National Taiwan University in FOCUS

2023-2024

NATIONAL TAIWAN UNIVERSITY IN FOCUS

2023-2024


圖書館

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From the Desk of President Chen

In the 21st century, with ever-rapid technological advancement and global changes, the challenges confronting higher education are greater than ever. To adapt to our changing world, NTU faculty, students and staff are continuingly working together to foster a world-class university that not only honors our past century of accomplishments, but also propels us into a new era. As pioneers of research and education, we will build a sustainable, inclusive future where diversity is celebrated.

As Taiwan's most comprehensive university, NTU has influenced all levels of society in Taiwan. In this report, each aspect demonstrates how we assiduously serve this great institution under the university's motto of "integrity, diligence, fidelity and compassion." In accordance with the United Nations' Sustainable Development Goals (SDGs), we uphold NTU's social responsibility by creating a sustainable campus. All of NTU's sustainability actions are geared toward our goal of achieving carbon neutrality by 2048.

To seize opportunities arising from major global trends, we have advanced research in key international fields. NTU excels in semiconductor research and development by bridging the gaps between academia and industry. Much of our research also emphasizes sustainability, as faculty work to conserve wildlife populations and improve green energy. By advancing research in areas of global concern, NTU contributes to a brighter tomorrow.

At NTU, we believe we are stronger when we work together across borders and backgrounds. We promote comprehensive internationalization to encourage diversity, equity, and inclusion. With over 600 partner institutions around the world, students have ample opportunities, from exchange programs to internships, to pursue experiences abroad. We continue to establish new programs and partnerships that further enhance the international mobility of our faculty and students and invite more international scholars to our campus. These initiatives have raised our international visibility and global influence.

This year, NTU began revolutionizing higher education in Taiwan. The inauguration of the Office of Future NTU Initiatives symbolized the start of a learner-centered open university. This initiative promotes interdisciplinary and flexible learning beyond the traditional boundaries of the classroom and department. Such an initiative will cultivate leaders with critical thinking skills who are trained to overcome obstacles by integrating interdisciplinary resources.

As our centenary approaches, NTU faculty and students will continue to cherish their ideals and pursue their dreams. Equipped with diverse knowledge and global experiences, they will create a better future for the world.

Wen-Chang Chen

Prof. Wen-Chang Chen
President, National Taiwan University

NTU Focus Data

- Established in 1928 and renamed National Taiwan University (NTU) in 1945. Today, NTU is recognized as one of Asia's top comprehensive research universities.

- 34,000+ students
- 5,700+ faculty members
- 16 colleges
- 60 departments
- 152 graduate institutes
- 100+ research centers

GLOBAL NTU

- 6,000+ international students from 77 countries, comprising 17% of all students
- International faculty members: 11%
- 1,500+ visiting students from overseas, with an annual growth of 11.5%
- 640+ partner institutions in 67 countries
- Exchange students from 400+ schools in 52 countries
- 670+ study abroad programs
- 100+ dual degree programs in 20 countries

QS WORLD UNIVERSITY RANKINGS

- QS World University Rankings 69 (2024)
- QS Asia University Rankings 21 (2024)

THE IMPACT RANKINGS

- THE Impact Rankings 2023: 67
- THE World Reputation Rankings 2022: 91-100

TOP RESEARCH

- Ranks in top 1% of the world in 19 Essential Science indicator metrics
- 800+ highly cited papers
- Citation increased by 200% in the last decade

EMPLOYABILITY

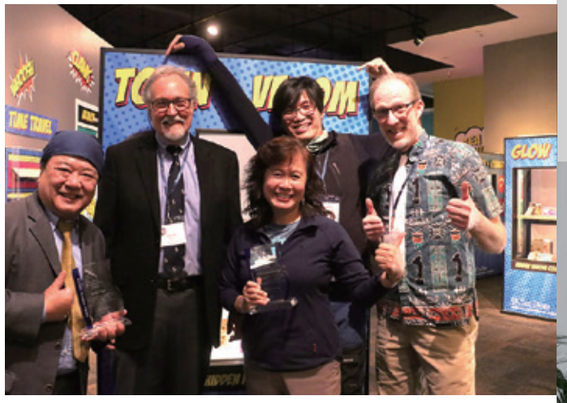
- QS Graduate Employability Rankings 2022: 51
- THE Global Employability Rankings (2023-2024): 80

HONORS

President Wen-Chang Chen receives an honorary doctorate from Université Grenoble Alpes (UGA) in recognition of his academic excellence and UGA's partnership with NTU.

Professor Chih-Yuan Lu of the Department of Physics receives the 2024 George E. Pake Prize in recognition of his outstanding research, which catalyzed the growth of Taiwan's semiconductor industry.

Professor Hsiao-Wei Yuan of the School of Forestry and Resource Conservation receives the 2023 Pacific Seabird Group Special Achievement Award in recognition of her environmentalist research on the Chinese Crested Tern.



The "Epsilon 4" race car, designed by the NTU Racing student organization, receives 5th place in the Formula SAE Australasia business presentation category and the Most Impressive Student Award.

Students from the Department of Finance win the Taiwan regional championship in the CFA Institute Research Challenge.

Professor Pisin Chen of the Department of Physics receives the 2023 Hannes Alfvén Prize in recognition of his groundbreaking research on plasma wakefield accelerators.

Professor Pao-Kuan Wang of the Department of Atmospheric Sciences receives the 2023 Nikolai Dotzek Award in recognition of his research on severe storms, which improved weather forecasting and climate simulation.

President Tsai Ing-wen congratulates the Taiwan team "TWN48" who won third place in the Capture the Flag competition at the DEF CON 31 World Hackers Conference.

Research to Advance Us

- Engineering and Technology
- Medicine and Life Sciences
- Natural Sciences
- Humanities and Social Sciences

Engineering and Technology

“TaidaFloat”

A Milestone in Taiwan's Offshore Wind Industry

Professors Mao-Hsiung Chiang and Kai-Tung Ma designed a floating platform that can support the offshore installment of ultra-large wind turbines in Taiwan. The design has been certified by the American Bureau of Shipping (ABS).

This platform, named “TaidaFloat” (“Taida” is a phonetic shorthand for “NTU”), is designed to support a 15 MW wind turbine. It is a semi-submersible platform with a distinct shape, made of 100% flat panels. This simplifies the fabrication process, greatly reducing construction time and cost.

The TaidaFloat project is supported by industry partners including the CSBC Corporation Taiwan and Ship & Ocean Industries R&D Center. The design received an Approval in Principle from ABS, marking a milestone for Taiwan in offshore wind energy. NTU strives to support the government and industry to achieve 20 GW offshore wind power by 2035 and net-zero carbon emission by 2050.

left TaidaFloat platform and mooring system, designed to carry a 15 MW wind turbine.

