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First Brain Bank in Taiwan

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FEATURES



VP for General Affairs Prof. Wen-Cheng Liao: Monumental Challenges of Campus Infrastructure

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GLOBAL OUTLOOK



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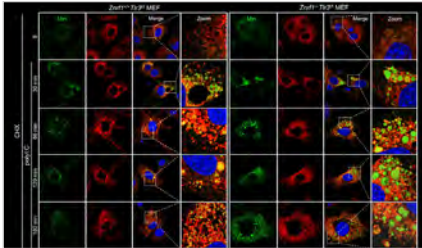


Cracking Linguistic Puzzles: NTU's Linguistics Legacy on the World Stage

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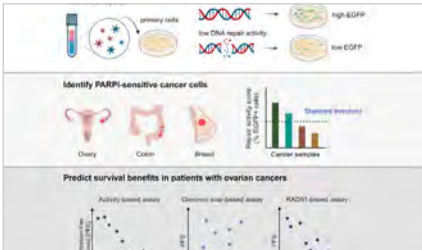
ACHIEVEMENTS



Discovery of the Regulatory Mechanism of Toll-like Receptor 3 Triggering Interferon Production and Viral-induced Respiratory Bacterial Superinfections

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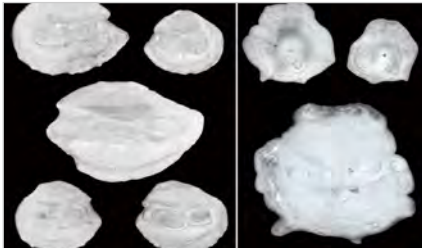
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Breakthrough in Real-Time Monitoring of Tumor Cell's DNA Repair Activity

A team of researchers led by Prof. Hung-Yuan (Peter) Chi from the Institute of Biochemical Sciences at National Taiwan University has achieved a significant milestone by developing a novel adenovirus-based fluorescence method to monitor DNA repair activity in tumor cells precisely. Notably, it has been successfully applied to ...

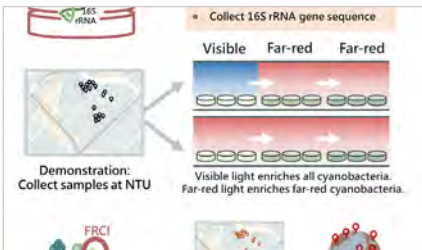
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Exciting Discovery Reveals Link Between Deep-Sea Fish Communities and Changing Seawater Temperatures

In an interdisciplinary research effort spanning over three years, a team of talented scientists based in Academia Sinica (AS) and National Taiwan University (NTU) has unveiled a significant breakthrough in our understanding of the drivers of deep-fish ecology. The study was led by Assistant Research Fellow Dr. Chien-Hsiang Lin from ...

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Developing an Efficient New Method for Identifying Far-Red Cyanobacteria

Associate Prof. Ming-Yang Ho from NTU Department of Life Science and Assistant Prof. Po-Yu Liu from the School of Medicine, National Sun Yat-sen University have collaborated to develop a bioinformatics method for effectively identifying far-red cyanobacteria. Named as "Far-Red Cyanobacteria Identification" (FRCI), this ...

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TEACHING & LEARNING



Charting the Future of Neuroscience: First Brain Bank in Taiwan

After six long years of dedicated preparatory work since 2017, NTU has finally established Taiwan Brain Bank, an initiative aimed at building a comprehensive database of tissue samples to advance domestic medical research. This landmark project, the first of its kind in Taiwan, not only complies with rigorous ...

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Empowering Leaders of the Next Generation: Innovative Program in Disaster Risk Reduction and Resilience

Global climate change has produced an increased frequency and scale of ...

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Office of Future NTU Initiatives: Nurturing Tomorrow's Leaders

National Taiwan University (NTU) marked a major milestone in advancing the Ministry of Education's "Future University Project" by inaugurating ... the "Office of Future NTU Initiatives" ...

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PEOPLE



Uniting for Impact: Showcasing Social Responsibility Initiatives at Taiwan Universities

During the past six years, the University Social Responsibility (USR) Program has reached many remarkable milestones. The first stop of the "2023 Exhibition of Engaged Scholarship" was in Northern Taiwan. Organized by ...

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Brand New Ground Floor of the Main Library Inaugurated

NTU Main Library commenced operations in the heart of campus in 1998, offering resources and support to countless readers over the past quarter century. However, due to ...

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95th Anniversary to Unveil Centenary Vision: Recognizing Contributions and Talents while Moving towards a Smart Sustainable Campus

NTU held a ceremony to celebrate ...

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On Display: Revitalized Taivoan Embroideries

The special exhibition "Patah Ki Hima. Raan Ki Tara – Colorful Taivoan Needlework," curated by the NTU Museum of Anthropology and the Siaolin Community ...

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Play and Learn: The "Operation Egg Industry Transformation" Board Game AR Experience

Chia-Chi Tsai, CEO of Talent Field, a community placemaking1 enterprise ...

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| Features

VP for General Affairs Prof. Wen-Cheng Liao: Monumental Challenges of Campus Infrastructure

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| Intro video of Prof. Wen-Cheng Liao, Vice President for General Affairs.

Office of General Affairs oversees all infrastructure projects on NTU campus, which are crucial to the everyday life of faculty, staff, and students. This year, the Office was assigned four major projects by the President: the construction of a student dormitory at the intersection of Xinhai Road and Keelung Road, the expansion of faculty dormitories, NTU TEC on Zhubei campus, and the Centennial Memorial Museum, in observance of the university's 100th anniversary.

The Office awarded the tender for the student dormitory at the end of September 2023, with the completion expected in 2028. The winning consortium is the team of architect Jou-Min Lin, recipient of the Public Commission Golden Quality Award. The dormitory will have a capacity of 3,750 beds. The Office is delighted that the animation of the winning project sparked lively discussions on Facebook among students and received a lot of positive feedback upon its release on the internet.



Prof. Wen-Cheng Liao is the Vice President for General Affairs as well as a professor of the Department of Civil Engineering. He specializes in high-performance concrete, fiber-reinforced concrete, concrete shrinkage and creep behavior and prediction mode, concrete durability, and seismic design for RC structures.

NTU has planned six new sites for faculty dormitories, two of which have been contracted. Hopefully, these initiatives will meet the growing housing demand of new faculty members. As new faculty are required to work toward promotion, the Office is tasked to ease their housing burden so they can better focus on their research. NTU currently has the facilities to accommodate 1,000 faculty members, with 200 city-center units reserved exclusively for new recruits for up to five years.

The Zhubei Campus project is another focus of the Office of General Affairs. The campus gate is prioritized for completion this year, as well as the planning of NTUTEC. As an industry-university cooperation facility, it draws design inspiration from Cornell Tech. Finally, the design of Centennial Memorial Museum was awarded to the well-known, innovative Japanese architect, Hirata Akihisa, following an international competition.

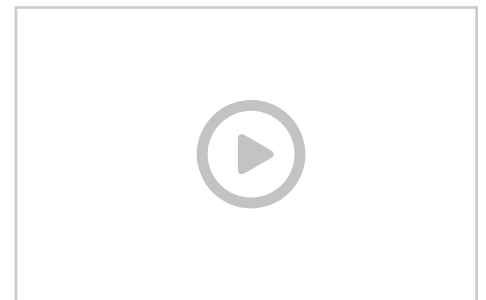
Students are highly concerned about the impact of the university's major infrastructure projects, as they might alter the campus environment and materially affect the students' daily activities. Sensitive to such concerns, Prof. Wen-Cheng Liao affirms that NTU has set up effective channels for the exchange of opinions. During the third week of every month, the President holds a meeting with the student union, student representatives, and graduate student association. The meeting also invites senior administrators, such as the Chief Secretary as well as Vice Presidents for Student Affairs, Academic Affairs, and General Affairs to attend. The campus is a shared space, so differences are inevitable and take time and effort to reconcile, but the Office of General Affairs will strive to listen to all parties. Combining the expertise of the Office of Campus Planning and other committees, Prof. Liao affirms that workable, satisfactory solutions can be reached within the scope of the law.



