



## Bimonthly Newsletter – SDGs Special Issue

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# Taipei Tech Post

## National Taipei University of Technology







Taipei Tech has implemented a ceramic-oriented USR project that aims to promote the culture and beauty of ceramic artistry and to drive the transformation and integration of Yingge's local ceramic industry.

To promote ceramic culture and to facilitate cross-disciplinary and cross-institutional collaborations, Taipei Tech signed an MOU with Yingge Ceramics Museum on April 21st. As the first university partner of Yingge Ceramics Museum, Taipei Tech will work closely with the museum on the preservation of ceramic culture and craftsmanship and the development of ceramic technologies.

Located in New Taipei City, Yingge Ceramics Museum is the first ceramic-themed museum in Taiwan. "There is a collection of more than three thousand pieces of ceramic art in the museum," mentioned Wu Hsiu-Tzu, Director of Yingge Ceramics Museum, "and we have also made significant progress in the ceramic-related research and industry revival over the years." The museum is currently planning to exhibit a selection of ceramic artworks at the Taipei Tech Arts and Cultural Center in October as one of the celebratory events for the university's 110th anniversary.

Taipei Tech started a ceramic-oriented university social responsibility (USR) project last year. The project aims to promote the culture and beauty of ceramic artistry and to drive the transformation and integration of Yingge's local ceramic industry. Through this USR project, faculty members and students from the Department of Cultural Vocation Development have held a series of ceramic workshops and exhibitions and documented local ceramic artists through interviews. This project also echoes the UN Sustainability Goals of "Quality Education", "Industry, Innovation and Infrastructure", and "Sustainable Cities and Communities".

Taipei Tech President, Wang Sea-Fue, noted that in the 2021 QS World University Rankings by Subject, Taipei Tech has secured the world ranking of 101-150 in the Materials Science category. "We have managed to apply ceramic materials in a wide range of fields such as biomedicine, energy, and optoelectronics," said Wang, "and researchers of our Additive Manufacturing Center for Mass Customization Production have also developed ceramic-based digital dentistry equipment."

With the Yingge Ceramics Museum partnership, Wang believes that Taipei Tech can work closely with the museum to take ceramic application, technology, and artistry to the next level.

## New Partnership to Preserve Ceramic Artistry and Advance Ceramic Technologies







Taipei Tech held an on-campus university social responsibility (USR) exhibition from May 10 to May 12 to showcase the university's many USR projects and their results.

The USR projects of Taipei Tech are the collective effort of the USR Office and the faculty members and students of various departments. The projects focus on community regeneration and sustainable development; the many Taipei Tech USR teams bring their expertise to many local communities throughout Taiwan.

The architecture students proposed a plan that aims to make communities more friendly to the aging population. Based on the findings of their field research and survey, the plan includes community living, micro eldercare centers for senior citizens, care cafés, friendly stores, and pedestrian zones. The senior-friendly community that they envision effectively combines a people-oriented concept and the professional angle of architectural design and environmental psychology.

Another project presented in the exhibition is the water quality monitoring system deployed in the clam farming ponds in Kouhu Township, Yunlin. A team composed of faculty members and students from the departments of Chemical Engineering, Computer Science & Information Engineering, and Business Management installed industry-grade sensors that can monitor the pH scale, oxidation level, oxygen level, and temperature in the ponds. The data is sent to a server, and the clam farmers can use an app on their mobile phone to see the data. The project has increased the production rate of clam farming.

Members of the departments of Interaction Design and Computer Science & Information Engineering utilized virtual reality to engage tourists in Nangan Township, Matsu to stimulate local tourism. The team also recruited and trained volunteers from local elementary schools and middle schools to become familiar with VR and AR technologies. Through this training, local students can become more technologically savvy and learn more about local history.

Taipei Tech President Wang Sea-Fue noted that the Taipei Tech USR projects have resulted in many fruitful achievements over the years. USR teams have built a direct-to-consumer produce store in the indigenous community of Jianshi Township in Hsinchu, revitalized and preserved the heritage of the woodworking industry in Fengyuan District in Taichung, and held beach cleanup activities in Jinshan District of New Taipei City. Wang encouraged more faculty members and students to find their passion and join the university's USR effort.