01 Scaled model of the TaidaFloat undergoing a tank test at NTU.

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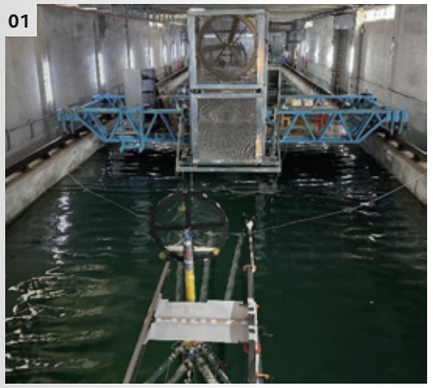
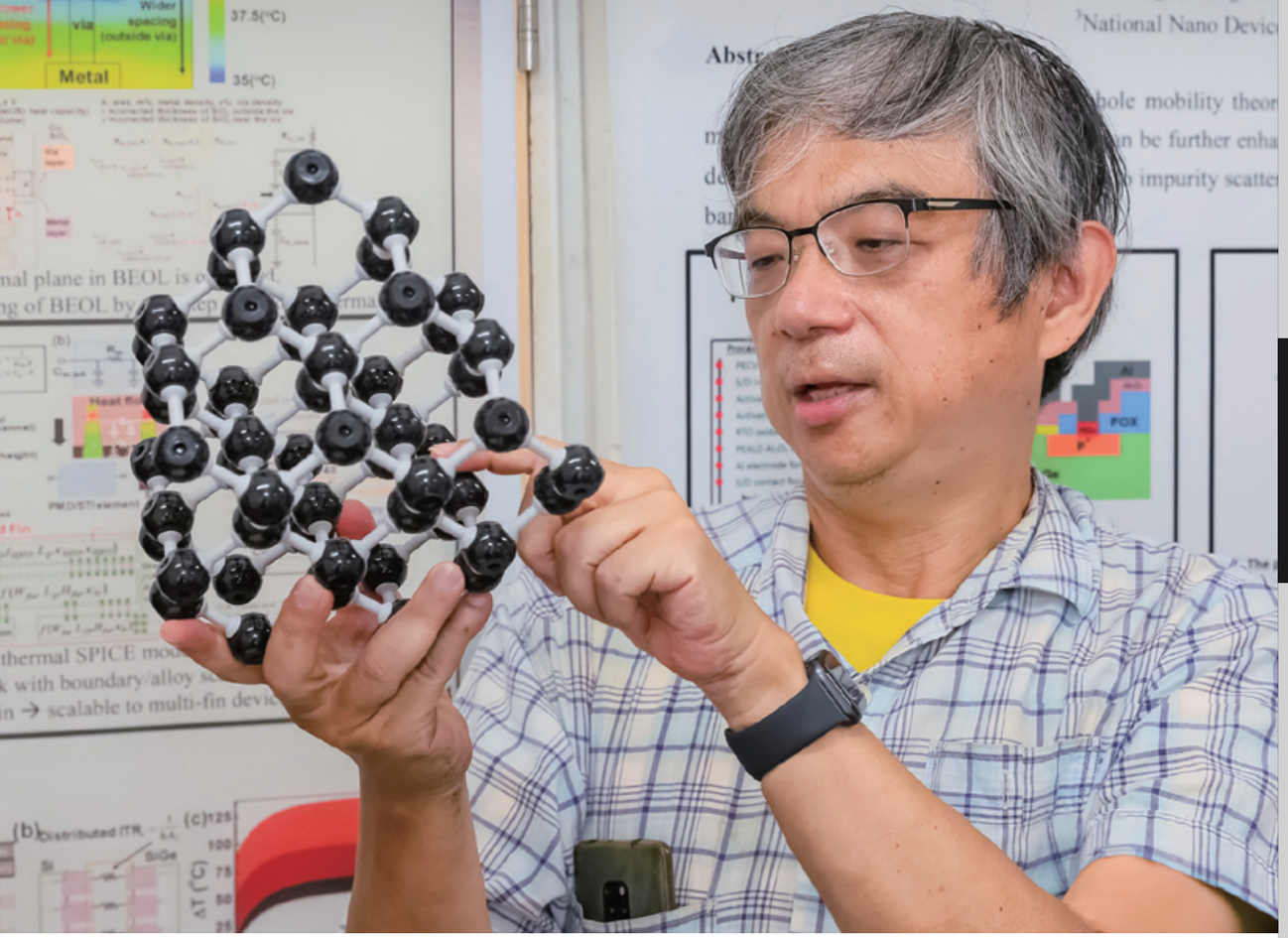
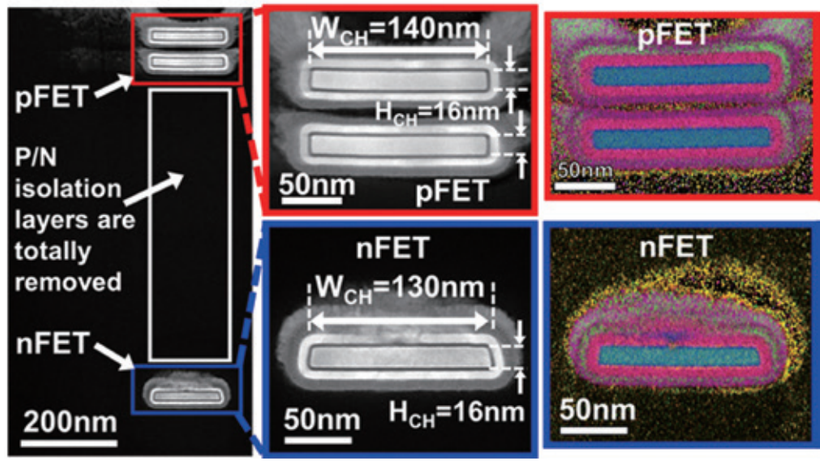




Presenting Innovative Research at Preeminent Semiconductor Conferences

Professor Chee Wee Liu's research team from NTU's Graduate Institute of Electronics Engineering (GIEE) has presented nearly 50 papers at the world's most prominent electronic device conferences: IEEE International Electron Devices Meeting (IEDM) and IEEE Symposium on VLSI Technology. Their 2021 VLSI paper was a highlighted paper and reported in Nature Electronics Research Highlights. Their 2021 IEDM paper received the Roger A. Haken Best Student Paper Award, the first time a Taiwanese student received this. At 2023 IEEE Symposium on VLSI Technology, Professor Liu's group presented five papers, setting a record for educational institutions in Taiwan.

To pursue beyond A5 (0.5nm) technology nodes (based on the imec roadmap), the team worked on complementary FET (CFET). They presented these results at 2022 and 2023 IEDM. Beyond nanosheets, the CFET architecture can stack pFET and nFET vertically in one transistor footprint (Figure 1). The transistor stacking serves as the driving force to continue Moore's law. At 2023 IEDM, his team reported the first heterogeneous nanosheet high mobility channel (HMC) CFET. The dual channels are used to individually optimize each transistor. NTU was the only university to demonstrate monolithic transistor stacking with industries (imec, Intel, CEA-Leti, Samsung, and tsmc) in the "3D Stacked Transistors" session at 2023 IEDM.



