

## **Nagoya University (National) Graduate School of Environmental Studies**

### ◆ Program name

Nagoya University Global Environmental Leaders Program

### ◆ Degrees:

- a. Master of Environmental Studies
- b. Master of Engineering

### ◆ Credit and years needed for graduation:

- a. 30 credits, 2 years
- b. 30 credits, 2 years

### ◆ Program Certificate requirements

1. 22 credits (out of the 30 above) from the NUGELP curriculum (See below for curriculum details)
2. Master's thesis and oral presentation in English

### ◆ Note

NUGELP is made up of faculty of the Civil Engineering and the Environmental Studies.

### ◆ Address:

Furo-cho, Chikusa-ku, Nagoya-shi, Aichi  
464-8601, JAPAN



## **Features of University** <http://www.nagoya-u.ac.jp/en/>

### **Nagoya University:**

Nagoya University is one of the leading national universities located in Nagoya City in Central Japan (Chubu Region). It was established in 1920 first as a medical school and at present has nine schools and four independent graduate schools, accommodating about 16,000 students including about 2,800 international students. Among 17 Japanese Nobel laureates in the 21st century, six are graduates of or have been affiliated with Nagoya University as faculty members during their career.



Toyoda Auditorium of Nagoya University

### **City of Nagoya:**

Nagoya is the fourth biggest city in Japan in terms of population (over 2 million) and is one of the largest industrial areas in the country. The Nagoya-Chubu Region has been leading Japan's major industries such as automobile manufacturing, represented by Toyota Motor Corporation. The region is also known historically for its past experiences of having overcome industrial pollution and for its furtherance of environmental actions in both private and public sectors.

## **Features of Graduate School** <http://www.env.nagoya-u.ac.jp/en/index.html>

**Interdisciplinary Research and Education:** The Graduate School of Environmental Studies was established in 2001 as the first interdisciplinary postgraduate school of environmental studies in Japan by integrating from natural sciences to engineering and social sciences. The School has promoted education and research taking "Sustainability" and "Safety and Stability" as its main visions. These visions are based on a wide range of academic disciplines including engineering, architecture, physical sciences, economics, and politics. These academic disciplines enable us to provide meaningful solutions for the societal demands concerning an environmentally sustainable future for our earth.

**Dedicated to Sustainable Development in Developing Countries:** Since its establishment, the School has been dedicated to research and education for sustainable development in developing countries. Not only by receiving students from these countries but also by co-working with local researchers and government officials for research

and survey projects. The School has expanded and strengthened its ties with developing countries including Bangladesh, Cambodia, Mongolia, Myanmar, Philippines, Vietnam, Bhutan and Timor-Leste. The projects cover a variety of issues ranging from urban and transport planning, low carbon cities, infrastructure management to disaster management.

**Assistance to International Students:** Nagoya University receives about 2,500 international students from more than 100 countries, about 80% of whom are from Asia. The Education Center for International Students (ECIS) has abundant experience in supporting international students joining Nagoya University. In the Graduate School of Environmental Studies, foreign faculty members are available as an International Student Advisor to assist students from overseas for both academic and living concerns. Moreover, the staff of the Nagoya University Global Environmental Leaders Program (NUGELP) has abundant study and professional experience overseas, and is available to assist the program participants. The education and daily communication language under the Program is English. With such a support system at the University, JDS fellows are therefore able to start their study and life without major difficulties.



## ***Features of the Program***

### **Nagoya University Global Environmental Leaders Program (NUGELP)**

(<http://www.civil.nagoya-u.ac.jp/nugelp/index.html>)

NUGELP was established in 2008 to develop environmental leaders who are able to identify and analyze infrastructure and environmental problems from a global and holistic perspective, and propose practical measures to solve the problems in Asia and Africa. The Graduate School of Environmental Studies accepts Master's course students and trains them to be leaders, through close partnership with the Department of Civil and Environmental Engineering, the Graduate School of Engineering.