Prof. Liao holds that projects overseen by Office of General Affairs are highly important to the daily life of faculty, staff, and students.



Prof. Liao affirms that NTU has set up effective communication channels for the exchange of opinions. On a shared campus, differences are inevitable, but the Office of General Affairs strives to work toward a satisfactory solution.

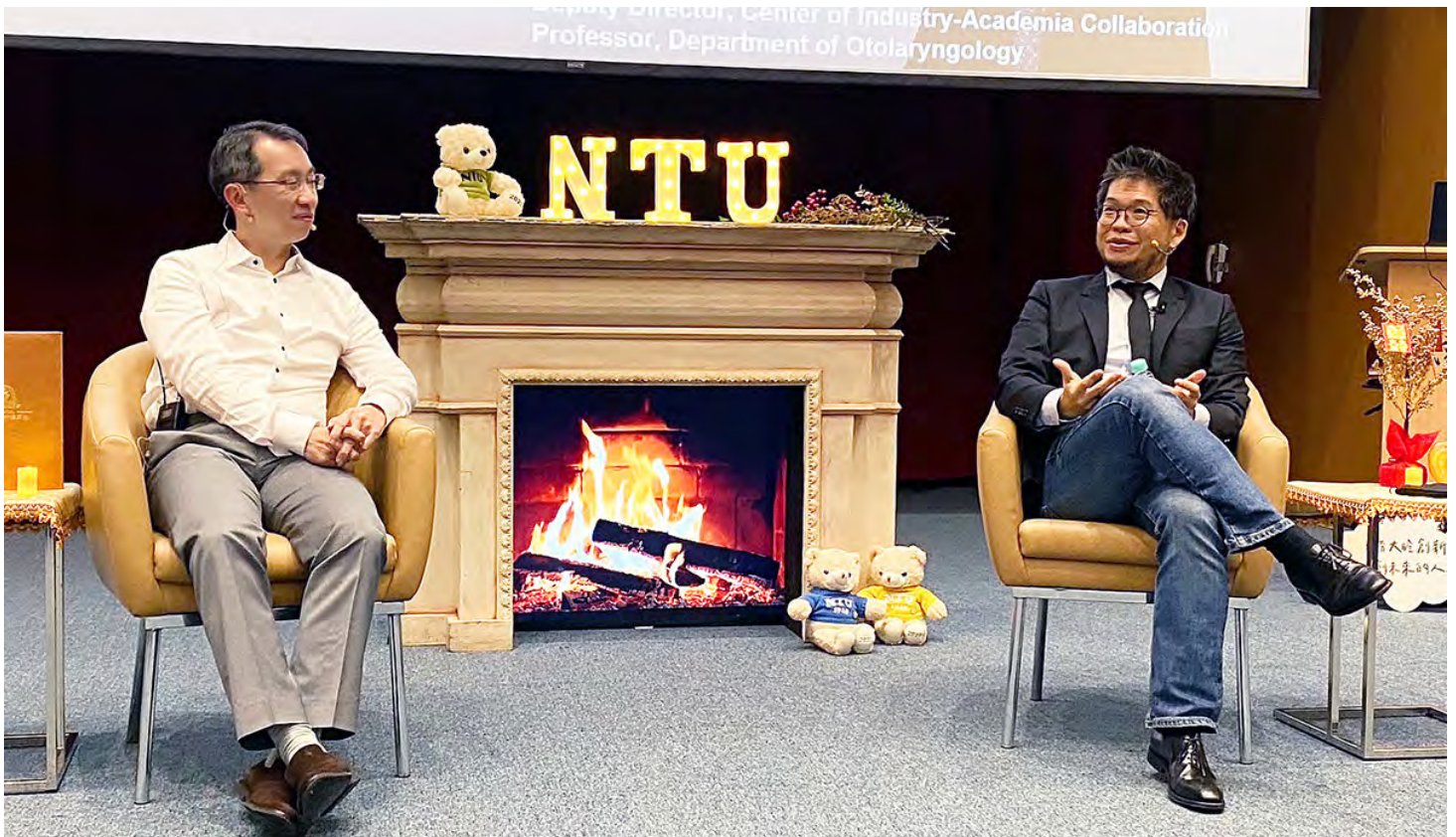


Expected to be completed in 2028, the student dormitory will have a capacity of 3,750 beds.

GLOBAL OUTLOOK

Don't Let Go of a Good Idea: YouTube's Co-Founder Steve Chen's Journey through Tech

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Steven Chen (right) encouraged the audience to chase their dreams, whether in Taiwan or Silicon Valley. He stressed the importance of living the venture instead of fearing failure.

Returning to NTU after two years, Steve Chen, the Co-Founder and former Chief Technology Officer of YouTube, a globally renowned internet entrepreneur, joined Dr. Tsung-Lin Yang, the current Deputy Director of NTU's Center of Industry-Academia Collaboration for a fireside chat. Their conversation delved deep into Steve Chen's two decades of experience in Silicon Valley and his take on the start-up landscape in Taiwan.

Steve Chen recounted his early days at PayPal as one of its first engineers, sharing this journey full of twists and turns. He navigated the treacherous waters of the Dot-com crash, celebrated the triumph of PayPal's Initial Public Offering, and witnessed the acquisition of eBay by PayPal. Knowing "even after going through



NTU Executive Vice President Shih-Torng Ding (right) welcoming Steven Chen (center) and Deputy Director of NTU Center of Industry-Academia Collaboration Dr. Tsung-Lin Yang (left) during his opening remarks.

all that, you can still succeed as a company” gave him great confidence to pursue all the brilliant ideas he had. Soon after, he started YouTube with fellow PayPal mafia members, Chad Hurley and Jawed Karim, etching their names in the history of the internet.

Chen shed light on the vibrant ecosystem that thrives within the heart of Silicon Valley. A close-knit network of key players such as venture capitalists, potential investors, and like-minded tech start-ups have fueled the valley’s innovation. He then stressed the importance of having a co-founder based in the Bay Area or the Silicon Valley region. Given the relatively small population of Taiwan, having connections in the region enables global reach, enriches the decision-making processes, and bridges the language and cultural gaps.

Chen revealed that a start-up can undergo dramatic transformations in its first 3 to 6 months. For example, YouTube began as a dating site, which was scraped in just a week, and PayPal initially started as a security app, lasting only several months. With this insight in mind, Chen encouraged budding entrepreneurs to boldly put their ideas into practice instead of clinging on the idea that they must succeed. “These are unique experiences that only a start-up venture can offer,” said Chen.

GLOBAL OUTLOOK

Forging Academic Bonds: Collaborative Partnerships in France

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NTU and UGA Student Exchange Agreement renewal signing ceremony. From left to right: Sabine Saurugger, Director for Science Po UGA, UGA President Yassine Lakhnech, NTU President Wen-Chang Chen, and Eirini Sarigiannidou, Vice President for International Affairs at Grenoble INP-UGA.

Last October, President Wen-Chang Chen and Prof. Hsiao-Wei Yuan, Vice President for International Affairs, led a delegation to visit leading institutions in France, including the Institute of Health and Medical Research (CNRS), Institute of Health and Medical Research (INSERM), and NTU's strategic partner, Université Grenoble Alpes (UGA). President Chen also participated in the Doctor Honoris Causa Ceremony at Université Grenoble Alpes (UGA) and reaffirmed NTU's commitment through the renewal of both the MOU and Student Exchange Agreement with UGA President Yassine Lakhnech.

The signing ceremony was graced by Ambassador Francois Wu, who traveled from Paris, underscoring the importance of this agreement between NTU and its key partner, UGA. The agreement signifies a commitment to ongoing cooperation,



Doctor Honoris Causa Ceremony 2023. From left to right: Prof. Yassine Lakhnech, President of Université Grenoble Alpes, Wen-Chang Chen, President of National Taiwan University, Rédouane Borsali, CNRS Research Director and Director of Carnot Polynat Institut.

with a focus on advancing academic exchanges and research collaborations. This partnership is anticipated to create more opportunities for both institutions to explore various academic fields collaboratively and strengthen connections within the global academic community.