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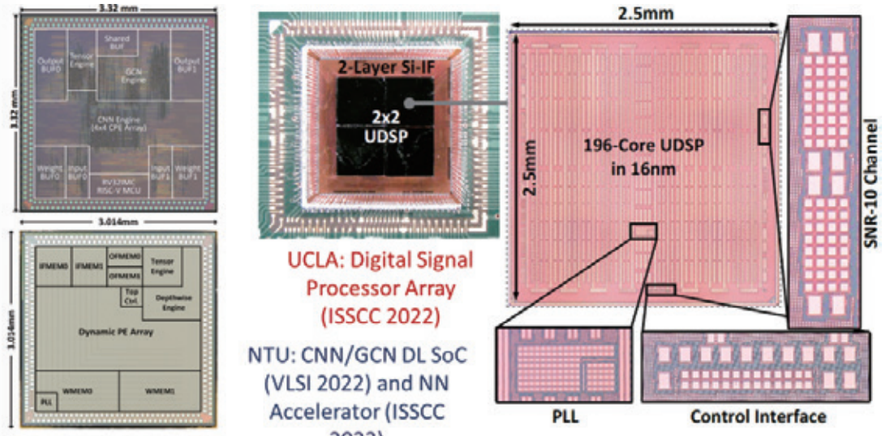
01 Successful fabrication of the world's first monolithic self-aligned high mobility GeSi nanosheet CFET. [5] (©2022 IEEE)

Full text



UCLA: Digital Signal Processor Array (ISSCC 2022)

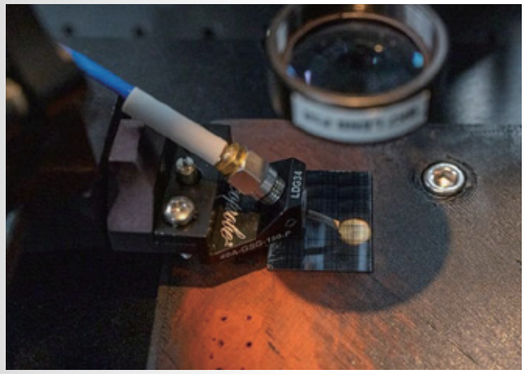
NTU: CNN/GCN DL SoC (VLSI 2022) and NN Accelerator (ISSCC 2023)

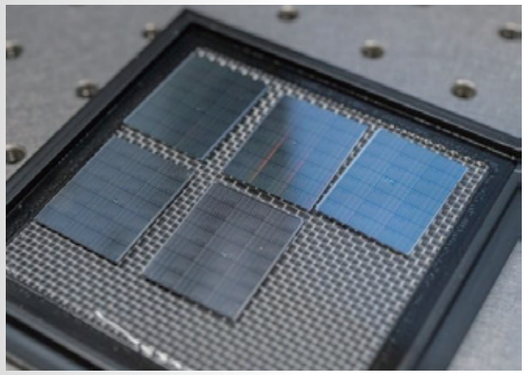
US and Taiwan Join Forces to Advance Semiconductor Technology

In 2023, the Taiwan National Science and Technology Council (NSTC) and the US National Science Foundation (NSF) launched the Advanced Chip Engineering Design and Fabrication (ACED Fab) program to support US-Taiwan joint research in semiconductors. Four of NTU's research teams were awarded funding through this program. These collaborative efforts combine Taiwan's advanced semiconductor technology with the US's strengths in architecture and software.

Professor Chia-Hsiang Yang is collaborating with the University of California-Los Angeles (UCLA) to develop an artificial intelligence and machine learning computation chip based on a runtime reconfigurable array (RTRA) architecture. Professor Chee Wee Liu is partnering with Stanford University to develop in-memory computing chips based on magnetoresistive random access memory (MRAM). Professor Huei Wang is collaborating with the University of California-Davis (UC-Davis) to develop a miniaturized, low-noise, infrared spectroscopy system based on CMOS-MEMS technology. The system is expected to have applications in cutting-edge cancer detection. Professor Chun-Hsing Li is working with the University of California-Berkeley (UC-Berkeley) to realize a lower-cost, energy-efficient next-generation 240 GHz radar system, which will offer higher angular resolution and larger Multiple Input Multiple Output (MIMO) arrays for full spectral imaging, 6G wireless communication, autonomous vehicles, 3D sensing and more.

NTU plays a pivotal role in Taiwan's semiconductor industry. The University is committed to promoting more international collaborations and attracting more international talents for semiconductor research and education.





left Professor Huei Wang and his team. They have extensive experience in the field of microwave and millimeter-wave circuit design.

right Professor Chia-Hsiang Yang collaborates with UCLA to develop an artificial intelligence and machine learning computation chip based on RTRA architecture.

A Better Way to Display Extended Reality

The Multimedia Processing and Communications Lab led by Professor Homer Chen is revolutionizing extended reality (XR) displays. They are changing the fundamental principle of XR from “showing images to each eye” to “projecting light field to retina.” When most XR displays project virtual aspects into a real environment, the viewer's eyes struggle to focus on the virtual and the real consistently. But their newly developed light field technology resolves this vergence-accommodation conflict, which is the root cause of dizziness, eyestrain and nausea common to most XR displays.

The most transformative feature of this technology is that it provides continuous focus as opposed to a fixed focal plane, delivering the most natural XR experience. This light field projection module has an extremely compact form and is integrable with most eyepieces and light sources, making it ready for mass production. It also allows high-quality light field content to be generated on smartphones or Snapdragon XR2 faster than real time.

Professor Chen’s team competed with more than 100 startups in the 2023 Qualcomm Innovate in Taiwan Challenge and won the first runner up award.

Full text

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01 A prototype of the light field display, which has applications to education.