NUGELP provides solution-oriented education based on the following instructions:

- Students receive comprehensive instructions in English covering various disciplines ranging from civil engineering, transport analysis and planning, sustainability and environmental studies, environmental system analysis and planning, climate change and infrastructure to environmental industry systems.
- Through such instructions, they are able to acquire a deeper understanding of the issues, policies and the relevant technological know-how, and the capacity to design policies and institutions.
- As part of the coursework, students have opportunities to participate in practical and research internship at private companies, government bodies or international organizations in the Nagoya-Chubu Region, where a progressive approach to manage environmental problems is ongoing.
- The unique international and interactive nature of the program, in which international and Japanese students learn together, allows students to enhance their understanding of issues from perspectives of local and global viewpoints and improve their international communication skills. Students from China, Mongolia, Bhutan, Timor-Leste, Philippines, Indonesia, Bangladesh, India, Pakistan, Afghanistan, Iran, Uzbekistan, Ethiopia and , Guatemala etc. are studying at NUGELP.
- In addition to the master's degree, a special certificate will be awarded by NUGELP to students who complete the program. It certifies that students have acquired comprehensive capacity and skills to take an active role as a future leader in the field of civil engineering and environmental studies for their home country and the global society.

Special events are also planned for JDS fellows during the two-year degree program.

- (i) Domestic and overseas study tours to study planning, design and maintenance management for infrastructure.
- (ii) Special lectures from alumni of civil engineering international program in Nagoya University.

## Necessary Curriculum to Obtain the Degrees

NUGELP offers all its courses in English within a comprehensive and interdisciplinary curriculum. Master's program students are required to obtain a minimum of 30 credits mainly from the courses listed below as well as to defend their Master's thesis. Syllabus details for each course are available at the program website.

<http://www.civil.nagoya-u.ac.jp/nugelp/curriculum/syllabus.html>



### **Target: Basic Knowledge and Skills as a Leader**

- **Sustainability and Environmental Studies (Lecture, 2 credits) by Hiroki TANIKAWA, Miho IRYO and Anatoly Zinchenko**  
The objective of the course is to provide students with several definitions, views, interpretations, and analyses on the notion of sustainability. The lectures are to be given by several lecturers that may include external guest speakers. Sustainability covers broad areas. It is therefore inevitable that the course consists of various topics. The course tries to clarify the topics from three viewpoints, namely: 1) Society and/or social sciences, 2) Observation and data by natural sciences, and 3) Urban and spatial perspective. One common element that should be noted here is “safety”.
- **English Communication in Environmental Issues (Lecture, 2 credits) by Miho IRYO and Sohyun CHUN**  
Develop ability to learn and think about environmental problems in English, and apply the ability for presenting and discussing one's ideas in English. English communication ability is a fundamental requirement for engineers and scientists working in the field of environmental problems, since environmental problems are not unique to any one country. In this course students will be assigned specific subjects concerning environmental problems and will be required to study the assigned subjects deeply, and then present and discuss the studied subjects in class in English.
- **Frontier in Civil Engineering (Lecture, 2 credits) by Associated Faculty**  
The aim of the lecture is to comprehensively examine the framework of civil engineering through the introductions of various research topics, projects and so on which the staff of civil engineering have investigated in recent years. [Course topics] 1. Guidance/ 2. Frontier of structural engineering/ 3. Frontier of material engineering/ 4. Frontier of coastal engineering/ 5. Frontier of river engineering/6. Frontier of geotechnical engineering/ 7. Frontier of urban and transportation planning.
- **Civil Engineering and Policies for Developing Countries I (Lecture, 2 credits) by Miho IRYO and Kiichiro HAYASHI**  
The objective of this course is to study various issues including sustainable development, environmental management, and international cooperation for better understanding of the fundamental knowledge on civil engineering in developing countries. Then comprehensive way of thinking will be studied [Course topics] 1. Concept of sustainable development/ 2. Environment and resource issues in developing countries/ 3. International environmental management I (Multilateral Environmental Agreements)/ 4. International environmental management II (International organizations)/ 5. International cooperation.
- **Civil Engineering and Policies for Developing Countries II (Lecture, 2 credits) by Associated Faculty**  
The objectives of this course are (1) to study the fundamental knowledge on planning, design, construction and maintenance of infrastructure in Japan, as well as developing countries; (2) to survey various issues in civil engineering, including the environmental problems and recent development of regional disaster mitigation activities. [Course topics] 1. Introduction to disaster risk assessment/ 2. Water resources and river basin management/ 3. Coastal zone management/ 4. Infrastructure development under aid programs/ 5. Infrastructure projects in developing countries