During the delegation's visit to CNRS, their discussions delved into collaborative prospects in biology and chemistry. President Chen and CNRS Dean Antoine Petit officially solidified this collaboration by signing a MOU agreement in Paris, marking the establishment of a formal cooperative relationship between the two institutions. Meanwhile, the International Offices of both sides are holding discussions on an internship program for the upcoming academic year. This initiative is poised to expand internship opportunities and avenues for NTU students, fostering deeper collaboration and cooperation between Taiwan and France.



Gift exchange at CNRS MOU signing ceremony. Antoine Petit, Chairman and CEO of CNRS (left) and Wen-Chang Chen, President of National Taiwan University (right).

GLOBAL OUTLOOK

Festive Gathering at IMP Appreciation Banquet

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| The IMP Program Annual Appreciation Banquet, held last autumn, drew nearly 200 participants.

The curtain has fallen on the second edition of the NTU International Mentorship Program (IMP), sounding a successful note. The Appreciation Banquet, attended by nearly 200 mentors, students, and distinguished guests, including Executive Vice President Prof. Shih-Torng Ding, Vice President for International Affairs Prof. Hsiao-Wei Yuan, and Mr. Giuseppe Izzo, Chairman of the European Chamber of Commerce, was a celebration of the collaborative effort to cultivate the international talents at NTU. Each mentor received a thoughtfully designed co-branded coffee gift box of aromatic NTU coffee from NTU Office of International Affairs (NTU OIA), as a token of appreciation.

The banquet was enlivened with a series of captivating performances, including impressive singing by Mr. Brandon

Thompson, Chairman of the Canadian Chamber of Commerce in Taiwan, and a spectacular rendition by Mr. Steven Hendric, an Indonesian intern at Taipei Zoo. The event also featured dynamic Kung Fu Yoga performances by Mr. Benjamin Wang, the Director of Communications, and Mr. William Musslin, a Course Engineer at TLI - Taipei Language Institute. Guests were treated to freshly brewed coffee by Zhanlu Coffee, delightful Bassetts Ice Creams courtesy of the Minnesota State Government Office in Taiwan, delectable desserts made from animal welfare ingredients by Carrefour, and an Indonesian food and culture booth arranged by Indonesian students. Students, mentors, and internship organizations showcased their prodigious skills, providing guests with a multi-sensory feast of visuals, sounds, and flavors.

As NTU and its partners bid farewell to the second edition, preparations for the third International Mentorship Program are already underway. With nearly 40 new internship organizations joining, the program is set to offer more exciting job opportunities, guiding more students to explore diverse and promising career paths.



Click or Scan the QR code for more information about the NTU IMP.

GLOBAL OUTLOOK

College of Public Health Celebrates 30th Anniversary with an Academic Feast

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The KP Lecture attendees.

The NTU College of Public Health (CPH) celebrated the significant milestone of its 30th-anniversary by holding an international symposium last October. The main theme of symposium concerned the analysis and application of multiomics data in the field of public health, and the list of distinguished speakers included this year's KP Chen Memorial Lecturer Prof. George Davey Smith, FRS, Prof. Steven Hyman, Prof. Fumihiko Matsuda, Prof. Pak Chung Sham, and Prof. Cathy SJ Fann.

The KP Chen Memorial Lecture was established memory of Prof. Kung-Pei Chen, a founding father of public health education in Taiwan, to recognize individuals who have made extraordinary contributions to contemporary public health. The 2023 Laureate, Prof. Davey Smith of the University of Bristol, UK, is a clinical epidemiologist renowned for his work on improving causal inference in research on disease etiology and prevention. In his presentation, he stressed the importance of employing diverse approaches in drawing causal inferences. Often called the



Dean Shou-Hsia Cheng (left) presenting the award to Prof. George Davey Smith.

'Triangulation of Evidence' method, his approach effectively mitigates the risks associated with unmeasured confounders and residual confounding, advancing the quality of public health research.

The symposium also featured four prominent speakers who offered their unique perspectives on the application of multiomics data to address unmet public health needs. Prof. Steven Hyman, a distinguished scholar in psychiatric research at Harvard University, explored the intricate topic of "From Genetics to Biological Insight in Schizophrenia, a Paradigmatic Psychiatric Disorder." Prof. Pak Chung Sham, a world-renowned genetic epidemiologist at the University of Hong Kong, shared his insights on "Causal Modeling in Psychiatric Phenotypes." Meanwhile, Prof. Fumihiko Matsuda, a leading researcher in genomic medicine at Kyoto University, addressed "The Role of the Integrative Rare Disease Analysis Platform of Japan RADDAR-J in Elucidating the Pathology of Rare Disorders." Finally, Prof. Cathy SJ Fann, of Academia Sinica, gave a compelling presentation on "Big Data Applications in Genetic Research: drawing from data collected in Taiwan and the UK Biobank."

For the past 30 years, NTU College of Public Health has led the development of public health in Taiwan. As health data analytics is expected to play an important role in improving human health and well-being, this symposium was not only a celebration of the college's achievements but also a fanfare for its ambition to continue leading and making achievements for the next 30 years.



Panel discussing the KP Lecture. From left to right are Prof. Wei J. Chen, Prof. Pak Chung Sham, Prof. Fumihiko Matsuda, Prof. George Davey Smith, and Prof. Yu-Kang Tu.

| GLOBAL OUTLOOK

Cracking Linguistic Puzzles: NTU's Linguistics Legacy on the World Stage

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| The Taiwan team performed well and achieved outstanding results, securing two silvers, three bronzes, and an honorary mention.

Ever since Taiwan's inaugural participation in the International Linguistics Olympiad (IOL) in 2016, Prof. Shu-Kai Hsieh, a dedicated mentor at the NTU Linguistics Institute, has been guiding our young linguists to success on this grand stage. In 2023, linguistics talents from NTU won 2 golds, 11 silvers, 9 bronzes, and 15 honorary awards, showcasing their prowess on the international stage. Notably, three participants earned a place in the prestigious IOL Hall of Fame for their exceptional achievements.

The year 2022 was a milestone; NTU's linguistics talents displayed remarkable teamwork and made exceptional achievements in the team competition. To qualify for the primary training, participants must emerge in the top 10%, with the subsequent stage grooming the top eight for the Asia Pacific Linguistics Olympiad (APLO). NTU's linguistics experts, aided by alumni and former Olympians, provided comprehensive training that went beyond theoretical knowledge, imparting the skills needed to unravel complex linguistic puzzles.



| The 2023 International Linguistics Olympiad was held in Bansko, Bulgaria.

Contrary to common belief, IOL stands apart among high school science Olympiads, blending indigenous language materials into logic puzzles. The competition tests participants' observational, inductive, and deductive skills, as well as their cultural imagination. Past contestants integrated linguistic prowess with diverse disciplines, excelling globally in AI, Computer Science, Mathematics, Medicine, Engineering, and Political Science.

Gao Haoxuan, a three-time IOL Hall of Famer, stresses the invaluable preparation he received at NTU, where linguistic mastery and international camaraderie are fostered. Team competitions, such as the Bunun language-themed escape room designed by NTU students, and enhanced teamwork gave him a competitive edge.

