genotoxicity of ambient air, exhaust gas, tap water and wastewater etc. In addition, meaning of the genotoxic value obtained by the assays is also considered in relation to cancer risk.

On the other hand, the concentration of chemicals in the environment and in waste media tends to fluctuate greatly depending on various sampling conditions such as wind direction, water temperature and coexisting materials. Namely, it may be more appropriate and efficient to measure many times with low cost and simple measurement methods than measuring a few times with advanced analytical instruments. We examine the applicability of various simple measurement techniques to actual wastewater management.

In this internship program, students can gain fundamental knowledge and techniques about the research mentioned above.

● Skills you will obtain:

- General techniques of sampling and pre-treatment for environmental samples
- Method of a genotoxicity test using bacteria (*Salmonella Typhimurium*)
- Handling of experimental results for risk evaluation



## Muto Lab (Morphodynamics and Stratigraphy)

- Name of Laboratory:  
Laboratory of Morphodynamics and Stratigraphy
- Name of Professor:  
Prof. Tetsuji MUTO (tmuto@nagasaki-u.ac.jp)
- Keywords of Research:  
Autostratigraphy, Deltas, Geomorphology, Geology, Model Experiments, Rivers, Sea Level Changes
- Outline of Research:  
The Morphodynamics and Stratigraphy Group seeks new understanding of stratigraphic responses to sediment transport processes and imposed boundary conditions in sedimentary basins, largely by means of model experimentation. Our current interest lies in the dynamics of river deltas in response to extra-system forcing of various time scales. A recent, critical advance in our understanding of the long-term behavior of river deltas comes partly from the finding of deterministic autogenesis, whereby we have originated “autostratigraphy”, a framework norm for genetic stratigraphy that takes full account of deterministic autogenesis. The autostratigraphic model of river deltas suggests that abrupt stratigraphic breaks are not necessarily associated with sudden changes in rate of base-level movement but can result from purely autogenic responses of the system.
- Skills you will obtain:
  - Hydraulics of open channel flow (Froude number, specific energy, specific momentum)
  - Experimental geomorphology and stratigraphy

## Nagae Lab (Environmental Toxicology)

- Name of the Laboratory:  
Environmental Toxicology Laboratory
- Name of the Professor:  
Prof. Masaki NAGAE (nagae@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Toxicological evaluation of air and aquatic pollution, Endocrinology (teleosts), EDC (endocrine-disrupting chemicals)

- Summary of the Laboratory:

In our laboratory, toxicity or hormonal activity of chemicals are evaluated using *in vivo* exposure test using medaka (small teleost, *Oryzias latipes*) or daphnia (*Daphnia magna*).

In addition, molecular biological and biochemical techniques are employed for the detection and quantification of the useful biomarkers for chemical pollution.



In the summer school of our faculty, our laboratory will provide students the following experimental skills related genetic sex determination of fish (medaka) and human.

- Skills you will obtain:
  - Sampling methods of test fish (medaka)
  - Genomic DNA extraction from tissue sample
  - PCR and electrophoresis for genetic sex determination of medaka and human

## **Nakagawa Lab (Environmental Groundwater Science)**

- Name of the Laboratory:  
Environmental Groundwater Science Laboratory (Nakagawa Lab)
- Name of the Professors:  
Prof. Kei NAKAGAWA (kei-naka@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Groundwater quality, Flow and transport modeling in porous media, Remediation of contaminated soil and groundwater
- Summary of the Laboratory:

Groundwater contamination by nitrate from agricultural fields is a problem shared by many parts of the world. Shimabara-Peninsula is an important agricultural district experiencing this problem. Thus, our research interests focus on characterization, transport mechanism, fate, and pollution control measures of groundwater. We would like to contribute to conservation of groundwater environment using techniques such as field sampling, chemical analysis, lab-experiments, and numerical modeling.