### **Target: Advanced Technologies and Knowledge**

- **Environmental Systems Analysis and Planning (Lecture, 2 credits) by Hiroki TANIKAWA**  
The course objectives are to understand “environmental systems”, i.e., the interaction of human activities and nature, to learn the scientific mechanisms of global environmental problems, such as climate change, to learn the basic principles and methods of analyzing environmental systems, e.g., environmental economics, mathematical models, life-cycle assessment, etc., and to learn the principle and methods of environmental management at local, national and global scales.  
[Course Topics] 1. Environmental systems: Natural Resources and Human Activities/2. Circulation and

transformation of water, air, energy and materials/ 3. Environmental space and carrying capacity of the earth /4.Global climate issues/ 5. Math: modeling of climate change/ 6. Environmental resource economics/ 7. Math: Lotka-Volterra's equations/ 8. Sustainable development/ 9. Environmental indicators and environmental resource accounting/ 10. Life cycle assessment/ 11. Urban climate system.

➤ **Transportation Systems Analysis (Lecture, 2 credits) by Takayuki MORIKAWA and Toshiyuki YAMAMOTO and Tomio MIWA**

The course objective is to understand approaches and methods to analyze travel behavior and the demands for various transportation systems.

[Course Topics] 1. Transportation policies and transportation systems analysis/ 2. Travel demand and travel survey/ 3. Aggregate demand model 1 – Trip generation & production/attraction/ 4. Aggregate demand model 2 – Trip distribution/ 5. Aggregate demand model 3 – Modal split /6.Traffic assignment on network 1/ 7. Traffic assignment on network 2/ 8. Traffic assignment on network 3/ 9. Traffic simulation 1/ 10. Traffic simulation 2/ 11. Disaggregate demand model 1 – Binary choice/ 12. Disaggregate demand model 2 – Multinomial choice/ 13. Disaggregate demand model 3 – Estimation and statistical test/ 14. Disaggregate demand model 4 – Aggregation and forecast/ 15. Disaggregate demand model 5 – Multi-dimensional choice.

➤ **Advanced Traffic Engineering and Management (Lecture, 2 credits) by Hideki NAKAMURA**

The course objectives are to understand fundamental traffic characteristics, to estimate variables required for highway planning and traffic operation such as highway capacity and delay, and to understand fundamentals of traffic signal control technique and to be able to set traffic signals.

[Course Topics] 1. Introduction to traffic engineering and its scope/ 2. Traffic surveys/ 3. Macroscopic traffic characteristics 1 / 4. Microscopic traffic characteristics 2 / 5. Fundamental relationship between flow, average speed and density/ / 6. Traffic flow models/ 7. Capacity analysis and breakdown phenomena 8. Microscopic traffic characteristics/ 9. Highway planning and level of service/ 10. Intersection planning and design/ 11. Traffic signal phasing and control variables/ 12. Capacity of signalized intersections/ 14. Traffic management and application of emerging technologies/ 15. Assessment of operational conditions.

➤ **Advanced Course in Lifecycle Design of Civil Structures (Lecture, 2 credits) by Hikaru NAKAMURA, Takeshi HANJI and Koji NISHIGUCHI**

This course objective is to study design method and maintenance of bridge structures in the context of lifecycle management of civil structures. After completing this course, students will be able to:

- List different types of structural design methods and explain their differences,
- Explain typical design flow of bridge structures, and
- Understand current conditions of existing bridges and describe maintenance systems of bridges in Japan.

[Course Topics] 1. To study fundamental theory of reliability-based structural design and to understand structural reliability and different design methods such as the allowable stress method and the limit state design method/ 2. To understand a typical flow of structural design which includes structural planning, selection of structural systems, verification of required performances, lifecycle cost analysis, and maintenance plan, by studying design examples of steel and concrete structures/ 3. To understand current conditions of existing bridges in Japan and to study efficient maintenance systems of bridge structures.

➤ **Advanced Infrastructure Planning (Lecture, 2 credits) by Takayuki MORIKAWA and Toshiyuki YAMAMOTO**

The course objective is to understand the roles of infrastructure by learning its economic characteristics, planning procedure, financing, and evaluation methods.