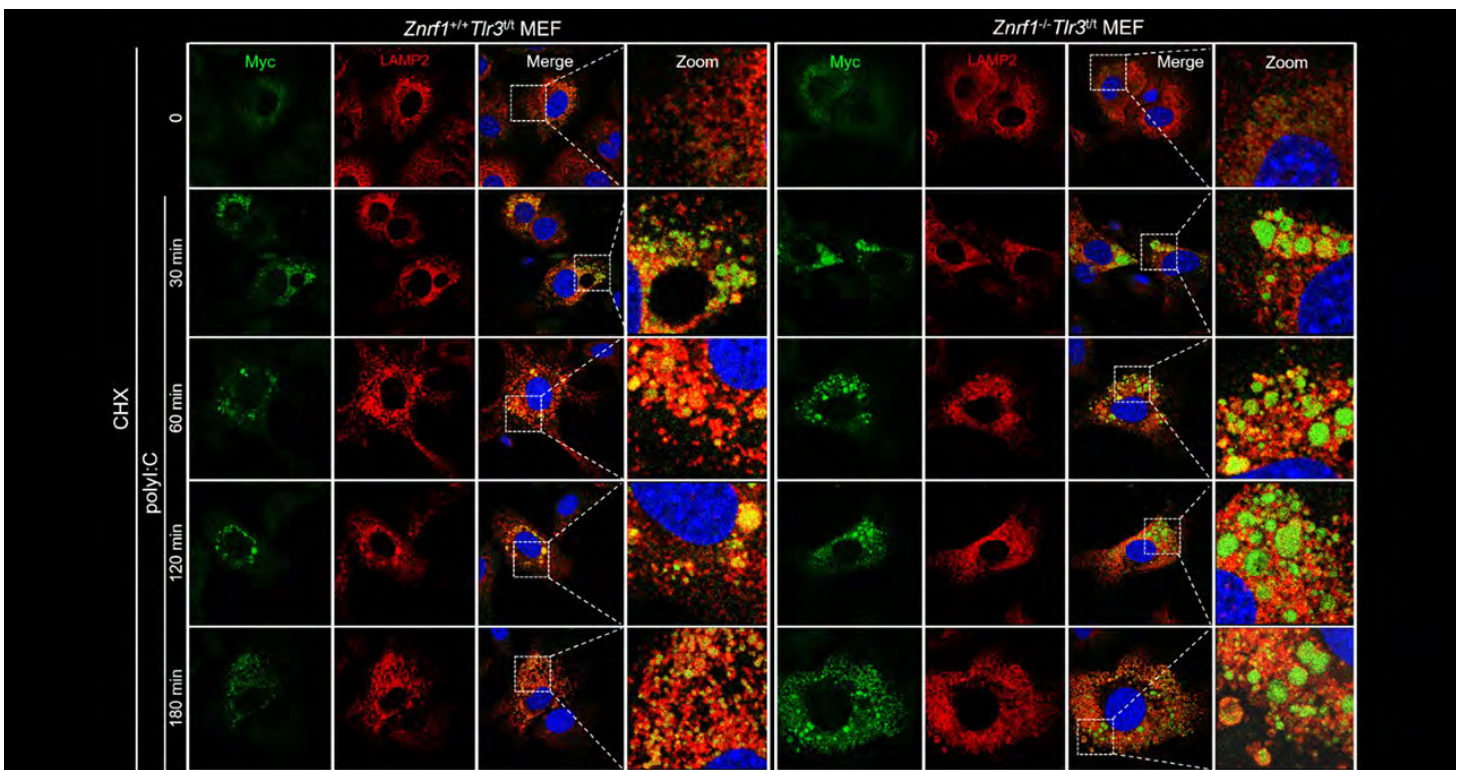
While the Linguistics Olympiad is yet to be fully integrated into Taiwan's talent cultivation framework, annual endeavors receive support from the Department of Pre-college and K-12 Education, LTTC, and other private sponsors. Prof. Hsieh, besides nurturing future linguists, has led initiatives to enhance the allure of linguistics, including producing edutainment videos and founding the Linguists Enthusiast Club at NTU.

Looking ahead to 2025, when the Taiwan Linguistics Olympiad will mark its tenth year, NTU's Linguistics Institute is scheduled to host the 22nd IOL. With an anticipated 300 participants from overseas, the event promises to be a celebration of academic and cultural exchange, showcasing Taiwan's rich and varied linguistic and cultural heritage to the world.

ACHIEVEMENTS

Discovery of the Regulatory Mechanism of Toll-like Receptor 3 Triggering Interferon Production and Viral-induced Respiratory Bacterial Superinfections

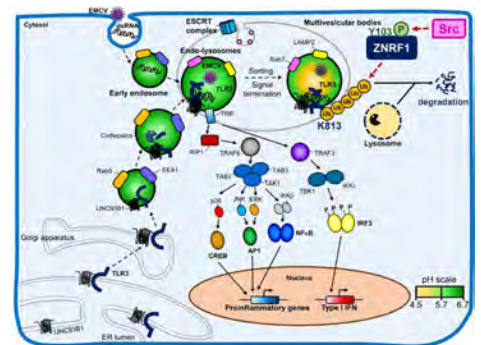
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Immunofluorescence staining adopted to observe how ZNRF1 promotes TLR3 trafficking from endosomes to lysosomes.

The team led by Prof. Li-Chung Hsu from NTU Institute of Molecular Medicine, College of Medicine revealed for the first time the regulatory effect of the ubiquitin ligase ZNRF1 on the immune response mediated by Toll-like Receptor 3 (TLR3). This discovery provides new research directions for the treatment of bacterial superinfections caused by respiratory viral infections.

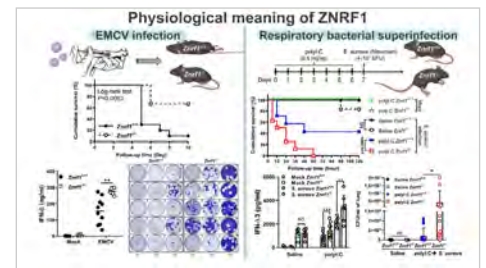
Type I IFN is an important cytokine in the antiviral process, but prolonged interferon production may cause autoimmune diseases. TLR3-driven interferon production is critical for the host to fight against specific RNA viruses. Professor Hsu and the team found that ZNRF1 can promote the trafficking of TLR3 from endosomes to multivesicular bodies/lysosomes, ultimately leading to the



Graphical model summarizing regulation of TLR3 trafficking and type I IFN production by ZNRF1.

degradation of TLR3 and the disruption of interferon production. Mice and cells lacking ZNRF1 can better cope with encephalomyocarditis virus and SARS-CoV-2 infections because they produce more Type I IFN. However, mice lacking ZNRF1 are more susceptible to respiratory bacterial infections caused by viruses, further worsening lung damage.

The first author of this study is Professor Hsu's PhD student You-Sheng Lin, and other members on the team include PhD students Yung-Chi Chang, graduate student Yu-Hsin Ho, physician Chih-Yuan Lee, Dr. Ting-Yu Lai and Prof. Sui-Yuan Chang, Prof. Yi-Ping Hsueh and Prof. Tsung-Hsien Chuang. The research was supported by NTU, the National Health Research Institutes and the National Science and Technology Council. The team will continue to dedicate their effort to conducting research related to the immune regulation of ZNRF1.



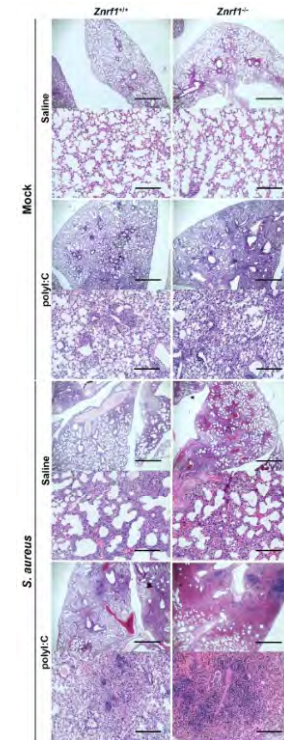
The physiological meaning of ZNRF1, a ubiquitin ligase.



Click or Scan the QR code to visit the website of Prof. Li-Chung Hsu's laboratory.



Click or Scan the QR code to read the journal article in *Journal of Experimental Medicine*.



H&E staining of histological sections of lung tissues.