Our lab has a potential short term opportunity for the students who is interested in issues about groundwater pollution. We are planning to have field trip to Shimabara-Peninsula to collect water at the site of contamination. Then, we will try to evaluate water quality in the lab. Student will be able to join the field tracer experiment at the same site and data analysis to obtain important parameters such as field hydraulic conductivity understanding how spread contamination in the aquifer.
- Skills you will obtain:
  - Method of field survey and groundwater sampling
  - Analyses of groundwater quality
  - Knowledge about soil and groundwater contamination in Japan

## **Nakayama H Lab (Environmental Bioengineering)**

- Name of the Laboratory:  
Environmental Bioengineering Laboratory (<http://nakayamalab.com>)
- Name of the Professor:  
Prof. Hideki NAKAYAMA ([nakayamah@nagasaki-u.ac.jp](mailto:nakayamah@nagasaki-u.ac.jp))
- Keywords of the Laboratory:  
Environment protection technology, Metal-biotechnology, Biorefinery

- Summary of the Laboratory:

The aim of researches in our laboratory is to develop novel environment protection technology to be used in high-salinity environments.

Using halophilic or salt-tolerant plants and microbes, we are developing metal-biotechnologies to remove and recycle inorganic metals from concentrated seawater. We are also working on biorefinery projects using halophilic bacteria as a cell factory to convert organic wastes to valuable materials such as biofuels, bioplastics, and functional peptides.

During internship program in our laboratory, students will work on a short-term project related with environmental protection technology (metal-biotechnology and biorefinery). The project will involve field trips to marine environments and hot springs in Nagasaki to collect samples for the isolation of microbes with special functions, which will be useful for the development of new environmental protection technology. By participating in this project, students will be trained for experimental skills in the fields of microbiology, biochemistry, molecular biology, and analytical chemistry.

- Skills you will obtain:
  - Microbiology (functional screening and identification of useful microbes)
  - Molecular biology (functional analysis of genes and proteins)
  - Biochemistry (enzymatic reaction, biocatalyst)
  - Analytical chemistry (amino acids, organic acids, alcohols and sugars analysis using HPLC, metal analysis using ICP-AES)

## Nakayama T Lab (Atmospheric Environmental Science)

- Name of the Laboratory:  
Atmospheric Environmental Science Laboratory
- Name of the Professor:  
Assoc. Prof. Tomoki NAKAYAMA (t-nakayama@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Atmospheric Chemistry, Air Pollution, Climate Change, PM<sub>2.5</sub>, Aerosol Particles, Trace Gases, Field Observation, Laboratory Experiment
- Summary of the Laboratory:

Aerosol particles originate from a variety of natural and anthropogenic sources. Primary particles emitted directly to the atmosphere as liquids or solids, while secondary particle formed by nucleation and condensation of precursor gases as well as through reactions in cloud droplets. These particles influence Earth's radiation balance both directly by absorbing and scattering solar radiation and indirectly by acting as cloud condensation nuclei. It has also been recognized that fine particulate matter, such as PM<sub>2.5</sub>, negatively impacts human health of many people. The PM<sub>2.5</sub> is expected to be heterogeneously distributed in both indoor and outdoor atmospheres because of its many direct emission sources and secondary formation processes.

This is a new laboratory started on March 2018. In our laboratory, optical and hygroscopic properties, as well as secondary formation processes, of aerosol particles, have been studied based on laboratory experiments and field observations. In addition, we have developed a new palm-sized optical PM<sub>2.5</sub> sensor with Panasonic cooperation. We are planning to apply this system to high-density multi-point observations and mobile measurements for personal exposure studies.
- Skills you will obtain:
  - 1) Knowledge on chemical and physical processes in the atmosphere
  - 2) Skill of ambient observation and data analysis

## Nishiyama Lab (Soil Science)

- Name of the Laboratory:  
Laboratory of Soil Science

- Name of the Professor:  
Prof. Masaya NISHIYAMA (m-248ma@nagasaki-u.ac.jp)

- Keywords of the Laboratory:  
Soil, microbial ecology, soil particle- and plant-microbe interactions

- Summary of the Laboratory:

Microorganisms are affected by conditions in nearby soil, not those in soil as a whole. Since soil contains a variety of materials, such as inorganics, organics, and living organisms, as well as water and a gaseous atmosphere, and since these components are distributed heterogeneously in the soil, there exist a variety of physicochemical and biological conditions, even within a given sample of soil. Thanks to the varied, heterogeneous nature of soil habitat at the microsite-level, diverse microorganisms can coexist, and a variety of microbial processes are able to occur, which allows for the elemental cycling that sustains life on Earth. Our current research interests are mainly in the activity of microorganisms at particular microsites within soil: 1) effects of inorganics on the activity and the fate of microorganisms and microbial biomass, 2) rhizosphere microorganisms in Fe-deficient soil.