[Course Topics] 1. Public economics 1 (Social welfare and Pareto optimum)/ 2. Public economics 2 (Consumer's behavior and demand curve)/ 3. Public economics 3 (Producer's behavior and market equilibrium)/ 4. Public economics 4 (Market failure)/ 5. Public economics 5 (Externality)/ 6. Public economics 6(Public goods 1)/ 7. Public economics 7 (Public goods 2)/8. Decision making in infrastructure planning/ 9. Evaluation and decision making 1(Cost-benefit analysis and value of non-market goods)/10. Evaluation and decision making 2(Evaluation methods of non-market goods and utility function)/ 11. Evaluation and decision making 3(Value of travel time saving and project evaluation)/ 12. Evaluation and decision making 4(Social welfare function and analytic hierarchy process)/ 13. Decision making under uncertainty 1 (Expected utility theory)/ 14. Decision making under uncertainty 2 (Bayesian decision making and value of information)/ 15. Decision making under uncertainty 3 (Game theory and dilemma problem).

- **Advanced Fluvial and Coastal Hydrodynamics (Lecture, 2 credits) by Tomoaki NAKAMURA and Ryota TSUBAKI**  
The aim of this course is to understand physical processes in rivers and oceans. This class will provide advanced theories and technologies applied in the management of rivers and coasts.  
[Course Topics] 1. Outline of the course/ 2. Governing equations for incompressible viscous fluid flow/ 3. Shallow water equations/ 4. Flow resistances in open-channel flow/ 5. Long wave theory/ 6. Shallow water wave theory/ 7. Wave-averaged conservation equations.
- **Advanced Geotechnical Engineering (Lecture, 2 credits) by Toshihiro NODA and Kentaro NAKAI**  
Firstly, overview and theoretical background of geotechnical engineering is reviewed. Then, actual adopted examples to settlement (consolidation) and failure (bearing capacity) problems of the soft grounds are explained. Moreover, dealing method to various uncertainty of the ground is provided such as safety factor method and reliability design method.  
[Course Topics] 1. Introduction to geotechnical engineering/ 2. Multi-dimensional consolidation analysis/ 3. Observational method for predicting consolidation settlement (Asaoka's method)/ 4. Mean effective stress and bearing capacity/ 5. Rigid plastic finite element method /6. Undrained bearing capacity ( $\phi_u=0$  circular slip surface analysis).
- **Advanced Numerical Analysis (Lecture, 2 credits) by Tomio MIWA and Kentaro NAKAI, Tomoaki NAKAMURA and Koji NISHIGUCHI**  
This lecture provides basic theories of numerical analyzing techniques which are often used in the civil engineering field. Programming assignment will be given from each lecturer. Through the lecture and practical work, participants are needed to understand the fundamental knowledge of each numerical analysis method and acquire programming skills.  
[Course Topics] 1. Finite element method / 2. Optimization problem/ 3. Finite difference method / 4. Approximate analysis of ordinary differential equation.
- **Advanced Steel Structures (Lecture, 2 credits) by Kazuo TATEISHI**  
This course is required to understand the following topics, Importance of maintenance of infrastructures: deterioration in steel structures: calculation method for remaining life of steel members based on fracture mechanics: fatigue and corrosion in steel members: inspection method for steel structures.  
[Course Topics] 1. Importance of maintenance and difficulties / 2. Experiences of damage in steel structures and repair/retrofitting methods/ 3. Fatigue and preventing method/ 4. Fracture mechanics and its application/ 5. Corrosion and preventing method/ 6. Inspection method for steel structures.
- **Advanced Concrete Structures (Lecture, 2 credits) by Hikaru NAKAMURA and Taito MIURA**  
The objective of this course is to confirm basic knowledge of RC structures, understand the design concept, understand time dependent behavior of concrete, and understand construction for quality control.  
[Course Topics] 1. Life of concrete structures/ 2. Utilization of nonlinear analysis in design/ 3. Outline of nonlinear structural analysis for concrete structures/ 4. Constitutive models 1/ 5. Constitutive models 2/ 6. Constitutive models 3/ 7. Outline of diffusion analysis for concrete structures/ 8. Thermal stress 1/ 9. Thermal stress 2/ 10. Creep and shrinkage 1/ 11. Creep and Shrinkage 2/ 12. Quality control of concrete/ 13. Proposal of construction methods for quality control/ 14. Presentation of proposal/ 15. Presentation of proposal.
- **Advanced Mechanics of Geomaterials (Lecture, 2 credits) by Masaki NAKANO**  
Fundamental and advanced knowledge on mechanics of geomaterials is learned for construction and maintenance of many kinds of geotechnical structure under consideration of safety, environment and economy. [Course Topics] 1. Consolidation/compression and shearing properties of remolded clay/ 2. Consolidation/compression and shearing properties of natural deposited clay/ 3. Basic plasticity/ 4. Characteristics of conventional elasto-plastic constitutive model/ 5. Characteristics of unconventional/modern elasto-plastic constitutive model and description of mechanical behavior on natural deposited clay through this model/ 6. Characteristics of mechanical behavior on many kinds of geomaterial and description of the behavior through the new model/ 7. Design of geotechnical structure: two approaches by conventional design and numerical analysis.
- **Advanced Urban Planning (Lecture, 2 credits) by Hirokazu KATO**  
This course objective is to understand the procedure of urban planning and obtain knowledge of practical techniques of planning.  
[Course Topics] 1. Procedure of urban planning/ 2. Land use planning/ 3. Landscape planning/ 4. Public transportation planning/ 5. Road network planning/ 6. Urban development.
- **Advanced Continuum Mechanics (Lecture, 2 credits) by Masaki NAKANO and Toshihiro NODA**  
This course provides an introduction to continuum mechanics. Students will be able to understand and

