Sustainable Global Environmental Studies Program

We conduct education and research on the past, present, and future history and changes of the atmosphere, hydrosphere, geosphere, and biosphere that make up the Earth's environment, as well as their interactions, from the earth's interior to outer space, to develop human resources with interdisciplinary knowledge and thinking ability. Specifically, education and research are conducted on the structure, behavior, evolution, and diversity of organisms in the Earth's environment, and the mechanisms of transmission, expression, and regulation of genetic information. Based on the knowledge obtained from these studies, we conduct education and research on (1) genetic engineering for the industrial production of useful materials, (2) analysis of the relationship between biological functions and the internal and external environment, (3) conservation and restoration of the environment using chemical and biological methods, (4) changes in the crustal structure, (5) prediction of natural disasters, and (6) disaster prevention technology. Furthermore, we also work on issues aimed at the formation of a sustainable society.

(Note) Faculty members marked with an asterisk (*) are scheduled to retire in March 2027.

Educational field	Education and Research	Supervisors	Related lectures
Geological Science	We conduct education and research for unveiling the origins of underground resources and changes in the global environment during 4.6 billion years of the Earth history. The primary targets of our study are solid substances that record the Earth history such as minerals, rocks, and sedimentary strata. From the targets, we explore the material cycle, chemical reaction, heat history, and environmental changes of the Earth from its birth to the present on the basis of accurate age dating.	Prof. Yasuo Ishizaki ishizaki@sus.u-toyama.ac.jp	Advanced volcanology
		Prof. Shin-ichi Sano ssano@sus.u-toyama.ac.jp	Earth and life history
		Associate Prof. Ken-ichi Yasue yasueken@sus.u-toyama.ac.jp	Advanced neotectonics
		Junior Associate Prof. Ai Kawamura kawamura@edu.u-toyama.ac.jp	Vertebrate Paleontology
		Assistant Prof. Hikaru Sawada hsawada@sus.u-toyama.ac.jp	Advanced earth material science
		Assistant Prof. Toru Nakajima tnakaji@sus.u-toyama.ac.jp	Advanced Orogenic Geology
Geophysics of Atmosphere, Ocean, and Cryosphere	As global warming progresses, extreme weather events are becoming more severe and frequent. The Hokuriku region is also affected by these significant climate changes, facing increased risks of various local disasters such as heavy snowfall, thunderstorms, heatwaves, and storm surges. To protect safe urban functions and rich social life from these risks, we aim to study the mechanisms behind climate system changes from a global perspective and develop highly capable individuals who can apply this knowledge to solve local problems.	Prof. Kazuaki Yasunaga yasunaga@sus.u-toyama.ac.jp	Advanced dynamic meteorology
		Prof. Kazuma Aoki kazuma@sci.u-toyama.ac.jp	Advanced atmospheric radiation
		Prof. Konosuke Sugiura sugiura@sus.u-toyama.ac.jp	Advanced geoglaciology
		Prof. Bunmei Taguchi taguchi@sus.u-toyama.ac.jp	Advanced ocean and climate dynamics
		Prof. Masahiro Hori mhori@sus.u-toyama.ac.jp	Advanced remote sensing
		Associate Prof. Wataru Shimada shimada@sci.u-toyama.ac.jp	Advanced snow and ice science
		Associate Prof. Atsushi Hamada hamada@sus.u-toyama.ac.jp	Advanced atmospheric physics

Solid Earth Geophysics	Our education and research are aiming to advance our understanding of the structure of the solid Earth and its dynamics, especially around the Central Japan. We are investigating the crustal structure, seismic and volcanic activities, and environmental changes in this area through geophysical observations, field surveys, and laboratory experiments. Students are trained to contribute to the prediction, prevention and mitigation of natural disasters..	Prof. Tohru Watanabe twatnabe@sus.u-toyama.ac.jp Prof. Naoto Ishikawa * ishikawa@sus.u-toyama.ac.jp Associate Prof. Kazuo Kawasaki kawasaki@sus.u-toyama.ac.jp Assistant Prof. Kohei Hotta hotta@sus.u-toyama.ac.jp	Advanced physics of the Earth's interior Advanced paleomagnetism and rock magnetism Advanced resource and environmental geophysics Advanced geodesy
Regulatory biology	Education and research are conducted on adaptive significance of biological rhythms and sleep system, endocrine system, and behavioral system of an individual organism or population in changing external environments.	Prof. Kouhei Matsuda kmatsuda@sci.u-toyama.ac.jp Prof. Masayuki Ikeda msikeda@sci.u-toyama.ac.jp Prof. Kimiko Shimizu kshimizu@ctg.u-toyama.ac.jp Associate Prof. Tomoko Yoshikawa tomokoyn@ctg.u-toyama.ac.jp Junior Associate Prof. Norifumi Konno nkonno@sci.u-toyama.ac.jp Junior Associate Prof. Tomoya Nakamachi nakamachi@sci.u-toyama.ac.jp Junior Associate Prof. Eri Morioka emorioka@sci.u-toyama.ac.jp	Advanced Biochemistry for Organic Molecules Advanced biological clocks Advanced endocrinology Advanced behavioral physiology Advanced invertebrate neuroethology
Life information science	We study the molecular mechanisms underlying cell differentiation and organ development, as well as genome structure, inheritance, and gene expression in diverse plant species. We also investigate how plants perceive, transduce, and respond to environmental and endogenous signals, including light and hormones.	Prof. Ichirou Karahara karahara@sci.u-toyama.ac.jp Project Associate Prof. Tomoaki Nishiyama tomoaki@sci.u-toyama.ac.jp Junior Associate Prof. Masayuki Yamamoto mpyama@sci.u-toyama.ac.jp Junior Associate Prof. Daisuke Tamaoki tamaoki@sci.u-toyama.ac.jp	Advanced plant morphology Advanced plant molecular genetics Advanced plant cell biology
Living structure science	We analyze various processes in the biological developments, morphogenesis, structural features, phylogenetic relationships, diversity, behavioral ecology and evolution through comparative study in living structures. Thus, we conduct education and research to understand the fundamental principles and rules.	Associate Prof. Yuji Yamazaki yatsume@sci.u-toyama.ac.jp Associate Prof. Kiyoto Maekawa kmaekawa@sci.u-toyama.ac.jp Associate Prof. Tsutomu Tsuchida tsuchida@sci.u-toyama.ac.jp Assistant Prof. Kyouko Sato taraxaca@sci.u-toyama.ac.jp	Living structure science Advanced evolutionary developmental biology Advanced biology of symbiosis Advanced plant cytotaxonomy