During the internship in our laboratory, students will work on a program for basic analyses of soil, e.g., soil texture, three phases (solid/liquid/gas) ratio of soil, bulk density, particle density, water holding capacity, soil pH, cation exchange capacity, ammonium and nitrate content. The interns will become familiar with skills related to soil analyses and learn more about the properties and functions of soil.

- Skills you will obtain:
  - Basic methods for physicochemical and microbiological analyses of soil

## Okada Lab (Neuroethology and Ecotoxicology)

- Name of the Laboratory:

Neuroethology and Ecotoxicology Laboratory

- Name of the Professor:

Prof. Jiro OKADA (jokada@nagasaki-u.ac.jp)

- Keywords of the Laboratory:

Animal behavior, Nervous system, Invertebrates, PPCPs

- Summary of the Laboratory:

The aim of our research is to investigate the impact of environmental pollutants on the invertebrate behavior. The medicine released from populated districts to the environment is considered as a new threat for the ecosystem. Such medicines are called “PPCPs” (pharmaceuticals and personal care products). The purpose of this internship program is to learn possible threats of PPCPs to the wildlife with special reference to their impacts on animal behavior. Invertebrates are the organisms differentiated very diversely in the terrestrial and aquatic environments, and they play biologically important roles in their habitats. In this program, the natural behaviors of crickets and mudflat crabs are observed both in the field and the laboratory. The effects of neuroactive PPCPs on their behaviors and neural activities are also examined by laboratory experiments.

- Skills you will obtain:

- Physiological basis of animal behavior
- Experimental techniques in behavioral pharmacology and electrophysiology
- Data handling in behavioral biology and electrophysiology

### **Shirakawa Lab (Green Chemistry)**

- Name of the Laboratory:  
Green Chemistry Laboratory
- Name of the Professor:  
Assoc. Prof. Seiji SHIRAKAWA (seijishirakawa@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Organic Chemistry, Organic Synthesis, Green Chemistry, Reaction in Water, Organocatalysis
- Summary of the Laboratory:

Synthetic organic chemistry is indispensable research field for the development of new biologically active compounds, such as medicines, and functional materials. Our group focuses on the development of new efficient methods for the synthesis of useful organic compounds, especially in green and sustainable method. For example, our research group is interested in the development of organic reactions in water as environmentally benign reaction media. We are also interested in the development of new organocatalysts as metal-free, non-toxic catalysts.

In this internship program, you will be able to study general research techniques for synthetic organic chemistry, and obtain general knowledge of green sustainable chemistry.
- Skills you will obtain:  
General techniques for organic synthesis  
Methods for green and sustainable organic synthesis  
General methods for characterization of organic compounds



## Tamura Lab (Environmental Physiology)

- Name of the Laboratory  
Environmental Physiology Laboratory
- Name of the Professor:  
Akihiro TAIMURA (taimura@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Human thermoregulation  
Body temperature / Skin blood flow / Sweat rate  
Heat / Cold tolerance  
Heat / Cold adaptation
- Summary of the Laboratory:  
The environmental physiology laboratory studies the effects of changes in temperature and humidity on human thermoregulation.  
In an artificial climate chamber, where temperature and humidity can be adjusted, physiological and psychological reactions under various temperature and humidity conditions are analyzed.  
Experiments measure physiological thermoregulatory response under a fixed environmental condition (heat, cold, humidity, etc.), thermal sensation, thermal comfort, etc., or analyze and examine the regulation mechanism of a psychological reaction.
- Skills you will obtain:
  1. Finger skin blood flow, temperature and subjective thermal sensation during ice / hot water immersion.
  2. Sweat rate and sweat concentration (sodium [Na<sup>+</sup>], chloride [Cl<sup>-</sup>] and potassium [K<sup>+</sup>]) during heat stress / exercise (bicycle ergometer).
  3. Observation of skin temperature, cutaneous blood flow and subjective thermal sensation during artificial carbon dioxide rich-water immersion (1000 ppm).
  4. Visualize skin temperatures by thermography (infra-red thermos camera) under various temperature and humidity conditions.