explain the basis of Vector and Tensor Analysis, explain material and spatial descriptions of the physical value of body, material time derivative and expression of deformation of body using tensor, understand and explain properties of Cauchy's stress tensor, understand and explain law of mechanics and Cauchy's first/second law of motion.

[Course Topics] 1. Vector and tensor/ 2. Basic kinematics/ 3. Objectivity/ 4. Equation of equilibrium and field equation/ 5. Constitutive equations.

- **Advanced Structural Mechanics (Lecture, 2 credits) by Junji KATO and Koji NISHIGUCHI**  
The objective of this course is to learn the stability theory of columns, beams, and plates. [Course Topics] 1. Column buckling/ 2. Beam-column/ 3. Buckling of a rectangular plate/ 4. Lateral-torsional buckling.
- **Conservation and Ecotoxicology of Soil and Water (Lecture, 2 credits) by Arata KATAYAMA**  
The class aims to understand the basics on the remediation of contaminated soil and water through the lecture on the outbreak of pollution, environmental standards, exposure to the organisms, toxicity and environmental fates of pollutants, effect on the ecosystem, remediation technologies of soil and water, and waste treatment technologies. A lecture-style class. [Course Topics] 1. Pollutants and their properties/ 2. Toxicity and the environmental standards/ 3. Interaction (exposure and metabolism/degradation) of pollutants with organisms (mammals, plants, and microorganisms)/ 4. Environmental fate of pollutants, remediation technologies.
- **Advanced Coastal and Offshore Engineering (Lecture, 2 credits) by Norimi MIZUTANI and Tomoaki NAKAMURA**  
The aim of this course is to understand wave dynamics in a coastal zone, wave-wave and wave-structure interactions, and their numerical analysis methods.  
[Course Topics] 1. Radiation stress and waves in coastal zone/ 2. Diffraction theory (vertical cylinder, axisymmetric structure)/ 3. Dynamic behaviour of floating body/ 4. Potential and the boundary element method/ 5. Green function and numerical methods.
- **Advanced Theory of River Basin Management (Lecture, 2 credits) by Yuji TODA**  
This course purpose is to understand the theoretical background and the recent technologies for river and river basin management.  
[Course Topics] 1. Hydrological cycle/ 2. Run-off process (Water, sediment, material (bio-elements)): Network of various fluxes/ 3. Fluvial Hydraulics/ 4. River Morphology/ 5. Flood risk management/ 6. Water resources/ 7. Ecosystem and landscape/ 8. Ecological functions/ 9. Ecosystem service and Bio-diversity/ 10. Eco-compatible river basin management.
- **Advanced Soil Dynamics (Lecture, 2 credits) by Toshihiro NODA and Kentaro NAKAI**  
The objective of this course is to understand the fundamental theory for dynamics problems such as liquefaction in geotechnical engineering is provided based on continuum mechanics and mixture theory.