ACHIEVEMENTS

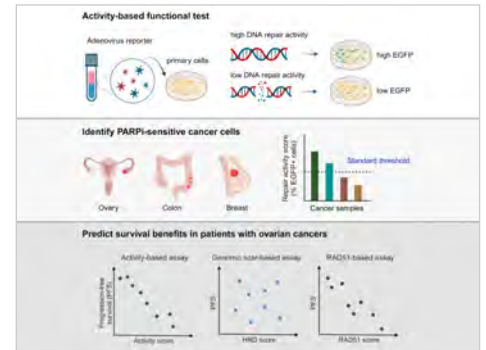
Breakthrough in Real-Time Monitoring of Tumor Cell's DNA Repair Activity

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A team of researchers led by Prof. Hung-Yuan (Peter) Chi from the Institute of Biochemical Sciences at National Taiwan University has achieved a significant milestone by developing a novel adenovirus-based fluorescence method to monitor DNA repair activity in tumor cells precisely. Notably, it has been successfully applied to tumor cells isolated from ovarian cancer patients, demonstrating its potential to accurately predict clinical responses to medication. This breakthrough contributes significantly to the advancement and realization of precision medicine. The research findings have been published in the prestigious scientific journal *Cell Reports Medicine*.

Previous studies have established that pathogenic mutations in BRCA1/2 genes result in reduced cellular DNA repair activity, rendering the cells susceptible to Poly(ADP-ribose) polymerase inhibitors (PARPi). Clinical research has shown that tumor cells from different cancer types, including ovarian, breast, pancreatic, and prostate cancer, exhibit a higher proportion of DNA repair deficiencies and respond well to PARPi treatment. However, conventional genetic testing alone is insufficient for the comprehensive and precise identification of eligible patients. This is because, in addition to BRCA1/2 gene mutations, defects in other molecular mechanisms within the cell can also lead to a decrease in DNA repair activity.

The newly activity-based detection method in this study complements the limitations of genetic testing, providing real-time insights into the DNA repair activity of tumor cells. Furthermore, by analyzing activity values from various types of tumor cells, the research team has identified a standard threshold that can be applied to predict the responsiveness of tumor cells to PARPi in triple-negative breast, ovarian, and colorectal cancer. Notably, in collaboration with the Department of Obstetrics and Gynecology at National Taiwan University Hospital, the research team conducted tests to evaluate the applicability of this detection method to ovarian cancer patients. The results showed that the activity detection method outperforms traditional genetic testing and immunofluorescence staining in accurately predicting the sensitivity of a patient's tumor cells to PARPi. It also effectively distinguishes patients' progression-free survival after frontline treatment. The team's research revolutionized cancer therapy, showcasing the power of innovation and collaboration in medical science.



This research underscores the significance of basic science and the power of collaborative efforts between basic and clinical research in addressing critical medical challenges.



Click or Scan the QR code to read the journal article in *Cell Reports Medicine*.

ACHIEVEMENTS

Exciting Discovery Reveals Link Between Deep-Sea Fish Communities and Changing Seawater Temperatures

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In an interdisciplinary research effort spanning over three years, a team of talented scientists based in Academia Sinica (AS) and National Taiwan University (NTU) has unveiled a significant breakthrough in our understanding of the drivers of deep-fish ecology. The study was led by Assistant Research Fellow Dr. Chien-Hsiang Lin from the Biodiversity Research Center at AS, along with Assistant Professor Dr. Li Lo from the Department of Geological Sciences at NTU, and Associate Professor Dr. Chih-Lin Wei and Associate Professor Dr. Sze Ling Ho from the Institute of Oceanography at NTU and has shed light on the intricate relationship between the structure of tropical deep-sea fish communities and fluctuations in the seawater temperatures.

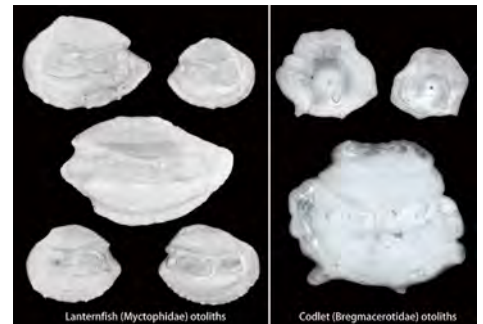


Figure 1. The most abundant fish otoliths found in ODP Hole 1115B, a deep-sea core from the Solomon Sea.

Utilizing exceptionally well-preserved fossil fish otoliths (Fig. 1) extracted from a deep-sea core obtained from the Solomon Sea on the southwest edge of the equatorial Pacific Ocean, the research team meticulously reconstructed the composition of deep-sea fish communities throughout the past 460,000 years. By conducting comprehensive analyses that combined ancient seawater temperature records with fish diversity and abundance, the team uncovered intriguing insights into past deep-sea fish communities.

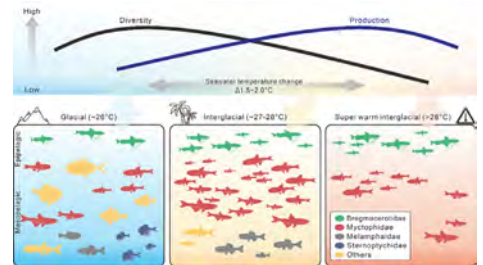


Figure 2. Linkage of deep-sea fish abundance, diversity, and seawater temperature on glacial/interglacial time scales.

The analyses revealed a strong correlation between various fish taxa in the mid-ocean zone and seawater temperature. During the cooler ice ages, fish diversity increased while their overall abundance decreased. Conversely, during the warmer interglacial periods, fish diversity declined while their abundance increased. Furthermore, the team observed that only a few heat-tolerant fish taxa, such as Myctophidae and Bregmacerotidae (Fig. 1), managed to thrive in larger numbers during the warm interglacial periods. The most significant finding that bears implications for future climate under high CO₂ emission is a substantial decrease in fish diversity and abundance in the “super” interglacial environment, where seawater temperatures surpassed present-day levels. The study further revealed distinct tipping-point temperature for fish diversity and abundance, with a notable difference of approximately 2 degrees in the threshold value (Fig. 2).



Click or Scan the QR code to read the journal article in *Science Advances*.

This groundbreaking research represents the first fossil record of fish on such a long timescale and with such high time resolution. Furthermore, it establishes the crucial link between deep-sea fish community and seawater temperatures in the tropics on glacial and interglacial timescales. These findings emphasize the profound sensitivity of deep-sea fish in mesopelagic ecosystems to warming seawater, underscoring the ecological challenges they may face if CO₂ emissions continue unabated. The conclusions of this study thus call for a thorough assessment of potential repercussions on fish communities in the future under different carbon emission scenarios.

ACHIEVEMENTS

Developing an Efficient New Method for Identifying Far-Red Cyanobacteria

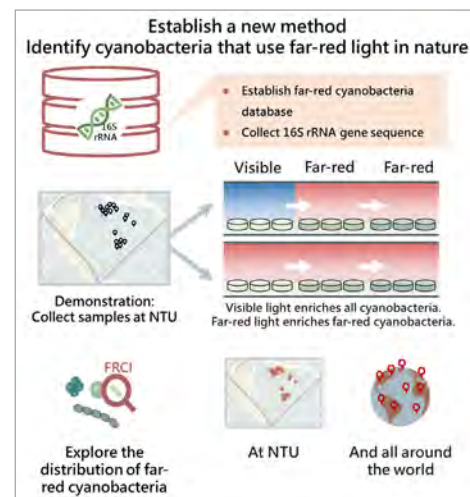
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Associate Prof. Ming-Yang Ho from NTU Department of Life Science and Assistant Prof. Po-Yu Liu from the School of Medicine, National Sun Yat-sen University have collaborated to develop a bioinformatics method for effectively identifying far-red cyanobacteria. Named as “Far-Red Cyanobacteria Identification” (FRCI), this novel method utilizes high-throughput next-generation sequencing technology with higher sensitivity and resolution to better understand the distribution and diversity of these special cyanobacteria in the environment.

Far-red cyanobacteria are a type of bacteria capable of photosynthesis using far-red light, with ecological significance in various ecosystems. Traditional methods struggle to accurately and efficiently identify these strains, especially when they are present in low quantities. FRCI has made significant improvement in this regard, enabling precise identification of far-red cyanobacteria and providing more detailed data, including species, proportions, and their relative abundance compared to other bacteria.