02 Demonstration of continuous focus

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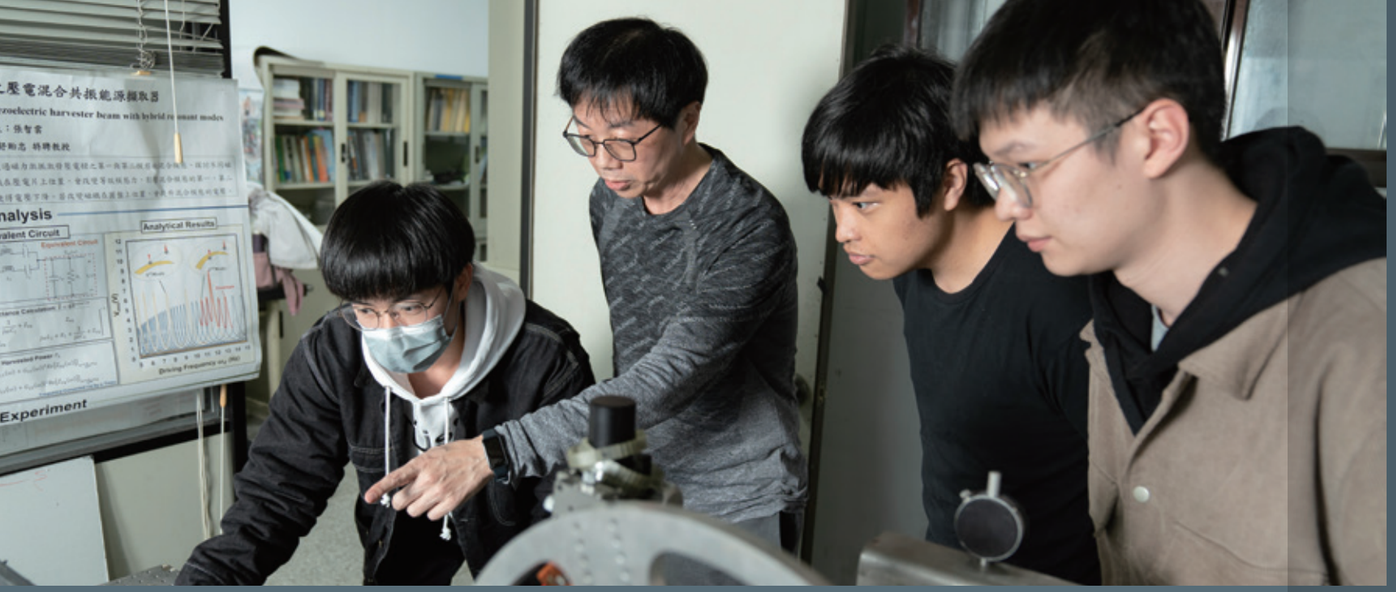
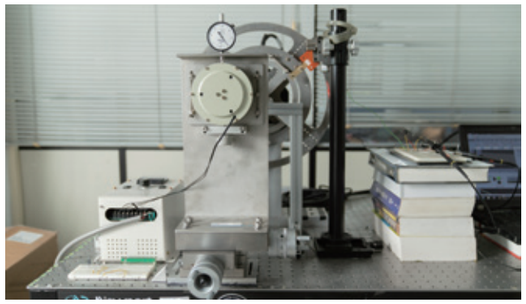
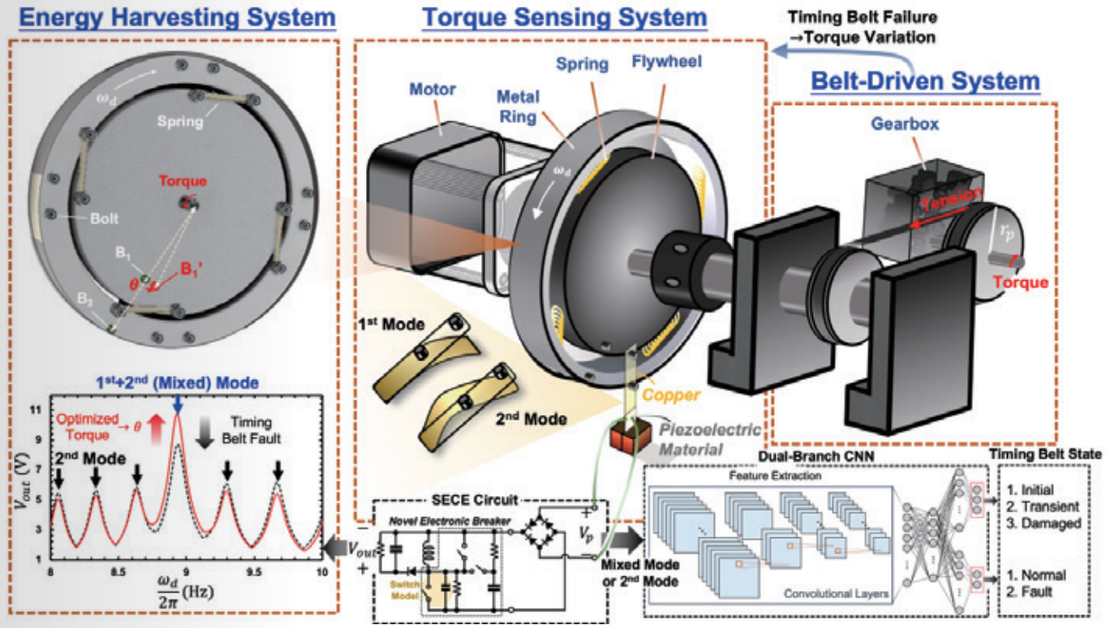


Innovative Applications of Self-Powered Technology in Condition Monitoring

The recent emphasis on piezoelectric technology for self-powered sensors in condition monitoring has sparked significant research. This method employs piezoelectric elements as sensors, generating voltage in response to surrounding vibrations. In condition monitoring, smart sensors distinguish between normal and faulty conditions by detecting varied output voltages, forming the basis of piezoelectric energy-based monitoring.

Professor Yi-Chung Shu of NTU's Institute of Applied Mechanics recently developed a breakthrough device that integrates energy harvesting and torque sensing through a synchronized electric charge extraction (SECE) circuit. Detecting excessive shaft torque in rotary systems is crucial for avoiding disasters. Despite advancements in torque sensor innovation, crucial needs persist for self-power provision, signal transmission ease and heightened sensitivity. Professor Shu's approach addresses these challenges by creating a self-powered electronic breaker within SECE for optimized switch control during pulse excitations. Additionally, they achieve broadband energy harvesting and power amplification through phase angle optimization and SECE, utilizing changes in piezoelectric voltage spectrum amplitudes for torque sensing. Moreover, real-time monitoring of timing belt health is implemented through a dual-branch output convolutional neural network, ensuring precise piezoelectric voltage recognition with minimal learning data.





Schematic representation of the device demonstrating its integrated functionalities: energy harvesting, torque sensing and real-time condition monitoring of timing belt health.

Prof. Yi-Chung Shu
yichung@iam.ntu.edu.tw

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Saving the Chinese Crested Tern

Since 2003, Hsiao-Wei Yuan, the Vice President for International Affairs at NTU and a professor in the School of Forestry and Resource Conservation, has been dedicated to the research and conservation of the Chinese Crested Tern. This bird had fewer than 100 individuals remaining when her work began, but the population has greatly increased thanks to her work. Professor Yuan's advocacy garnered international attention, showcasing Taiwan's efforts in biodiversity preservation. In recognition of her contributions, she received a Special Achievement Award at the 50th Pacific Seabird Group Annual Meeting in February 2023.

Professor Yuan and her team conducted fundamental scientific research on the Chinese Crested Tern and applied their findings to create practical conservation strategies, ensuring the survival of this rare bird. The team rehabilitated the bird's nesting habitats on the Matsu Islands, combining UAV and AI machine deep learning to estimate the population size and locate its nests. As it is a migratory bird species that nests on uninhabited islands, protecting its breeding grounds is crucial.

However, the fate of the Chinese Crested Tern remains uncertain as human activity continues to disturb its breeding grounds. Professor Yuan emphasizes that while the award is a recognition of her team's efforts, the daunting mission of conserving marine ecology has just begun.