#### **Target: Interdisciplinary Topics**

- **Environmental Industry Systems (Lecture, 2 credits) by Hiroki TANIKAWA and Miho IRYO**  
This course is structured on a unique style of learning. The course consists of: 1) lectures by environmental industries located in Chubu areas; 2) presentations and/or discussions amongst the students, 3) discussions between the students and the industry staff. The industries are from prominent companies mainly in the field of manufacturing. Note that students are strongly recommended to take 'Theory of Environmental Resources Management'.
- **Low Carbon Cities Studies (Lecture, 2 credits) by Hiroki TANIKAWA and Schandl HEINZ**  
To learn policies, plans, technological and institutional measures to realize low carbon cities with a view to integrating climate change mitigation in urban development. To have a concrete idea of planning a low carbon city, actual policy plan for establishing low carbon city will be reviewed in class. Students are supposed to have taken (be taking) a lecture Environmental Systems Analysis and Planning.  
[Course plan] 1. Global climatic system/ 2. Mechanisms of global warming/ 3. Climatic change and human history/ 4. Economy, energy and environment/ 5. Urban environmental management and planning/ 6. Human activities and energy in cities/ 7. Urban forms, land use and energy/ 8. Transportation and energy/ 9. Urban squares, buildings and energy/ 10. Urban heat island phenomena/ 11. Lifestyles and energy/ 12. Urban environmental simulators.
- **Climate Change and Infrastructure (Lecture, 2 credits) by Miho IRYO**  
Lectures on climate change (global warming) will be given, especially from the viewpoints of policies and institutions. Students are expected to understand: 1) basic facts about climate change; 2) United Nations Framework Convention on Climate Change (UNFCCC); and 3) climate change mitigation measures in developing countries. [Course Topics] 1. Science of the Climate Change and its Impacts on Social Systems/ 2. Climate Change and International Systems/ 3. Regional Mitigation and Adaptation Strategies for Climate

Change/ 4. International Mitigation and Adaptation Strategies for Climate Change/ 5. International Negotiation and Consensus Building.

➤ **Environmental Urban Systems (Lecture, 2 credits) by Miho IRYO**

Policy and technical knowledge will be provided for environmental science experts as well as for engineers in the field of civil engineering or architecture. Analytical theories and tools for sustainable or optimal urban management will be also discussed. [Course Topics] 1. What are environmental urban systems and there issues? / 2. Historical review of city structures and location theory/ 3. Environmental impact assessment/4. Urban and transportation planning for eco-cities/ 5. Preservation of urban greenfield and landscape / 6. Energy management/ 7. Consensus building and urban planning/ 8. Case studies of environmental policies in different cities

**Target: Research-oriented internship**

➤ **Global Research Internship (Research training, 2 credits) by Associated Faculty**

As part of the Global Environmental Leaders Program, this course aims at providing research-based internship opportunities at universities, research institutions, companies, governments and non-governmental organizations in Japan and overseas to acquire the ability to conduct practical and applied research. Internship should be conducted based on close communication with Academic Advisor(s). Students are expected to acquire practical research know-how on site. Details of the internship such as period and terms of implementation should be decided through consultation with Academic Advisor(s) and experts at recipient organizations.

**List of faculty members capable of guiding JDS Fellows**

<http://www.civil.nagoya-u.ac.jp/introduction/teacher-e.html>

An academic advisor shall be tentatively assigned upon selection. Assignment will be based on the submitted documents, consultation and the interview from the viewpoint of JDS fellows' academic and professional background and research interests. All faculty members listed below are authorized to supervise JDS fellows. For more information, please visit the following website and see the accompanying document. (<http://www.civil.nagoya-u.ac.jp/introduction/teacher-e.html>)

**Structural Engineering, Materials, and Informatics**

Name, Title	Area of Specialization	Research Themes
Junji KATO Prof.	Computational Mechanics, Topology Optimization	Topology optimization and design for structures and materials based on finite element method, Advanced design for additive manufacturing considering future products
Kazuo TATEISHI Prof.	Structural Engineering	Fatigue and fracture of steel bridges, Fatigue of steel-concrete composite slab
Hikaru NAKAMURA Prof.	Concrete Mechanics	Durability mechanics of concrete, Seismic design of concrete structures
Takeshi HANJI Associate Prof.	Steel Structures, Bridge Engineering	Maintenance and fatigue in steel structures, Seismic assessment and rehabilitation of steel bridges, Applications of image technique to infrastructures
Taito MIURA Associate Prof.	Concrete Engineering, Maintenance Engineering	Chemo-mechanical coupling analysis, Fracture mechanics, Micro-damage, Cementitious composite material, Discrete analysis
Koji NISHIGUCHI Lecturer	Computational Mechanics, High-Performance Computing, Fluid-Structure Interaction Problems	High-performance computing, Computational mechanics, Fluid-structure interaction, Constitutive Equation of Materials, Finite element method, Finite volume method, Computational fluid dynamics, Solid mechanics