## **Takao Lab (Environmental Analytical Chemistry)**

- Name of the Laboratory:  
Laboratory of Environmental Analytical Chemistry
- Name of the Professor:  
Prof. Yuji TAKAO (takao@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Analytical chemistry, GC/MS, HPLC/MS, Solid-phase extraction, River water, Suspended particulate matter in the air, PPCPs, PAHs
- Summary of the Laboratory:  
Laboratory of environmental analytical chemistry is interested in monitoring of trace amount of harmful organic chemicals released by human activities into the environment. In the first week, you will learn to analyze pharmaceutical compounds in river water. You'll collect river water. You'll filtrate, extract and concentrate it. And then you'll analyze it with HPLC/Q-TOF-MS. You'll read the peak area of chemicals. You can compare your obtained values of the river and others of river in the world. In the second week, you'll learn to analyze polycyclic aromatic hydrocarbon (PAH) in the air. You'll correct the particulate matter in the city air born with an air sampler. You'll extract, concentrate, cleanup and derivatize the sample. After analyzing it with GC/MS-MS, you'll read the peak area of chemicals and compare the data with world values. In both courses you will work with our lab student through whole process. If you have only one week for our lab, you can choice on week lab course. If so, please let us know which course you want.
- Skills you will obtain:
  - Correcting skills of environmental sample
  - Pre-treatment skills
  - Instrumental analytical technique

## Takasu Lab (Biogeochemistry and Marine Environmental Science)

- Name of the Laboratory:  
Biogeochemistry Laboratory
- Name of the Professor:  
Assist. Prof. Hiroyuki TAKASU (takasu@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Marine environment, Organic matter decomposition, Oxygen consumption, Hypoxia (dead zone)
- Summary of the Laboratory:  
Coastal seas provide valuable ecosystem services but are particularly vulnerable to the anthropogenic disturbances. Hypoxia (dead zone) created by the depletion of dissolved oxygen in coastal waters become a world-wide phenomenon and have been doubling in occurrence each decade since the late 1950s. It has caused a deterioration of a variety of characteristics important to the sustainability of coastal ecosystems. In most of cases, low oxygen is a direct result of increased nutrients inputs leading to higher rates of phytoplankton production and, subsequently, increased oxygen consumption as the larger supply of organic matter is respired by heterotrophic organisms (mainly bacteria). In addition, recent studies suggest that elevation of seawater temperature due to climate change is likely contributing to the increases of hypoxia through both physical and biological pathways. This situation motivates research of the interactive effects of temperature and organic matter quality and quantity on oxygen consumption in coastal waters. Our laboratory has been conducting researches on hypoxia formation in Omura bay and Isahaya bay located in Nagasaki.
- Skills you will obtain:
  - 1) General chemical analysis of seawater (oxygen, nutrients, chlorophylls)
  - 2) Estimation of microbial respiration (oxygen consumption) in seawater

### Takatsuji Lab (Radiation Biophysics)

- Name of the Laboratory:

Laboratory of Radiation Biophysics

- Name of the Professor:

Prof. Toshihiro TAKATSUJI (takatsuj@nagasaki-u.ac.jp)

- Keywords of the Laboratory:

Radioactivity measurement, Germanium semiconductor detector

- Summary of the Laboratory:

We have experienced severe accident of the Fukushima Daiichi Nuclear power Station. We have measured and analyzed many samples of radiation-contaminated soils, foods, plants, and etc using germanium semiconductor detectors. We rediscovered difficulty of the measurement and learned skills to overcome the difficulty by the experience.

- Skills you will obtain:

1. Preparation of samples.
2. Measurement.
3. Derivation of radioactivity from the measured gamma-ray energy spectrum.

• Umakoshi Lab (Seismology and Volcanology)

● Name of the Laboratory:

Seismology and Volcanology Laboratory

● Name of the Professor:

Prof. Kodo UMAKOSHI (umakoshi@nagasaki-u.ac.jp)

● Keywords of the Laboratory:

Earthquake, Unzen

● Summary of the Laboratory:

Our laboratory is performing fundamental research of tectonic earthquakes in and near the Kyushu Island. Using data from the Japan Data eXchange network (JDXnet, the nationwide real-time distribution network of seismic data), we have analyzed many earthquakes and regional seismicity in the Kyushu district.