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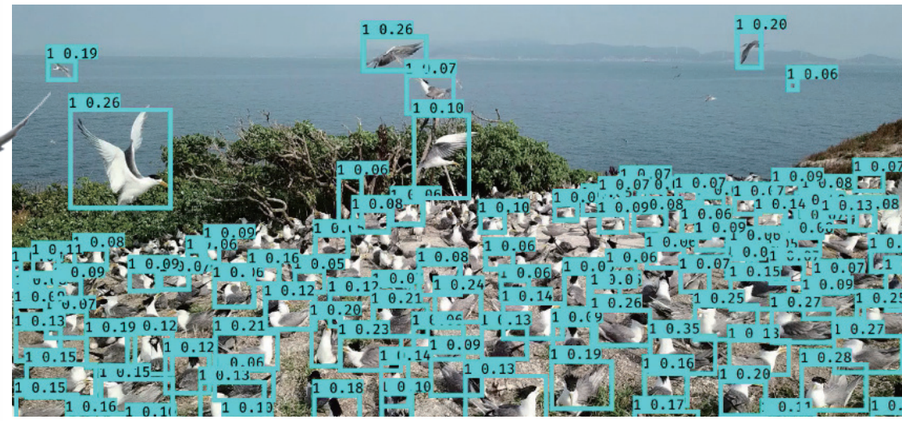
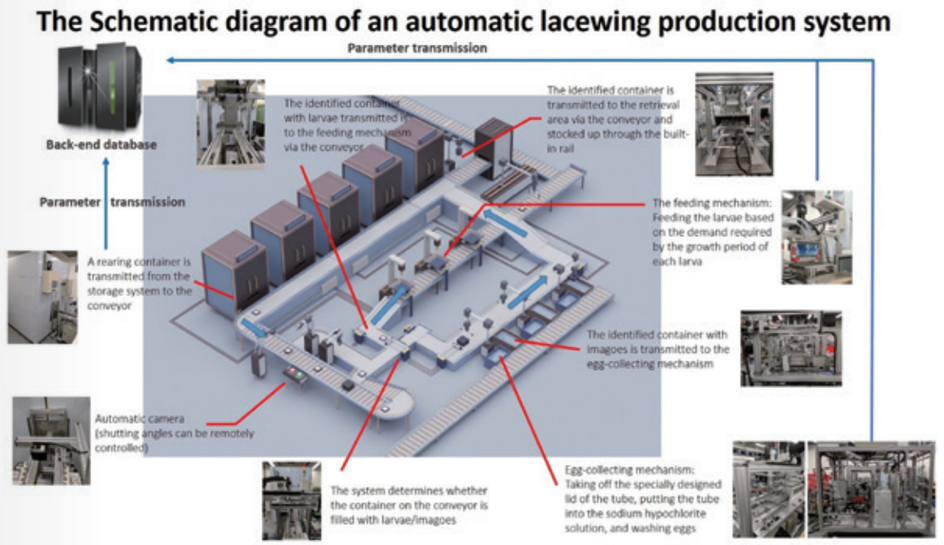


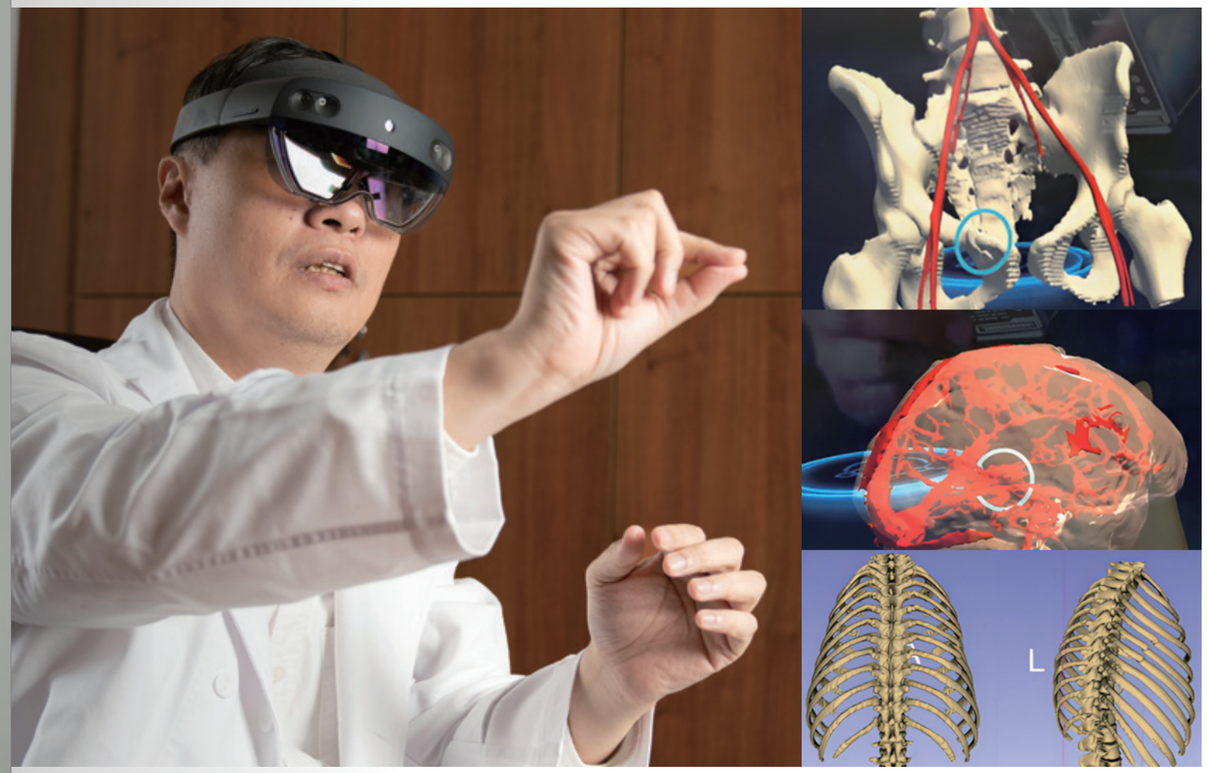


Improving Taiwan's Agriculture through Smart Technology

To promote smart agriculture in Taiwan, Professor Joe-Air Jiang from NTU's Department of Biomechatronics Engineering developed a multipurpose "Advanced IoT/WSN-Based InfoCom Monitoring Platform." This platform integrates mechatronic techniques with information and communication technologies such as the Internet of Things (IoT), Wireless Sensor Network (WSN) and Artificial Intelligence (AI) to enhance agricultural monitoring. This platform can be used to monitor a broad range of crops, species and agricultural environments.

Recently, Professor Jiang has extended his research to biological control. He has focused on developing automatic rearing systems for natural enemies of insect pests. Through these systems, natural enemies of insect pests are efficiently mass produced at a low cost. This offers an environmentally friendly way to manage pests, reducing pesticide use.

