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SUSTAINABLE CITIES AND COMMUNITIES

	2018-2022 Publications	257
	Course Units	494
	Student Engagements with Units on SDG 11	13,963
	2018-2022 Percentage of all Taiwan Publications	5.7%

Research

Reducing Urban Air Pollution

Air pollutants emitted by automobiles and motorcycles can seriously harm people's health. The research team led by Professor Kai-Hsien Chi of NYCU's Institute of Environmental and Occupational Health Sciences analyzed particulate matter (PM) in urban areas and found that metal particulates produced from frequent braking, or non-exhaust emissions, have adverse effects on human health. Therefore, congested traffic in urban areas is one of the main causes of reduced ambient air quality. The research team also introduced the concept of cellular oxidative stress to establish a next-generation air quality evaluation method that will help people understand the real air quality and aid the government in developing precise and effective pollution control policy, precisely improving air quality monitoring.

Loyalty to Bike Sharing Systems

Bike sharing makes life more convenient and creates the image of a sustainable and healthy city. The research team lead by Professor Chung-Cheng Lu of NYCU's Department of Transportation and Logistics Management conducted an empirical study on the Youbike bike sharing system and found that users' perceived green value, green trust, and green usage intention all positively affect their green loyalty. These findings suggest that bike sharing operators should emphasize the green value of bike sharing in their marketing campaigns to strengthen people's green perception of bike sharing and work to increase people's trust in this service, prompting more people to use bike sharing services as an eco-friendlier alternative to their everyday commute. The findings have been published in the international journal *Research in Transportation Business & Management*.

Social Impact

Sustainable Hakka Village Industry Revitalization Plan

To revitalize Hakka village industries and strengthen local placemaking, NYCU's College of Hakka Studies teamed up with National Taipei University of Technology, National Open University, and Minghsin University of Science and Technology. The four universities jointly initiated the "2nd Generation Placemaking - Sustainable Hakka Village Industry Revitalization Plan." The four parties signed a memorandum of understanding with the Taipei Hakka Affairs Commission and invited second generation placemaking tea farmers of Hakka villages along Provincial Highway 3 to join. The goal was to help create a brand image for Hakka tea with core values like culture, shared prosperity, and placemaking, thereby constructing a new placemaking industry in Hakka villages, strengthening Hakka villages' development capacity and implementing local practices.

On-Site Visits to Learn About Hakka Culture

Teachers and students of NYCU's College of Hakka Studies participated in the general studies course "Hakka and Taiwan" offered by Yuan Ze University, which includes field trips to the Xiaoli area in Bade, Taoyuan to show students what Hakka villages are like. Xiaoli, Taoyuan is rich in local Hakka culture and retains many important landscapes that represent traditional Hakka culture, such as Dahuofang Washing Pool, Ying-Chuan Hall, and Xiushan Temple. The teachers and students from both schools toured the area, learning about the context and history of Hakka cultural development and interacting with Hakka people to learn more about their culture.



Education & Cultivation

Strengthening Students' Earthquake Science Knowledge

To strengthen students' earthquake science knowledge, NYCU's Department of Civil Engineering encourages students to participate in scientific competitions to stimulate their creativity, developing various earthquake-resistant technologies and construction methods that can improve earthquake disaster prevention. In 2022, NYCU students participated in the "Introducing and Demonstrating Earthquake Engineering Research in Schools (IDEERS) Competition" organized by the National Center for Research on Earthquake Engineering of the National Applied Research Laboratories, achieving the outstanding performance of winning second place in the graduate group and fifth place in the undergraduate group. Through innovative seismic isolation and shock-absorbing designs, the students made the models less likely to overturn and be damaged. Through the competition, they learned to improve their seismic design evaluation and reinforcement techniques, contributing to a future of more earthquake-resistant and sustainable homes.



Education & Cultivation

Teachers and Students Working Together on Sustainable Green Architecture

A team formed by teachers and students of NYCU's Transdisciplinary Design Innovation Shop (TDIS) focused on the concept of housing justice and sustainable cities, spending two years to create the first 100% made-in-Taiwan wooden green structure "1 House for All," which won gold in "Architectural Project" and bronze in "Innovation" at the 2022 Solar Decathlon Europe 21/22. For this competition, the team offered three design solutions. They employed the energy-conservation design concept of passive houses and integrated the AIoT indoor automatic adjustments to achieve an energy-sharing station with net-zero energy consumption. Using the circular building design method and industry integration, they created a "net-zero carbon emission transitional house" to achieve the vision of housing equality. Finally, they combined carbon trading with the business model of social enterprises to create "social-enterprise housing" to achieve the goals of sustainable operation and sustainable development. This project combines zero-carbon and building material recycling design through a micro urban renewal model, which can particularly improve the quality of life in rental housing for the elderly, young people moving into cities, and nuclear families, promoting the development of a sustainable city that is low-carbon, affordable, and prosperous across generations.

Stewardship

Government-Academia Collaboration to Promote Hakka Culture

NYCU's College of Hakka Studies has long promoted Hakka affairs and actively collaborates with government agencies and private organizations to organize various Hakka language courses, Hakka academic and culture seminars, Hakka village conservation projects, and Hakka art and culture events, hoping to build a foundation for multi-ethnic research and explore the different aspects of historical and cultural research and ethnic economy through various cross-sector collaboration. This year, the College of Hakka Studies signed a MOU for government-academia collaboration with the Council for Hakka Affairs of Taichung City Government. The two parties will work together to establish a large database for language, history, talents, and artifacts, and organize academic seminars and presentations to promote Hakka culture, cultivate young Hakka talents, and encourage students to return to or stay in their hometown to help boost local development.

Eco-Friendly Campus Transportation

To create a sustainable living environment, NYCU has long provided free campus shuttle buses for faculty members and students, and introduced various energy-saving means of transportation, including electric motorcycle sharing, electric scooter sharing, and Youbike stations. The motorcycle parking lots also have charging stations for electric motorcycles to reduce pollution and improve people's health. To meet increasing needs to commute between campuses, NYCU has negotiated for city buses and intercity buses to drive into campus, providing faculty members and students with more diverse and convenient transportation, making inter-campus commuting safer and less of a financial burden.