● Skills you will obtain:

Seismic data analysis

## Yamaguchi M Lab (Plant and Atmospheric Environment)

- Name of the Laboratory:

Laboratory of Plant and Atmospheric Environment

- Name of the Professor:

Assoc. Prof. Masahiro YAMAGUCHI (masah-ya@nagasaki-u.ac.jp)

- Keywords of the Laboratory:

Air pollution, Plant growth, Crop yield, Tropospheric ozone, Particulate matter

- Summary of the Laboratory:

**The objective of our study is to clarify effects of air pollutants on plant growth and physiological function.**

Plants uptake carbon dioxide, produce organic matter, and evolve oxygen through photosynthetic activity utilizing solar radiation. These abilities allow plant to support the lives of oxygen-consuming organisms, however, forest decline has been observed worldwide since 1970s. Because ambient levels of air pollutants such as tropospheric ozone, the main component of photochemical oxidants, have adverse effects on plant, such air pollutants are considered as one of important factors relating to forest decline and yield loss of agricultural crops. Recently, East Asian countries face the problem of transboundary air pollution including tropospheric ozone and particulate matter. Therefore, to protect not only forest trees but also crop production in East Asia, we conduct experimental study on the effects of air pollutants on plants.

To evaluate the effects of air pollutants on trees and agricultural crops, we analyze plants grown in open-top chambers (OTCs) that allow for exposure to air pollutants. We use two types of OTCs: one type has ambient air introduced directly, while the other is supplied charcoal-filtered (clean) air. By comparing the dry mass, yield and physiological parameters of plants between the OTCs, we can determine how air pollutants adversely affect plant growth and physiological function.

- Skills you will obtain:

- Plant ecophysiology (Measurement of plant growth and physiological function)
- Biomonitoring of air pollution with plant

## Yamaguchi N Lab (Animal Ecology)

- Name of the Laboratory:  
Animal Ecology
- Name of the Professor:  
Assoc. Prof. Noriyuki YAMAGUCHI (noriyuki@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Animal Ecology, Ornithology, Behavioral Ecology, Migration of Birds
- Summary of the Laboratory:  
We are interested in behavior, ecology, and evolution, and work mainly but not exclusively on birds. Our study is related to behavioral ecology, in particular animal movements. Movements of animals affect various biological interactions and ecological processes in multi-scales. Of course, understanding the pattern and adaptive significance of animal movements itself is very attractive. We have great interest in the effects of weather conditions and human activities as important factors to understand animal movements.
- Skills you will obtain:  
Knowledge on Animal Ecology and Ornithology

## Yamashita Lab (Environmental Toxicology & Pharmacology)

- Name of the Laboratory:  
Laboratory of Environmental Toxicology and Pharmacology
- Name of the Professor:  
Prof. Kimihiro YAMASHITA (kimihiro@nagasaki-u.ac.jp)
- Keywords of the Laboratory:  
Central nervous system, Learning and memory, Endocrine disrupting chemicals, Phytoestrogen, Behavioral pharmacology
- Summary of the Laboratory:  
We are investigating the effects of environmental endocrine disruptors including phytoestrogens and heavy metals on the function of central nervous system in mammals. Environmental endocrine disruptors have the potential to interfere with the reproductive, endocrine, and immune systems. For example, exposure to nonylphenol, one of the most common environmental endocrine disruptors, during the perinatal period or in adulthood was found to decrease ovarian weight and sperm count, and altered kidney and liver structures in rats. However, studies which investigate the effects on central nervous system is not enough. Previous studies showed that estrogen has neuroprotective effects, and improves learning and memory. Many of endocrine disrupting chemicals have weak estrogenic activities. Thus, we currently focus on the mechanism of their effects to learning and memory performance in rats.  
The projects are promoted by using a battery of behavioral tests including an appetitive-motivated maze test (MAZE test), water maze test, the step-through passive avoidance test, an open-field test and elevated plus-maze test.
- Skills you will obtain:  
Experimental methods for behavioral pharmacology