Mixed Reality Transforms Medical Imaging Education



Mixed Reality (XR) merges real environments with virtual objects, enabling the projection of the human body into the metaverse. This technology has groundbreaking applications in the medical field. However, turning anatomic structures into 3D holographic images requires specialized software and engineers, which is costly and time-consuming. So far, this has hindered the integration of XR in medicine.

To overcome this obstacle, the Department of Emergency Medicine of National Taiwan University Hospital (NTUH) collaborated with Microsoft Taiwan and the German company apoQlar to simplify the transformation of 2D CT images into 3D holographic images. By using the Microsoft HoloLens 2 XR headset, medical students and physicians can view 3D anatomical structures in virtual space, enhancing learning and diagnostic efficiency.

This new technological process has significantly reduced barriers to using XR in medicine. Professor Chien-Chang Lee's team at NTUH used this technology to make a holographic image database from past trauma images for use in teaching, diagnosis, surgical planning and telemedicine. These findings were recognized by the American Medical Informatics Association and received a gold Edison Award in 2024. By bridging the gap between real and virtual worlds, XR technology ushers in innovative healthcare and medical education models.

NTU's Anti-Epidemic Fighters Protect Public Health

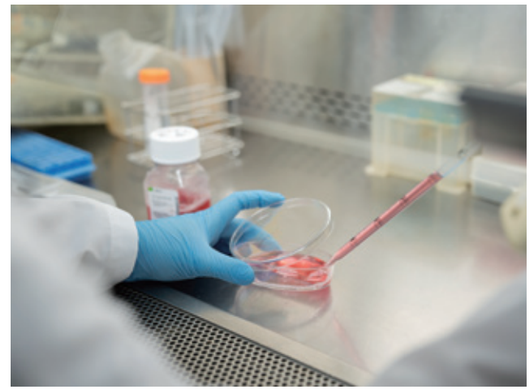
The Research Center for Epidemic Prevention Science (ReCEPS) was established in June, 2020. Professor Yen-Hsuan Ni, the Dean of NTU's College of Medicine, is the Director and Principal Investigator. The ReCEPS team includes people from the College of Medicine and other relevant departments across NTU.

ReCEPS is focused on epidemic prevention and control. Their work has helped to improve the accuracy of quarantine measures and vaccines, establish standard operating procedures for emerging infectious diseases and encourage international recognition and collaboration.

The key achievements of ReCEPS include using math models and machine learning to optimize interventions and study COVID-19 dynamics. They also developed a portable device integrated with an all-in-one LAMP strip system for nucleic acid amplification. Furthermore, to find new treatments and vaccines, they study factors hindering viral replication, use AI for drug candidates and conduct clinical trials.

During the past three years, ReCEPS has trained 197 postgraduate students and recruited 73 high-level researchers. Additionally, it has published 168 academic papers in international journals and 44 collaborative studies among industries and research labs. ReCEPS represents NTU as the leader of epidemic prevention research in Taiwan.

Click or Scan the QR code to visit the website of NTU ReCEPS for more details.



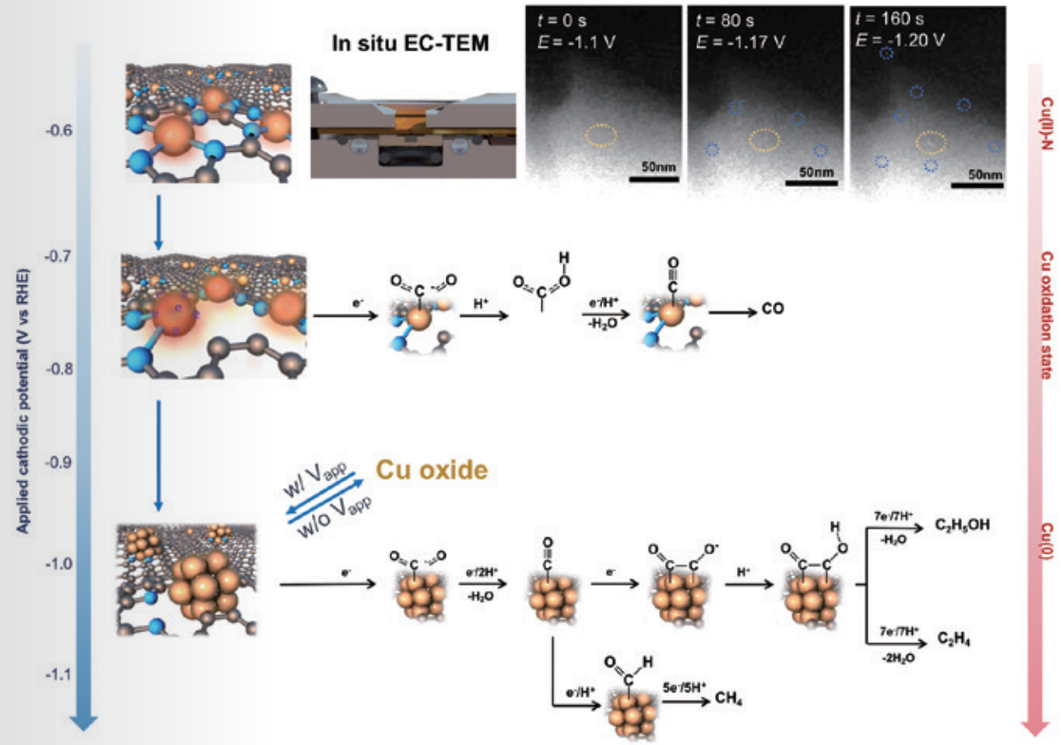
Natural Sciences

A New Way to Store Renewable Energy Sources

Nowadays, developing clean energy is crucial to mitigate damage to the environment and build a sustainable society. This raises the challenge of how to store renewable energy sources. An electrochemical conversion of carbon dioxide (CO2) into chemical fuels is a promising approach to address this problem. However, as CO2 reduction is complex and includes diverse reaction pathways, it is hard to find an efficient CO2 reduction reaction.

While various studies have explored different single-atomic electrocatalysts, Professor Hao Ming Chen's research marks the first in-situ understanding of a dynamically low-coordinated atomic electrocatalyst. This research shows its superiority over the initially prepared form.

Professor Chen's work has the potential to inspire future studies using dynamically low-coordinated atomic electrocatalysts as a novel design strategy, thereby driving the development of the next generation of superior CO2 reduction reaction catalysts. Importantly, this study establishes a pivotal atomic surface charge indicator to evaluate the intrinsic activities of single-atomic electrocatalysts, promising far-reaching impacts in the field.