### **Hydraulics, Hydrology, Coastal, and Ocean Engineering**

<b>Name, Title</b>	<b>Area of Specialization</b>	<b>Research Themes</b>
Norimi MIZUTANI Prof.	Coastal and Ocean Engineering	Tsunami disasters and their countermeasures, Study on dynamic interaction among wave, structure and foundation
Yuji TODA Prof.	Hydraulics	Fluid flow-biological-chemical interaction, Primary production of periphyton
Tomoaki NAKAMURA Associate Prof.	Coastal Engineering	Stability of coastal structures and their foundations in fluid-structure-seabed-sediment interaction fields
Ryota TSUBAKI Associate Prof.	Hydraulics, River Engineering	Advanced field monitoring of fluid flow and sediment transport, High resolution inundation flow simulation and its application to mitigate physical and environmental risks
Makiko OBANA Lecturer	River Engineering, Eco-Hydraulics	Transport of sand and granular organic matter in vegetation area in rivers, Functional assessment of sandbar ecosystems

### **Geotechnical Engineering**

<b>Name, Title</b>	<b>Area of Specialization</b>	<b>Research Themes</b>
Masaki NAKANO Prof.	Geotechnical Engineering	Mechanical behavior of new geomaterial made from surplus soil and industrial by-product, Mechanical behavior of intermediate-soils and problem soils, Large compression of soil due to decay of structure
Toshihiro NODA Prof.	Geotechnical Engineering	Soil-water coupled dynamic/static finite deformation analysis, Interactive behavior of soil-structure system
Kentaro NAKAI Associate Prof.	Geotechnical Engineering	Description and interpretation of cyclic behavior of sand, Interpretation of the difference between sand and clay, Dynamic analysis of structured soil

### **Transportation, Infrastructure, and Environmental Planning**

<b>Name, Title</b>	<b>Area of Specialization</b>	<b>Research Themes</b>
Takayuki MORIKAWA Prof.	Transportation Systems Analysis	Environmentally sustainable transportation, Intelligent transportation systems
Hideki NAKAMURA Prof.	Transportation Engineering	Performance-oriented highway planning and design methodology, Evaluation of junction design and traffic signal control
Toshiyuki YAMAMOTO Prof.	Transportation Planning	Travel behavior analysis, Environmentally sustainable transport, Intelligent transport system
Hirokazu KATO Prof.	Transport and Environmental Planning	Environmental impact assessment of transport policy, Environmental lifecycle assessment of transport sector, Impact assessment of global warming on cities, Urban management and regional transport strategy development in an era of declining population, fewer children, and aging of society
Tomio MIWA Associate Prof.	Transportation Planning	Transport management using ITS, Analysis on traffic network utilizing probe-vehicle system, Understanding and modeling driver's route choice behavior
Miho IRYO Associate Prof.	Transportation Engineering	Traffic flow and safety analysis of vehicles and pedestrians, Traffic simulation development

### **Environmental and Environmental System Engineering**

<b>Name, Title</b>	<b>Area of Specialization</b>	<b>Research Themes</b>
Arata KATAYAMA Prof.	Microbial Ecological Engineering	Microbial remediation of soil and groundwater contaminated with polychlorinated aromatic compounds
Kiichiro HAYASHI Prof.	International Environmental Cooperation	Environmental impact assessment and biodiversity assessment, Environmental policy development



Hiroki TANIKAWA Prof.	Engineering of Environmental Systems	Metabolism of material and energy in cities, and the design of low carbon cities
Takashi HIBINO Prof.	Environmental Studies of Materials	Energy materials, Fuel cells, Hydrogen generation, Waste biomass and plastics, Carbon resource utilization
Hiroaki SHIRAKAWA Associate Prof.	Environmental and Resource Economics	Energy and resource demand and supply in Asian countries, Assessment of regional interdependencies of environment and economy, Efficiency assessment of urban environmental management economic valuation of environmental policy
Nagahisa HIRAYAMA Associate Prof.	Environmental & Sanitary Engineering, Environmental Emergency Management	Social systems engineering/ Safety system, Civil and environmental engineering
Sho-ichi IMAWATSU Associate Prof.	Environmental Studies of Materials	Sustainable cities and communities, Resource utilization, Material transformation, Green chemistry, Synthetic organic chemistry, Nanocarbon (Fullerene)
Anatoly ZINCHENKO Associate Prof.	Environmental Studies of Materials	Polymer chemistry, Nanometer-scale chemistry, Environmental load reduction and remediation, Biophysics, chemical physics and soft matter physics