The research team conducted field sample collections, including grasslands and mosses, and applied the FRCI method for analysis. The results revealed the presence of far-red cyanobacteria in various locations on the NTU campus, with FRCI demonstrating its clear advantage in identifying low quantities of these cyanobacteria. Furthermore, the team used FRCI to identify far-red cyanobacteria in sequencing data from soils, deserts, hot springs and intertidal zones worldwide, contributing to a better understanding of the distribution of these organisms in ecosystems around the globe.

This research provides a new tool for the identification of far-red cyanobacteria, offering valuable insights for environmental science and ecology studies.



Establishment and verification of methods for exploring far-red cyanobacteria.



The authors include Ming-Yang Ho (second from the left on the front row), Ying-Yang Li (third from the left on the front row), Pa-Yu Chen (second from the left on the back row) and Jui-Tse Ko (third from the left on the back row).



Click or Scan the QR code to read the journal article in *Molecular Ecology Resources*.

TEACHING & LEARNING

Charting the Future of Neuroscience: First Brain Bank in Taiwan

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The inauguration ceremony of the Taiwan Brain Bank. In contrast to numerous government-driven brain bank initiatives in other nations, the Taiwan Brain Bank is founded on the altruism of patients, adding a profoundly human dimension to its mission.

After six long years of dedicated preparatory work since 2017, NTU has finally established Taiwan Brain Bank, an initiative aimed at building a comprehensive database of tissue samples to advance domestic medical research. This landmark project, the first of its kind in Taiwan, not only complies with rigorous government regulations but also meets the highest global standards, thus joining the ranks of the 150 brain banks worldwide.

The endeavor to set up a brain bank in Taiwan is unprecedented, considering that numerous such attempts fell short during the past three decades. Inspired by the generosity of patients willing to donate their brains posthumously and the appeals of patient organizations, Prof. Sung-Tsang Hsieh of the NTU College of Medicine led a dedicated working group. Through active communication and coordination with the relevant authorities, the team navigated challenges posed by outdated domestic laws and regulations, coupled with institutional shortcomings.



From left to right: NTU College of Medicine Prof. Sung-Tsang Hsieh, Taiwan Spinocerebellar Ataxia Association Director Suei-Ping Jhu, NTU College of Medicine Dean Yen-Hsua Ni, Minister of Health and Welfare Jui-Yuan Hsueh, Premier Chien-Jen Chen, NTU Executive Vice President Shan-Chwen Chang, NTU Hospital Vice Superintendent Yi-Ru Lai, and National Health Research Institutes President Huey-Kang Sytwu.

Ultimately, they secured approval from the Ministry of Health and Welfare to establish Taiwan's first Brain Bank in 2023, adhering to governmental regulations and meeting the high standards set by advanced countries.

In the preparatory phase, NTU engaged foreign brain bank experts to ensure that the brain bank's hardware and engineering truly met international standards. The establishment of the brain bank ensures that neuroscience research teams will have access to vital neural tissues, facilitating exploration into disease mechanisms and aiding in the research and development of new drugs. The bank will gather neural tissues from individuals with rare diseases, neurodegenerative diseases, as well as healthy individuals.

Vice President Shan-Chwen Chang, who actively supported the Brain Bank's establishment since beginning his tenure as the Dean of the Faculty of Medicine, lauded Prof. Hsieh's dedication. Expressing utmost respect and gratitude, he emphasized that the Brain Bank's establishment signifies a great leap forward for brain science research in Taiwan. He called for the continued support of all sectors of the community to ensure the Brain Bank's smooth operation and fruitful outcomes.

To repay the kindness of its many donors, Taiwan Brain Bank is determined to be a crucial player in furthering research on brain diseases specific to Asia, as well as developing more efficient therapeutic drugs. Taiwan Brain Bank stands not only as a crucial academic research organization but also as a substantial contribution to the maintenance of human health.



Click or Scan the QR code
to learn more about
Taiwan Brain Bank.

TEACHING & LEARNING

Empowering Leaders of the Next Generation: Innovative Program in Disaster Risk Reduction and Resilience

Share:     



| Instruction during an experiment session.

Global climate change has produced an increased frequency and scale of disasters, marked by complex and interconnected factors and effects. There is a pressing demand for experts with cross-disciplinary knowledge who can meet the intertwined socio-ecological challenges in an evidence-based and socially conscious manner.

Due to her distinctive geographical location and geological features, Taiwan faces a multitude of hazards. Disjointed land development and extreme weather conditions have resulted in increasingly severe and complex challenges, leading to serious damage and heavy losses. However, these environmental factors and effects have also led to the development of exceptional expertise in science, technology, and governance in Taiwan, constituting our resilience in the face of social and ecological challenges.



| Discussion during an experiment session.

To cultivate a global perspective and competence in future generations for addressing these upcoming challenges, the International College of National Taiwan University has inaugurated a new international Master's Program in Disaster Risk Reduction and Resilience (MDR³) in 2023. This pioneering program has recruited faculty members from the atmospheric, engineering, geographical, environmental, and social sciences. It is the first program of its kind to combine natural and social sciences as well as bridge the gap between research and teaching. The curriculum is designed to equip students with a holistic understanding and capability in such emerging fields as intelligent disaster prevention and management, loss and damage assessment, nature-based solutions, and resilience planning for climate justice.

MDR³ has established partnerships with several overseas and domestic institutions, including the National Science and Technology Center for Disaster Reduction (NCDR), which stands at the forefront of risk and resilience management in Taiwan. These partnerships offer numerous opportunities for collaborative lectures, international exchanges, field trips, internships, and scholarships. Through nurturing an international, multicultural, interdisciplinary environment, our goal is to cultivate young talents and leaders of the next generation who will bridge the gap between research, policy, and practice to contribute to realizing a more sustainable and resilient future.



| Operating drones in class.



| Drone demo session.



Click or Scan the QR code to visit the website of MDR³ and learn more about the program.

I TEACHING & LEARNING

Office of Future NTU Initiatives: Nurturing Tomorrow's Leaders

Share:     



The inauguration ceremony of the "Office of Future NTU Initiatives." From left to right: NTU Executive Vice President Wang-Ruu Tseng and Shih-Torng Ding; Minister of Education, Wen-Chung Pan; NTU President Wen-Chang Chen; and Vice President for Academic Affairs Hung-Jen Wang.

National Taiwan University (NTU) marked a major milestone in advancing the Ministry of Education's "Future University Project" by inaugurating the "Office of Future NTU Initiatives" last September. This newly established "initiative office" will work to instill the ethos of the future university within NTU, focusing on implementing the concept of a "learner-centered open university." Externally, the office will actively disseminate this future university vision among universities and colleges around Taiwan by holding forums and workshops to spark conversations within the higher education sector concerning the cultivation of future talents.

The inauguration ceremony was graced by Minister of Education Wen-Chung Pan. In his remarks, Minister Pan emphasized the pivotal role of higher education in nurturing the nation's future talents and his optimism that NTU will create and experiment effective progressive educational programs to nurture world-class talents. He stressed, "It is my hope to see NTU share its experience in the Future



Bing-Yu Chen, Dean of D-School (first right), explaining the progress of the Future University Initiatives-related programs.

University Initiatives with universities across Taiwan, revolutionizing higher education in Taiwan and turning this project into a wellspring of vitality for the nation's future universities.”

NTU President Wen-Chang Chen noted that NTU launched the Future NTU Project in 2019, with breaking down the barriers between academic departments and championing a "learner-centered open university" as its core strategic direction. This approach is aimed to empower students to explore core curricula across the university based on their areas of interest, then chart unique personal learning journeys according to their aspirations using various university resources. NTU will continue to rally for this future university vision and strive to adopt suitable innovative educational ideas.

To help the leaders of domestic universities understand the concept and practices of Future Universities, the NTU Future University Forum on "Higher Education Curriculum Reform" was held on last October. Experts and scholars from overseas as well as domestic institutions were invited to share their experiences in curriculum reform and innovative practices in talent development. The forum organizers warmly welcomed participation from education institutions across Taiwan to raise awareness and foster meaningful discussions.