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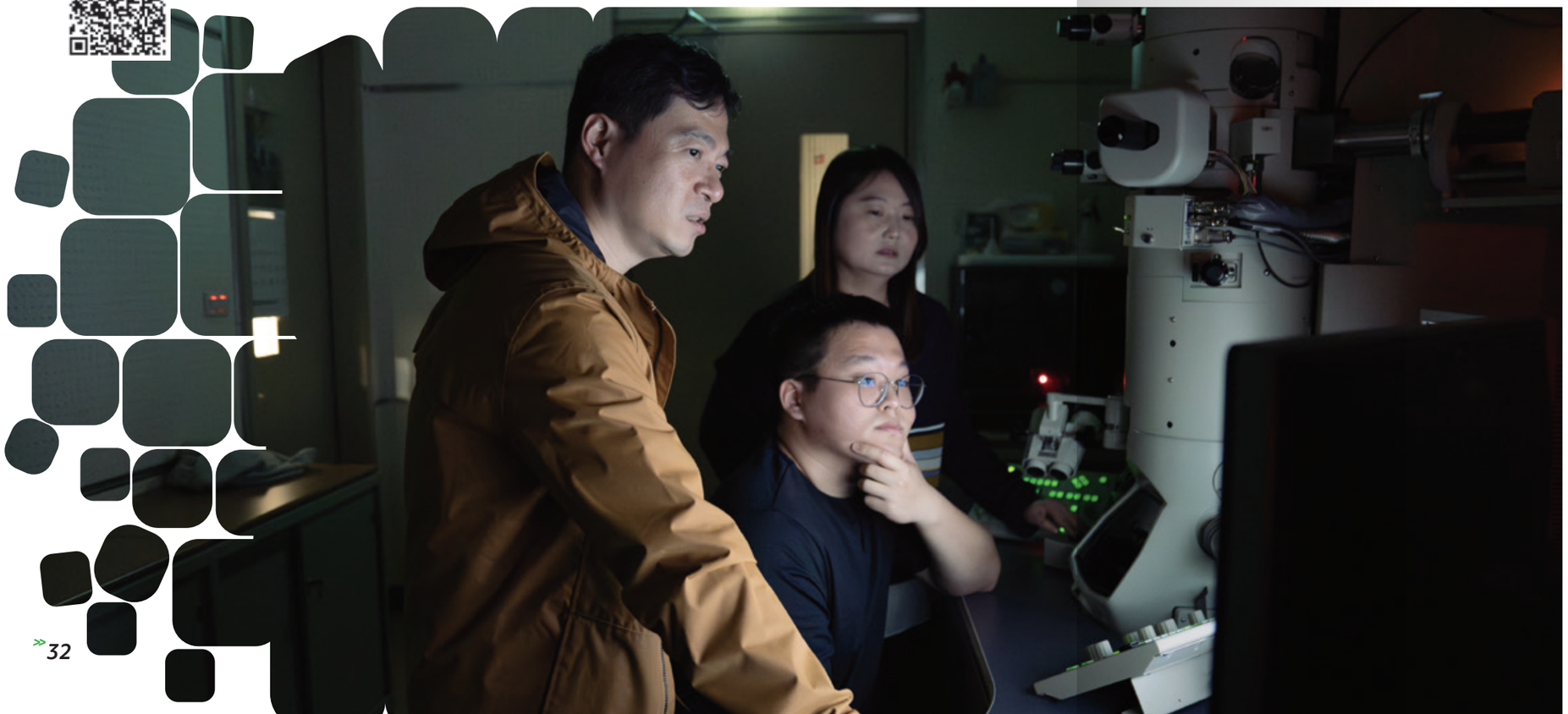
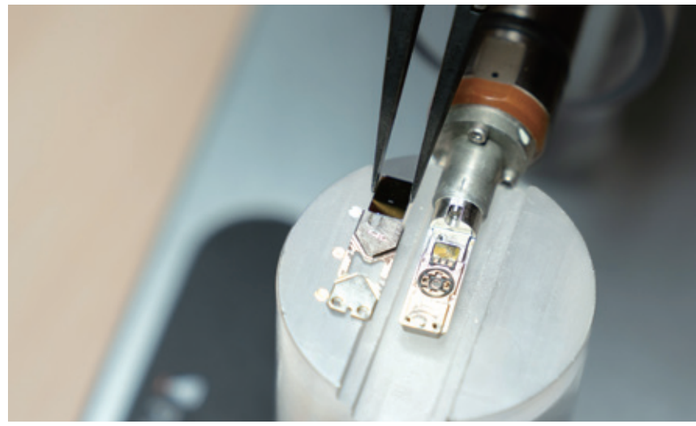
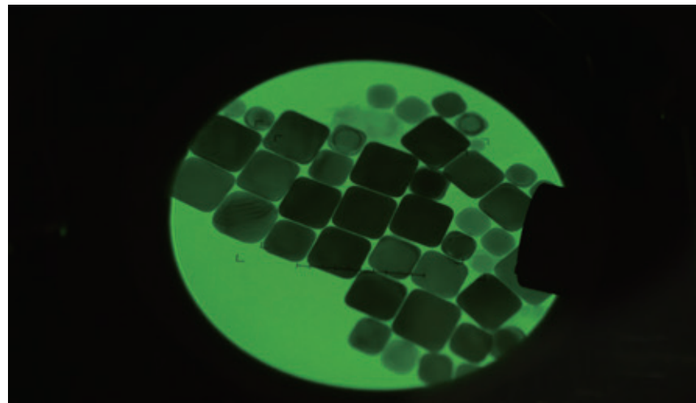


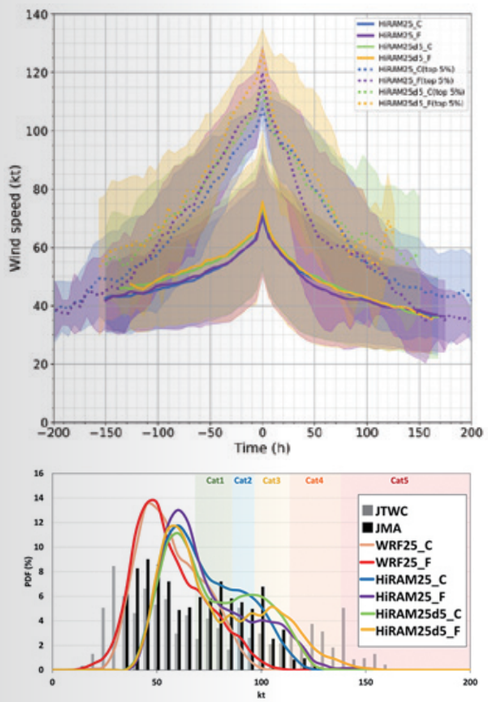




Tropical Cyclones Become More Intense Under Global Warming

Utilizing the High-Resolution Atmospheric Model (HiRAM) dataset and the Weather Researching and Forecasting (WRF) dynamical downscaling approach, Professor Chun-Chieh Wu of NTU's Department of Atmospheric Sciences assessed the impact of global warming on highly intense tropical cyclones (TCs) in the western North Pacific (WNP). The study indicates a projected increase in intensity, particularly notable for the most severe TCs (top 5%), as well as a higher intensification rate.

By incorporating dynamical downscaling simulations (with 5-km horizontal resolution), the research demonstrates an improved ability to replicate the probability density function (PDF) of TCs lifetime maximum intensity (LMI). It shows that the LMI PDF distribution of Category 4-5 TCs is expected to increase by about 6.5 percent by the end of the 21st century.