## Taipei Tech Holds Exhibition to Highlight University Social Responsibility Projects



The architecture students proposed a USR project that aims to make communities more friendly to the aging population





## Design Graduates Exhibit Projects Tackle Problems on COVID-19, Emergency Rescue, and Poverty



The 2021 graduates of the Department of Industrial Design exhibited their graduation projects from May 3rd to May 9th at the Taipei Tech Arts & Cultural Center. Taipei Tech President Wang Sea-Fue noted these projects cover various topics including ending poverty, ensuring health and well-being, promoting gender equality, encouraging sustainable consumption and production, and many others that can be associated with the sustainable development goals of the United Nations.

"These projects not only demonstrate what the students have learned during the past four years but also show their ambitions to utilize design to solve existing social problems," said Wang.

One of the projects, the Infinity Bubble, is designed to provide movable, temporary quarantine housing that can be easily deployed in areas severely hit by COVID-19. The outer layer of an Infinity Bubble uses negative pressure and HEPA filtration technology to keep the virus from spreading. Utilizing foldable material and the Miura folding technique, the size of an Infinity Bubble can also be greatly reduced for easy transport.

Li Jia-Yu, one of the designers of the Infinity Bubble, mentioned that "the most difficult part of the project was to find a form and a material suitable for easy and quick transport." Ellie Lei, another designer, noted that the Infinity Bubble would be really useful in areas where medical care capacity has capped.

The Infinity Bubble is one of nineteen Taipei Tech projects nominated for the Golden Pin Design Award this year. More than six thousand projects in twenty-five categories were submitted nationwide this year.

Another team of students designed Pad Case, a toolkit to make sanitary pads from agricultural waste. Pad Case is designed for women in Uganda, where sanitary products are not always available. Jasmine Wang, one of the Pad Case designers, mentioned that the product uses the most commonly-found fruits of Uganda, bananas and pineapples, as the source material for the disposable sanitary pads. "The leaves of pineapples and the trunk of banana trees are rich in fiber," said Wang, "and fiber can be easily turned into sanitary pads using the Pad Case toolkit."

LIGHTAID, a project by Nicholas Prawirani and Guo Xin-Yuan, makes it easier for bystanders to give CPR. According to Prawirani, statistics have shown that people typically feel tired and cannot continue to apply enough force for proper CPR after two minutes. LIGHTAID aims to solve this problem by utilizing a hydraulic press that amplifies the force applied by a rescuer. This conserves the rescuer's energy and helps facilitate more effective rescue.





The winner of the design contest, Lu Jun-Han, based his design on the school colors of blue and green while incorporating the oval shape of the school emblem with astronomy-inspired elements



Six thousand Taipei Tech masks were given to the neighboring communities and hospital to express love and care to the community

## Taipei Tech Donates Student-Designed Masks to Neighboring Communities and Hospital

In response to the surge of domestic COVID-19 cases and to raise awareness of university social responsibility (USR), Taipei Tech held a student mask design contest, in which the winning design was mass-produced and given to the neighboring communities and Taipei Municipal Wanfang Hospital.

The mask designed by Lu Jun-Han, an industrial design master's program student, won the first place of the contest. The base of the design is a gradient color composed of blue and green—Taipei Tech's school colors. The graphics include representative images of the Big Bang, infinity, and the universe, all based on Taipei Tech's oval emblem. Lu also included graphics of turtles as they are commonly found in the pond on campus.

Wang Sea-Fue, President of Taipei Tech, pointed out that ever since the COVID-19 local outbreak, members of Taipei Tech and surrounding communities have all adhered to the pandemic prevention measures to safeguard the community. "We have donated six thousand Taipei Tech masks to our neighboring communities, including the communities of Minhuei, Changlong, and Zhuyuan, and to Wanfang Hospital," said Wang, "and we hope to express our gratitude toward members of the communities and the health professionals during this critical time."

Chen Wei-Zhen, representative of the Minhuei community, mentioned that his father is a Taipei Tech alumnus, so he is particularly grateful for Taipei Tech's warm gesture. Li Lin-Yao, representative of the Zhuyuan community, thanked Taipei Tech for caring the collective wellbeing of the community. Wang Zhi-Gang, representative of the Changlong community, pointed out that Taipei Tech has been implementing an USR project to improve the landscape of the community. "Taipei Tech always takes initiatives in local revitalization, which shows how members of Taipei Tech care about our community," said Wang.