NTU representatives presenting key Future NTU Initiatives, including the College-level and University-level Interdisciplinary Bachelor's Programs, Trans-disciplinary Bachelor Degree Program, Specialization Program, NTU AR (Alumni Return & Recharge), Future Classroom, and NTU Academic Advising Office.

| People

Uniting for Impact: Showcasing Social Responsibility Initiatives at Taiwan Universities

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During the past six years, the University Social Responsibility (USR) Program has reached many remarkable milestones. The first step of the “2023 Exhibition of Engaged Scholarship” was in Northern Taiwan. Organized by the National Taiwan University System and five universities, the exhibition features over 60 different booths, which beautifully illustrated the myriad facets of social responsibility initiatives across academia.

Dedicated to "Working Together for Sustainability," the event team meticulously curated the exhibition in paperless, digital fashion. Visitors could effortlessly access information through a cloud-based folder, register for workshops online, and engage in interactive games via mobile apps, all in keeping with the sustainable development goals of university social responsibility.



The NTU booth at the Northern section of the 2023 Exhibition of Engaged Scholarship, organized by the NTU System.

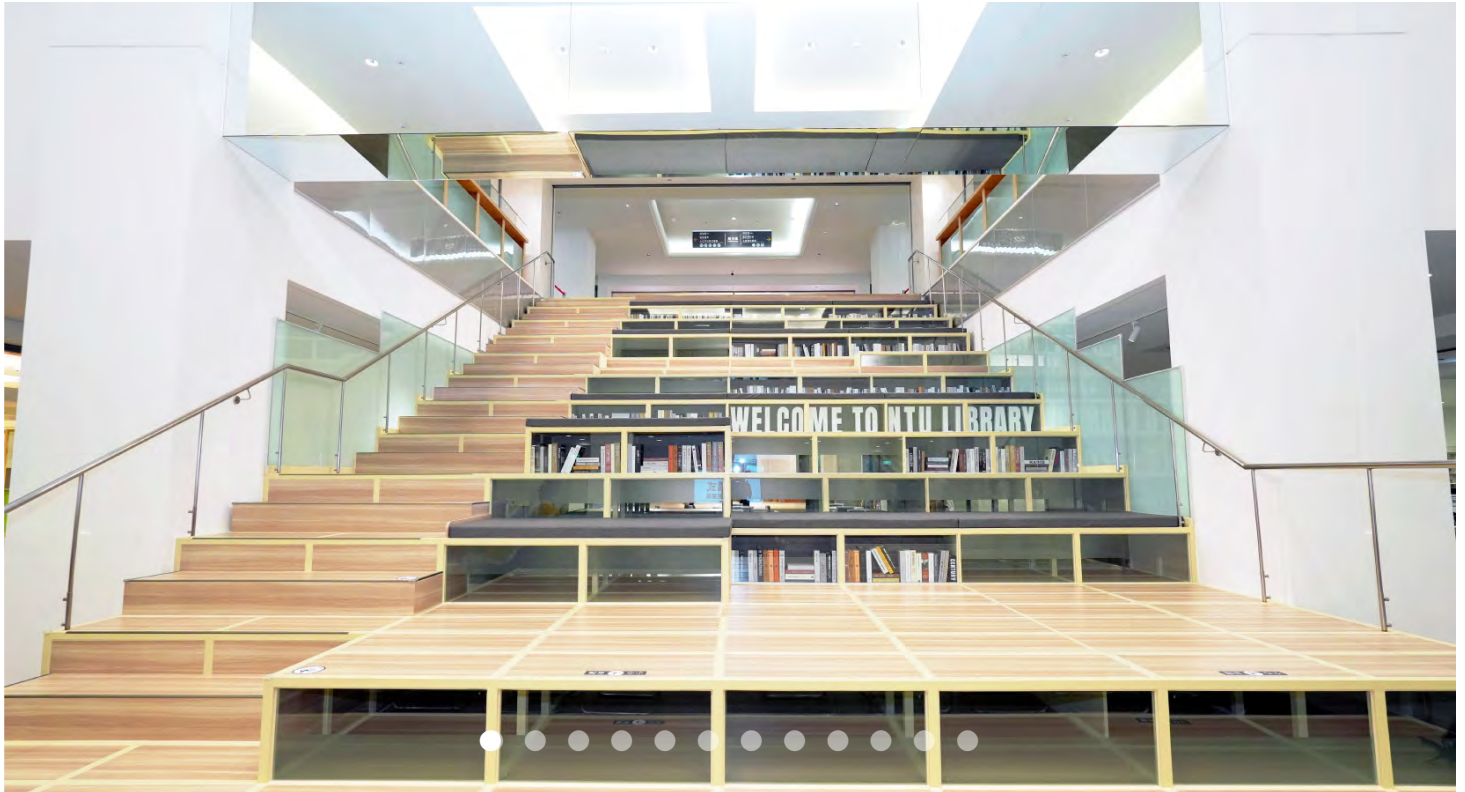
The exhibition not only showcased the collective results of the USR program but also carried profound educational implications. Visitors had the opportunity to gain in-depth insights into the distinctive features of each action plan and sustainability goal through the on-site exhibits and detailed orientations provided by the USR partners. This immersive experience heightened the participants' awareness of social responsibility and inspired more to participate.

For newcomers, the exhibition served as a unique platform where over 30 schools converged to convey a renewed meaning of "applying what was learned." Simultaneously, it shed light on the pressing social issues that each university is committed to addressing, facilitating students in making well-informed decisions in their future academic journeys.

| People

Brand New Ground Floor of the Main Library Inaugurated

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NTU Main Library commenced operations in the heart of campus in 1998, offering resources and support to countless readers over the past quarter century. However, due to structural limitations of the building, the library was unable to provide many innovative library services. To remedy this situation, the Operational Planning Committee was set up in 2014 to develop a space and service remodeling plan for NTU Main Library, under three guidelines: sustainable use, flexible space utilization, as well as diverse and innovative services.

In 2022, Mr. Nan-Chiang Hsieh, an alumnus of the Department of Economics, made a generous donation to support the renovation of the main hall on the ground floor. Named “Zhi-Qiang Hall” by Mr. Hsieh, the hall was inaugurated in the middle of last year. Through this name, which means “put learning into practice and stay grounded with dignity and self-reliance,” Mr. Hsieh expressed gratitude to his alma mater.



The new main staircase welcomes all readers with an uplifting visual impact; the see-through structure admits sunlight from the rear windows for enhanced lighting. The exhibition area is located above the staircase and the reading area is located below.

Unlike the quiet earth tones of the existing library, the newly inaugurated Zhi-Qiang Hall has a bright interior that opens up to the view of the campus and natural daylight, enhanced by white walls and light-colored wooden furniture. The key elements of the renovation design include the new main staircase, Service Counter, Digital Media Commons, Collaboration Commons, and Leisure Reading Area. We look forward to everyone coming to this new space to seek the pleasure of reading and feel inspired in their research. Welcome to the new ground floor of NTU Main Library!



On the left is the Collaboration Commons designed with a modular structure to allow flexible use of the space. Besides having group discussions and studying, readers can take a break in the Leisure Reading Area or browse through a special collection of graphs as well as photos of past events.



On the right sit the Service Counter and Digital Media Commons. Besides re-integrating service circulation for improved convenience, readers can enjoy a collection of audio-visual resources, such as movies and music, in the Digital Media Commons.

| People

95th Anniversary to Unveil Centenary Vision: Recognizing Contributions and Talents while Moving towards a Smart Sustainable Campus

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NTU held a ceremony to celebrate its 95th anniversary last November. The ceremony awarded an honorary doctorate to Mr. Yung-Tsai Cho, President of HIWIN Technologies Corp., as well as commending 10 outstanding alumni and presenting the Student Social Contribution Award.

The Student Social Contribution Award was presented to Ko-Shuan Shao, Yu-Chi Wang, Pei-Chen Shi, and TIWACT, a transnational education program, in recognition of their outstanding achievements in social services and altruism. A variety of student activities, art performances, and guided tours were also organized for the anniversary celebration, including alumni lectures, percussion recitals, hydrological history exhibitions, etc. Each college took the initiative to host events, such as alumni gatherings, academic lectures, and seminars.



