15

LIFE ON LAND

2018-2022 Publications	31
Course Units	44
Student Engagements with Units on SDG 15	1,402
2018-2022 Percentage of all Taiwan Publications	2.2%

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Research

Soil and Groundwater Pollution Remediation Technology

Leaks from oil pipelines, gas stations, and oil tanks are common sources of oil contamination in the soil and groundwater. Deputy Director Shan-Shan Chou of NYCU' s Environmental Technology & Smart System Research Center developed two types of high-end processing technologies, regenerative adsorption particles (RAP) and a hydraulic circulation flushing soil remediation system (HFS), that can remove light non-aqueous phase liquids (LNAPLs) in soil and groundwater. Testing at a petrochemical plant confirmed that the application of RAP and HFS technology can accelerate the removal of pollutants, thereby effectively improving the efficiency of soil and groundwater remediation.

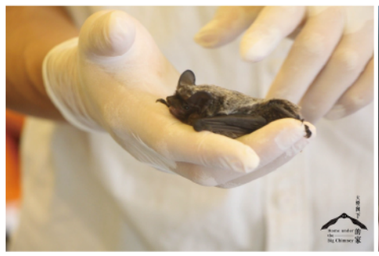
Disaster Prevention on Mountainous Roads

Rockfalls on mountainous roads not only seriously threaten the life and safety of road users, but can also seriously damage roadside retaining structures. The research team led by Professor Meng-Chia Weng of NYCU's Department of Civil Engineering conducted research based on a serious rockfall incident in Miaoli County, Taiwan, to assess the impact rockfalls have on retaining structures, using light detection and ranging (LiDAR) and unmanned aerial vehicles (UAV) to create highly precise terrain and geological models that successfully simulated the trajectory and velocity changes of rockfalls and damage to retaining structures, while also evaluating potential areas that could be impacted by such disasters. The research results can be applied to various landslide and retaining structure incidents and help government agencies establish a comprehensive disaster prevention strategy for mountainous areas. The results have been published in the international journal *Landslides*.

Social Impact

Frosted Bat Promotion Platform

The "Sixth Fuel Big Chimney Factory," which was part of the Japanese navy' s sixth fuel factory in Hsinchu, is the only frosted bat habitat in Taiwan. To promote this ecological wonder, NYCU's Sixth Fuel good-neighboring team operates the "Home Under the Big Chimney," an educational space with bat picture books and models to introduce people to this rare bat species in Taiwan. The team also takes care of bats that wandered into nearby communities, feeding them and demonstrating how to release them back into the wild, becoming a shelter for bats. The team also collaborates with the Hsinchu City Government and the Hsinchu Branch of the Society of Wilderness to regularly organize guided tours that let visitors observe the habitat of frost bats around the Big Chimney Factory, allowing the public to develop a closer emotional connection to the land, passing on and promoting this unique frosted bat ecology.



Creating Spaces for Environmental Education

The NYCU volunteer group Bridge of ASEAN and Taiwan (BAT) teamed up with Xinglong Elementary School in Donghe Township, Taitung, to carry out a "humanitarian architecture" project, focusing on the public welfare services of design and collaborative construction. Professor Pei-Hsien Hsu of NYCU's Graduate Institute of Architecture led 14 students to create a teaching demonstration space for environmental sustainability education in Xinglong Elementary School. The natural architecture "Birth, Life" designed by the team used wood construction and metalworking techniques to create an insect hotel with materials like wood, bark, dry grass, clay, and reeds, attracting various insects. Meanwhile, a water resource circulation system in the space gathers rainwater to nourish the growing plants. This natural building connects functions such as water resources circulation, plant ecology, and ethnic studies, helping the school teach students about environmental sustainability and cultural revitalization, while enabling children to better get in touch with nature.

Education & Cultivation

Ecology-Related Courses

NYCU offers many ecology-related courses each year, such as "Introduction to Ecology," "Contemporary World: Environmental Crisis & Ecological Sustainability," and "Multi-Sensor Monitoring of Geological Hazards." These courses teach students how to protect, maintain, and promote the sustainability of the ecological environment, prevent desertification, land degradation, and the loss of biodiversity, and manage forests sustainably.

- Introduction to Ecology
  This course involves ecological field trips that incorporate Hsinchu' s local characteristics, in which students survey and create a map of different trees on campus. Through in-class learning and field trips, the course aims to give students a deeper understanding of the global ecological environment and ecosystems with local characteristics, as well as the sustainable management of ecological environments.
- Multi-Sensor Monitoring of Geological Hazards
  This course explores multi-sensor monitoring methods and practical experience for monitoring surface deformation and geological hazards. By introducing practical measurement methods of geotechnical engineering and applications of multi-sensor monitoring, the course will enable students to learn geological and environmental professional knowledge, gain an understanding of natural disasters, geotectonic evolution, and natural and man-made environmental changes, and contribute to land monitoring and remediation.
- Contemporary World: Environmental Crisis & Ecological Sustainability
  This course introduces important ecological systems in nature, such as tropical, river, and marine ecosystems, and discusses important environmental issues like landslides, acid rain, ozone depletion, the greenhouse effect, nuclear power, and nuclear waste. The course also explores Eastern and Western environmental ethics and the meaning of sustainable development, cultivating positive emotions about the environment to encourage students to effectively participate in resolving environmental issues.

Stewardship

Protecting Biodiversity

NYCU' s International Institute for Cultural Studies and Department of Humanities and Social Sciences organized a series of lectures on multispecies research. The director of the Clouded Leopard Association of Taiwan was invited to give the lecture "From neofelis nebulosa, clouded leopard to likulau: how to make kins with an unfamiliar animal?" in which he talked about how the clouded leopard affects the health of forest biodiversity, as well as the history and culture of the indigenous Rukai and Paiwan peoples. Although the clouded leopard is extinct in the wild in Taiwan, its habitat remains intact. Ecologists, indigenous leaders, and international organizations have been actively coordinating and working together to restore the habitat, allow clouded leopards to return to the forests, and enable everyone to see and learn how to restore species in appropriate habitats.