Chen Tso-Hsiao, Superintendent of Wanfang Hospital, said that the vibrant color and design of the Taipei Tech masks will bring a pleasant mood to the medical staff. Yang Shih-Hsuan, Taipei Tech Vice President and Provost, indicated that the university wishes to send our support and gratitude through these masks toward the medical staff who have been working hard to protect our health during the pandemic.





# Offshore Wind Power Key Players Discuss Standardization and Net Zero Emission in Symposium



Taipei Tech and BSMI hosted a symposium to discuss the regulations and technical requirements pertaining to offshore wind power development in Taiwan

To accelerate the process of the offshore wind power industry taking root in Taiwan, Taipei Tech joined hands with the Bureau of Standards, Metrology and Inspection (BSMI) of the Ministry of Economic Affairs and hosted a symposium on the topics of Taiwan offshore wind power design, construction, operation, and maintenance. Participants discussed the regulations and technical requirements pertaining to offshore wind power development in Taiwan.

Ship and Ocean Industries R&D Center, CR Classification Society, and Taiwan Offshore Wind Industry Association (TOWIA) co-hosted the symposium, showing support from the industry to deepen the cooperation between academia, industry, and government sectors. Symposium participants also discussed the ways for Taiwan to achieve the goals of energy stability and net zero emission by 2050.

In 2020, the BSMI established the Offshore Wind Technology Regulation Advisory Committee with the Director General of BSMI, Lien Ching-Chang, as the chair, and Taipei Tech President, Wang Sea-Fue as the co-chair. Three technology review committees are operating under the advisory committee, including the Site Investigation and Design Committee, the Manufacturing and Construction Committee, and the Operation and Maintenance Committee. Sung Yu-Chi, the director of Taipei Tech Offshore Wind Power Engineering Research Center, Chou Shean-Kwang, CEO of the Ship and Ocean Industries R&D Center, and Cheng Chih-Wen, the president of CR Classification Society, serve as the chairs of the three committees respectively.

Hsieh Han-Chang, Deputy Director of BSMI, indicated that BSMI has been working on the draft of offshore windmill quality standards and is expecting to release the finalized version by the end of this year. "Establishing a functional review system is a significant task. It involves project verification, technician visas, and third-party verification mechanisms for the developers," said Hsieh, "and these are the details that we've been working on".

Wang of Taipei Tech noted that the university is responsible for site survey and designing technical regulations that cover the evaluation of environmental conditions, equipment performance, and support structure design. "Through the exchange at the symposium," said Wang, "we believe we can make the offshore wind power regulations more effective and comprehensive."



# Porous Sidewalks Help Cooling: Study

Article Courtesy of Taipei Times

By Rachel Lin and Kayleigh Madjar / Taipei Times Staff reporter, with staff writer

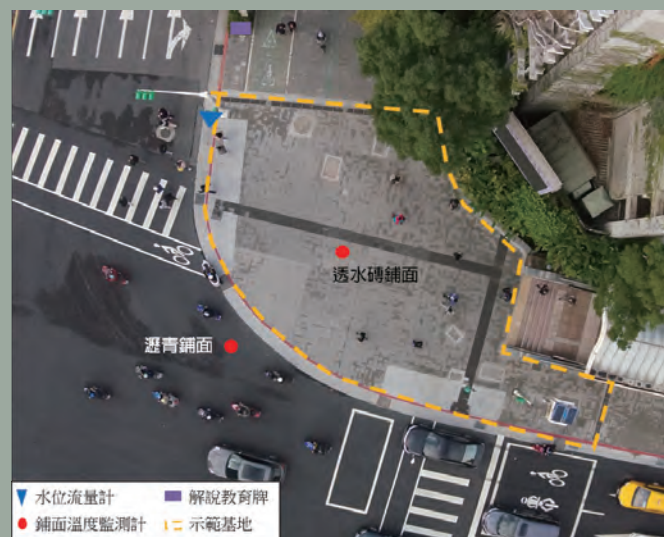


**P**orous sidewalks installed in Taipei last year have been found to reduce surface temperatures by up to 3°C in addition to absorbing excessive runoff, researchers said on Thursday.