President Yung-Tsai Cho (left) has made outstanding contributions to the innovation and development of the precision machinery industry in Taiwan. His company HIWIN Technologies Corp. is a leading brand in the global power control sector. He is also committed to industry-university cooperation and talent cultivation.

NTU will observe its centennial anniversary in 2028 and has officially launched a series of events in celebration. Many plans have been proposed to realize NTU's commitment to cultivating leaders, promoting the development of civilization, and contributing to society and the country:

Commending 100 Major Contributions

Starting this year, 20 contributions NTU members have made to the world or Taiwanese society will be selected every year. The contributions will be divided into three categories: Academic Excellence, Industrial and Business Achievements, and Social Contributions. The stories of these contributions will be compiled into a series of books titled *NTU: A Hundred Years of Glory*.

Recruiting Outstanding Faculty Members by Creating a High-quality Environment

NTU actively recruits talents through the Outstanding Chair Professorship, which works is complemented by the Ministry of Education's Yushan Fellow Program, and the National Science and Technology Council's Outstanding Talents. To help retain key faculty members, flexible salary, performance rewards, and Excelsior Chair Professorships, as well as strengthened cross-disciplinary cooperation and research programs have been implemented.

Enhanced R&D and International Cooperation

NTU aims to optimize its research environment, strengthen international cooperation, establish dedicated centers, as well as target key areas through the NVIDIA-NTU Artificial Intelligence Joint Research Center and the Ying-Shih Yü International Center for History and the Chinese Humanities. Additionally, the NTU Royal Palm Lecture Series and Raymond Soong Top Research Lecture Series have been launched to promote the sharing of knowledge and experience.

Smart and Sustainable Campus

NTU is promoting the "Smart Sustainable Campus" plan to improve network systems, implement circular sustainability and green electricity solutions, renovating buildings on campus, as well as completing many construction projects by 2028, notably the Min-Sheng Nursing and Health Building and a cutting-edge medical research building.

Centennial Memorial Hall

Centennial Memorial Hall with sustainable features will be constructed as a model of sustainable architecture, including a social contribution exhibition room and a multi-functional arts and culture activity space.

<https://ntubeats.ntu.edu.tw/enews/005>



The 10 recipients of the Outstanding Alumni Award.



Rena Yokogawa of the Department of Sociology, co-founder of TIWACT, giving a presentation on behalf of the recipients of the Student Social Contribution Award.



The centennial slogan "A Century of Perseverance Preluding a Century of Prominence" marks the official launch of the centennial series events.

| People

On Display: Revitalized Taivoan Embroideries

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The special exhibition “Patah Ki Hima. Raan Ki Tara – Colorful Taivoan Needlework,” curated by the NTU Museum of Anthropology and the Siaolin Community Development Association based in Jiashian District, Kaohsiung City, will be on display until February 3, 2024. This exhibition showcases the beauty of traditional Taivoan embroidery and highlights the efforts of the Taivoan people to revitalize their culture.

At the opening ceremony for the exhibition, Associate Prof. Kai-shyh Lin, Director of the NTU Museum of Anthropology, affirmed that the museum actively displays indigenous artifacts as a medium through which the public may connect with the indigenous peoples and their culture, supporting the tribes’ cultural revitalization in the process. He shared that some Taivoan elders told him that making these embroideries with dedication encourages future generations to wear them with pride, thus taking pride in their own culture and passing it on.



Members of the Taivoan tribe praying at the opening of the exhibition.

The Taivoan is one of the Plains Indigenous peoples in Taiwan, originally settling around Tainan City. Since the 18th century, 29 additional tribes were established along the Wu Mountains due to influx of the Han Chinese and Siraya people. Today they mainly live in the hills and valleys of Kaohsiung and Tainan counties. Some of their ancestors later migrated eastward to Hualien and Taitung.

President Wen-Chang Chen remarked in his speech that NTU has had close interactions with indigenous peoples due to its long history, experimental forests, and farms. He observed that the languages, music, and handicrafts of Taiwan's indigenous peoples are invaluable cultural assets, and the Museum of Anthropology on campus has long displayed historical artifacts from indigenous tribes. He added that NTU will support exchanges between the Museum of Anthropology and museums in similar fields overseas so that people elsewhere can discover and appreciate Taiwan's unique indigenous cultures.

NTU Museum of Anthropology received a group of elders from the Siaolin tribe, originally located in Siaolin Village, Jiaxian District, Kaohsiung City, for the first time in 1999. The visit became the foundation of a cordial long-term partnership. In 2009, Typhoon Morakot devastated Siaolin Village. After reconstruction, the tribesmen faced difficulties in rebuilding their community in an unfamiliar environment, living separate lives. However, they have devoted themselves wholeheartedly to the revival of Taivoan culture and remain optimistic about the future.



Inspired by *Threads of Splendor - Taivoan Pingpu Clothes and Embroidery Collections* by Prof. Chia-yu Hu, Department of Anthropology, and personally encouraged by her, members of the Taivoan tribe began to rediscover their traditional needlework-- stitch by stitch integrating the beautiful culture of embroideries into their daily life and passing it on to the next generation.



Members of the Siaolin tribe visiting the Museum of Anthropology to inspect artifacts with Prof. Chia-yu Hu (third left), in 2015. (Photo credit: Siaolin Community Development Association)

| People

Play and Learn: The “Operation Egg Industry Transformation” Board Game AR Experience

Share:     

“Have you heard of cage-free eggs?”

Chia-Chi Tsai, CEO of Talent Field, a community placemaking¹ enterprise based in Chiayi, was invited by NTU D-School to share innovative methods for initiating discussions on egg issues with the students. Starting with a question, her answer led to the launch of the “Operation Egg Industry Transformation” board game. That’s right, she creates a “game” to help young people and adults understand the importance of transforming the egg industry.



Students playing the “Operation Egg Industry Transformation” board game.

Issue Gamification: A New Form of Community Awareness-raising

Tzu-yi Hsu, the Operations Planning Manager at D-School and organizer of the event, said that this was the first time any of the students had played a board game that integrates public issues--in hopes of opening new horizons for problem-solving. Before the students started to play the game, Tsai explained the issues behind the game to them, that is, the inhumane treatment of laying hens at conventional chicken farms, the food safety crisis caused by drugs used on the chickens, the dilemmas faced by Taiwanese chicken farmers in the context of global competition, etc., showing the students how issues can be transformed into games so people can learn about the issues while playing the games.



Scan the cards for detailed introduction to the topic.

“This is not a very fun board game,” Tsai joked, since the players are learning while playing. However, the students said exactly the opposite in their feedback. Scott and Ray, students majoring in International Business at NCCU, threw themselves into the game and played enthusiastically. Afterwards, they couldn’t stop browsing the cards on their tablets to see more of the beautiful AR images and gather more information on the issue. Scott remarked, “I think the game’s degree of completion and issue integration are very high.” He believes that “Operation Egg Industry Transformation” employs traditional card and grid mechanisms, allowing players to gain knowledge while excitedly playing and completing the game.



Speaker Chia-Chi Tsai introducing egg issues and how they inspired her to create the board game.

Intrigued? You Can Follow in D-School's footsteps!

In 2020, D-School launched “Game for Life: Reading and Re-designing Games for a Purpose,” a course aimed at showing students how to translate issues they care about or knowledge into games for the public. Instructor Tsai said she hopes to recruit students from different disciplines to brainstorm together, share their expertise with game interactions, and design innovative user experiences. She will work with the School of Occupational Therapy next semester to offer a class on board game design for elder players.

Having taken D-School's Introduction to Social Design, Scott strongly recommended other D-School courses to Ray. He also had an in-depth discussion with speaker Tsai on the issue of raising laying hens. The game allows for player feedback on the issues, confirming the effectiveness of this new approach to communicating issues.

¹Placemaking means designing public spaces, old streets (laojie) and city squares, that are comfortable, safe, and accessible for all members of the community, regardless of age, ability, or socioeconomic status.