### **National Space Design**

<b>Name, Title</b>	<b>Area of Specialization</b>	<b>Research Themes</b>
Takashi TOMITA Prof.	National Space Design	National and regional space design for sustainable and resilient society, Coastal disaster management, Social implementation of national and regional design methodology
Shinichiro NAKAMURA Associate Prof.	National Land Use Design	Water resource management, Urban river restoration, Adaptation for climate change

**Academic Schedule** <http://www.civil.nagoya-u.ac.jp/nugelp/curriculum/timetable.html>

### **■ FIRST YEAR ■**

October

- Admission to the Nagoya University Global Environmental Leaders Program (NUGELP)
- Guidance for new students

October-February (Fall Semester): **First Semester**

- Attend lectures, practices and seminars
- Individual instruction by academic advisor(s)
- NUGELP Study tour and Seminar: Presentation and discussion by students and academic advisors

April-August (Spring Semester): **Second Semester**

- Attend lectures, practices and seminars
- Individual instruction by academic advisor(s)
- NUGELP Study tour: Presentation and discussion by students and academic advisors

September: **Global Research Internship**

- Group research project working in a group of international and Japanese students at private companies and local governments.

### **■ SECOND YEAR ■**

October-February (Fall Semester): **Third Semester**

- Attend lectures, practices and seminars
- Individual instruction by academic advisor(s)
- NUGELP Study tour and Seminar: Presentation and discussion by students and academic advisors

March: **Interim reporting and discussion toward a Master's thesis**

- NUGELP Workshop: Compile and present an interim report at a program workshop
- Discuss with students and academic advisor(s)

April-August (Spring Semester): **Fourth Semester**

- Attend lectures, practices and seminars
- Individual instruction by academic advisor(s)

- Compile a Master's thesis

**June-July: Submission and defense of the Master's thesis**

**September: Completion of the Master's program**

- Receive a master's degree (Master of Environmental Studies or Master of Engineering) and program certificate
- Return to home countries to develop one's career as global leaders
- Global alumni networking supported by Nagoya University
- Continued academic and career development support from Nagoya University

**Facilities** [http://en.nagoya-u.ac.jp/academics/campus\\_life/housing/index.html](http://en.nagoya-u.ac.jp/academics/campus_life/housing/index.html)

**Dormitory:** JDS fellows will be given priority to be accommodated in the university dormitories for the first one year.

**Learning in research groups:** Students are provided with individual desks, PCs with internet access, and also access to equipment and systems necessary to develop their own research under the supervision of academic advisors.

**Library:** The University holds its library of a total of 3.3 million copies for educational and research use and subscribes to some 32,000 titles of online journal. The University Library System provides a large number of desks and learning rooms for students to enhance their learning performance.

## **Message for Applicants**

**Nagoya University Center for Global Environmental Leaders:** In order to cultivate the specialists on civil engineering and environmental studies who will lead infrastructure and environmental policy and measures in the coming decades, Nagoya University established the Nagoya University Center for Global Environmental Leaders, directed by the Vice President of the University. The university-wide center supports capacity developments, global alumni networking and continued assistance to alumni as well as the regular operation of NUGELP, in close collaboration with the cooperated graduate schools and the Education Center for International Students.



In NUGELP, two English speaking staffs assist international students. Communication between the NUGELP Office and the students is conducted in English so that international students can smoothly start their study without difficulties.

**Education Center for International Students (ECIS):** ECIS provides various assistance to students from overseas including academic and daily life support, courses of Japanese and other languages and cultural understanding, and cultural exchange programs with local communities.



**JDS programs in Nagoya University:** Nagoya University has been a host university of JDS Fellows at the Graduate School of Law and the Graduate School of International Development. NUGELP has also accepted JDS Fellows from 2011. The University therefore has abundant experience in operating the program and also to assist JDS Fellows. Also thanks to other programs by JICA such as the long-term training program, many experts from developing countries are studying at Nagoya University.