The Taipei City Government has been experimenting with new building materials since launching a “sponge city” initiative in 2015 to improve drainage and flood controls in the capital. Seeking to reduce runoff along Zhongxiao E Road, which is prone to flooding, the city replaced its asphalt and concrete sidewalks with a more porous material.

To test the effectiveness of the renovation completed late last year, researchers from the National Taipei University of Technology’s Water Environment Research Center installed a sensor in front of Zhongxiao Xinsheng MRT Station Exit 4 to monitor how much water was absorbed by the pavement. They discovered that the material was not only effective at reducing runoff, but also had a lower temperature than other types of pavement.

Data gathered from March 9 to Aug. 31 showed that the sidewalk can reduce runoff by 13.8 to 63.4 percent, or about 40 percent on average, compared with traditional materials, the center said. Its surface temperature was on average 2.5°C cooler than asphalt, center director Lin Jen-yang said. The highest difference in temperature was recorded on July 26, when the porous surface was 3°C cooler than asphalt amid an atmospheric temperature of 37.4°C, Lin added. The material can absorb more water because its porous structure allows runoff to seep into the ground instead of accumulating on top, he said. In sunny weather, water evaporating from within the



porous pavement helps cool down the surface and the air above it, he added. “You can think of it like a sponge absorbing water,” Lin said. “The less runoff there is, the better the pavement is at absorbing rainwater.”

University president Wang Hsi-fu praised the renovation, saying that the wider sidewalks provide safer access to the school and complement the porous sidewalks installed on campus. The university is the first school in the nation to use the more efficient pavement on a wide scale, directing the runoff to shallow decorative gullies surrounding the campus, Wang added.



# Smart Cold Chain System to Conserve Organic Vegetables and Reduce Food Waste



Through the University Social Responsibility (USR) project, Taipei Tech professors and students, along with Taipei Tech's industry partner, Flutai Co., were able to build a smart cold chain system that draws inspiration from Atayal wisdom



It took six months for the cellar to be fully built, and the cellar can maintain a temperature between 7°C to 10°C without additional refrigeration machinery during winter



The Quri Indigenous Community, located in the mountainous area of Hsinchu, has long faced difficulties in storing agricultural produce due to energy outages caused by natural disasters. Through the University Social Responsibility (USR) project, Taipei Tech professors and students, along with Taipei Tech's industry partner, Flutai Co., were able to build a smart cold chain system that draws inspiration from Atayal wisdom.

A tribal elder, Lo Ching-lang, indicated that the community often encounters energy outages due to natural disasters such as typhoons and snow. It often takes time for maintenance personnel to arrive, as the community is located remotely in the mountains. When there is no electricity, it often results in tremendous loss of the community's agricultural produce.

Lo discussed the problem with the Taipei Tech USR team and shared with them the idea of a traditional cellar that their ancestors used to store a variety of foods. Students who study architecture, cold chain systems, and civil engineering were then recruited to join the team to execute the project. The professors, students, and local people worked together to redesign and rebuild an Atayal-inspired smart cellar for food preservation.

This smart cellar was built with composite materials that are eco-friendly and humidity-resistant. The traditional dirt wall was replaced with cement. The team installed humidity sensors on the walls and ran pipes through the wall for cold spring water to run through for temperature control. It took six months for the cellar to be fully built. During winter days, the cellar can maintain a temperature between 7°C to 10°C without additional refrigeration machinery.

Lo mentioned that the produce is now sent to the cellar right after harvest. "The vegetables can stay fresh for up to ten days in the cellar. This enables us to sell more directly to consumers instead of relying on wholesalers."

Lee Kuei-peng, professor of Taipei Tech's Department of Energy and Refrigerating Air-Conditioning Engineering, noted that, in addition to the cellar, the team has also built a complete smart cold chain system. The system monitors the temperature starting from when the produce is being harvested, and ending when the produce is handed to the consumer. Lin Wei-chi, master's student of the same department, indicated that the team has introduced computer management and automation to the process.