		Assistant Prof. Gohta Kinoshita gkino@sci.u-toyama.ac.jp	
Environmental and analytical chemistry	Our group focuses on exploring techniques from chemical approaches in solving and clarifying environmental problems. For example, we are developing simple and rapid analytical methods to measure harmful components related to environmental pollution. The dynamics of these components are then studied, and based on these findings, we perform basic research to remove the pollutants from waste water. Furthermore, our research also includes geochemical monitoring of CO_2 which consists of water rock interaction in geothermal fields. We also clarify and evaluate material cycling systems and mechanisms and changes in oceanic and terrestrial water systems, using major ions, trace elements, and stable isotopes.	Prof. Jing Zhang jzhang@sci.u-toyama.ac.jp Prof. Hideki Kuramitsu kuramitz@sci.u-toyama.ac.jp Prof. Keiji Horikawa horikawa@sci.u-toyama.ac.jp Lecturer Kazuto Sazawa sazawa@sci.u-toyama.ac.jp Assistant Prof. Takanori Kagoshima kagos@sci.u-toyama.ac.jp Project Assistant Prof. Hidetaka Kobayashi hidekoba@sci.u-toyama.ac.jp	Advanced marine geochemistry Advanced water analysis Isotope studies in environmental science Advanced environmental water quality Advanced Solid Earth Geochemistry Advanced Ocean Dynamics
Environmental Biology	We conduct research on the functions of organisms, which are important components of the biosphere, from the molecular to ecosystem level. In particular, education and research will be conducted on the effects of environmental factors such as light, water, metal ions, and chemical substances on the physiological functions of organisms, the effects of global environmental change, and interactions between individual organisms and between species.	Prof. Daisuke Tanaka tanakada@sci.u-toyama.ac.jp Prof. Hiroshi Ishii hishii@sci.u-toyama.ac.jp Associate Prof. Hiroyuki Kamachi kamachi@sci.u-toyama.ac.jp Associate Prof. Kenji Kashiwagi kasiwagi@sci.u-toyama.ac.jp Lecturer Akihiro Sakatoku sakatoku@sci.u-toyama.ac.jp Lecturer Tamihisa Oota tamihisa@sci.u-toyama.ac.jp	Advanced microbiology Advanced plant ecology Advanced plant physiology Advanced stratigraphy Advanced environmental molecular biology Advanced isotope ecology
Environmental Sustainability Science	Our group's primary focus is advancing environmental sustainability through rigorous research that emphasizes the conservation and responsible management of natural ecosystems, including land use land cover (LULC) and forestry, agricultural landscapes, plantations, coastal and marine seascapes, and urban green spaces. We mentor Ph.D. candidates in exploring methodologies for protecting, restoring, maintaining, and sustainably using ecological systems. Our research includes detailed analysis of land-use practices and ecosystem services in environmental systems such as freshwater and marine fish habitats, water resources, and agroecosystems from a sustainability science point of view. Additionally, we develop and implement sustainable management frameworks designed to ensure the long-term viability and resilience of environmental systems.	Prof. Naoya Wada wada@sci.u-toyama.ac.jp Prof. Geetha Mohan geetha@eco.u-toyama.ac.jp Associate Prof. Chakraborty Shamik shamik@eco.u-toyama.ac.jp Assistant Prof. Shishir Sharmin shishir@eco.u-toyama.ac.jp Assistant Prof. Peterson Miles Isao peterson@sci.u-toyama.ac.jp	Advanced Conservation Ecology