The implications of a warmer climate suggest that the heightened intensity of TCs, particularly those in the Category 4-5 range, could pose a significantly greater threat to lands in the WNP. This highlights the importance of such downscaling approaches to better understand and prepare for the potential risks associated with extreme weather events under the influence of global warming.

Full text

Dr. Christopher Chao-hung Chen, an Associate Professor at NTU's College of Law, published his book "Evolution of Law against Payment Frauds" in 2023. Amid significant technological innovation in the past decades, modes of payment have changed from exchanging cash and coins to the use of cards, wire transfers and other new types of payment methods (e.g. bitcoins or QR code payments). Focusing on fraudulent activities plaguing these payment systems, Dr. Chen explores how the law has evolved to tackle ever new problems in the payment services market.

Catch Me If You Can: The Legal Institutions Against Payment Fraud

Illustrated with laws in Taiwan, Singapore, Hong Kong and China, Dr. Chen examines the various legal institutions that are capable of tracking payment fraud and maintaining the integrity of payment systems. As payment becomes more digital, types of fraud move from counterfeit to unauthorized payment instruction. In response, governments rely more on the regulations of payment service providers to monitor and contain fraud. The book further considers how the law might evolve to cope with fraud related to crypto-coins and future central digital currencies.

Christopher Chao-hung Chen,
Associate Professor, College of Law
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Innovation to Transform Us

- The Future University
- Learning in the 21st Century

The Future University

Exploratory Learning Provides Freedom to Embrace Authenticity

In 2021, National Taiwan University began offering exploratory learning opportunities, giving students the chance to pursue learning experiences beyond traditional classroom settings. Through the exploratory learning program, students can pursue worthwhile endeavors off campus, such as entrepreneurship or community service, while earning credits. As exploration is crucial in identifying one's passions and potential, students discover their interests and capabilities through these diverse experiences. NTU's goal is to assist students in discovering their individual interests and inspire them to pursue these passions.

Since 2021, 64 students have participated in NTU's exploratory learning program. One student, Huai-pu Chen from the Department of Electrical Engineering, embarked on an adventure of the seas. In September 2023, while his classmates were beginning new courses, he was aboard a sailboat in Puerto Vallarta, Mexico. From there, he would challenge himself with the ambitious feat of crossing the Pacific Ocean. The exploratory learning experience is highly individualized for each student. Exploratory learning inspires students to transcend the limitations of the traditional classroom environment. It offers students the chance to delve into self-exploration and cultivate unique personal identities.

left Vice President for Student Affairs Shi-Wei Chu

right Student Huai-pu Chen sailing in Puerto Vallarta, Mexico.

The Future NTU Base Reshapes Higher Education

In 2019, NTU launched the Future NTU Initiative to establish a learner-centered, open university. The Future NTU Base (the Base) is comprised of the Office of Future NTU Initiatives, Center for General Education, Center for Teaching and Learning Development, Digital Learning Center, Academic Advising Office, College of Design and Innovation and School of Professional Education and Continuing Studies, which all work together to advance this project.

In 2023, the Office of Future NTU Initiatives organized an exhibition where all members of the Base showcased their achievements over the past four years. They also hosted three NTU Future University Forums which covered topics from curriculum reform and entrepreneurship to digital literacy in higher education, promoting global educational trends and dialogue among educators.

The Future NTU Base is committed to reshaping the future of education. They invite those interested in reimagining and reconstructing NTU and Taiwan's higher education to participate in their projects. In 2024, they will host more innovative workshops and forums for students, educators and higher education administrators.

01

02

01 & 02 (from left to right)

Executive Vice Presidents Wang-Ruu Tseng and Shih-Torng Ding, Minister of Education Wen-Chung Pan, President Wen-Chang Chen and Vice President for Academic Affairs Hung-Jen Wang unveil the plaque.

03 The Office of Future NTU Initiatives acts as the hub, promoting the works of the Base.

04 People visiting the Center for General Education's exhibition booth.

03

04

ESG Courses Prepare Students for Modern Business Management

As sustainability and ESG (Environmental, Social, Governance) become universal values, businesses want talents with more diverse backgrounds. Individuals must understand business management, sustainability and how to integrate interdisciplinary resources.

In 2023, NTU's College of Management designed practical ESG courses for undergraduate students to prepare them for modern business. One such course, "ESG Practice & Management Consulting," differs from traditional lectures. While there is theoretical instruction, the course invites industry mentors to lead case studies that address real-world challenges faced by businesses. The course was extremely popular, with an initial enrolment of over 150 students.

This is the first time a university in Taiwan has offered an ESG-related course for undergraduates. Professor Shing-yang Hu, the Dean of the College of Management, explained that many ESG issues test people's ability to work together across disciplines. This course is open to students across departments, fostering interdisciplinary teamwork.

Cultivating the Next Generation of Semiconductor Talents

NTU's College of Electrical Engineering and Computer Science (EECS) is an academic hub for semiconductors. EECS not only excels in semiconductor research, but also offers diverse courses that combine theory and practice. Students learn in state-of-the-art research environments and tackle practical problems. This equips them with a solid theoretical foundation, practice skills and innovative thinking.

In 2021, NTU established the Graduate School of Advanced Technology (GSAT) to advance Taiwan's semiconductor industry. GSAT integrates resources from EECS, the College of Engineering and the College of Science to offer cutting-edge programs in semiconductor technology. GSAT places a strong emphasis on internationalization by offering many EMI courses and recruiting international students. In the 2023-2024 academic year, 10% of GSAT students were international.

GSAT also collaborates with industry experts to offer courses about modern practices. These courses showcase GSAT's strength in connecting with the industry and enhancing students' professional competitiveness, positioning them as leaders in the dynamic semiconductor landscape.

left Professor Guang-Lei Yang, former Senior Director of TSCM's R&D department, shares his wealth of practical experience.

right Minister of Education Pan Wen-Chung and others.

Applications of Diverse and Innovative Digital Learning

Digital media has become an indispensable tool in education, reducing teachers' workload, adding flexibility and variety to course design and fostering student autonomy. The Digital Learning Center (DLC) at NTU is proud to announce that its YouTube channels, "NTU OpenCourseWare" and "NTU Speech," were awarded Silver Creator Awards for surpassing 100,000 subscribers. These channels feature high-quality courses and lectures in various fields, and are quickly becoming an indispensable learning resource for both NTU students and the public.

The DLC hosted three virtual reality (VR) curriculum workshops this year, covering topics such as hardware operation, content creation and software training. Participants created VR curriculums for tennis instruction, environmental studies and laboratory introductions. Next year, the DLC will train TAs to assist faculty in VR curriculum development, promoting the pedagogical applications of VR.

Additionally, the NTU COOL learning management system (LMS) provides a practical platform for faculty to integrate digital technologies into their teaching. It offers tools for video learning, online interaction and tracking progress and allows students to manage their own learning pace, supporting autonomous learning.

01

02

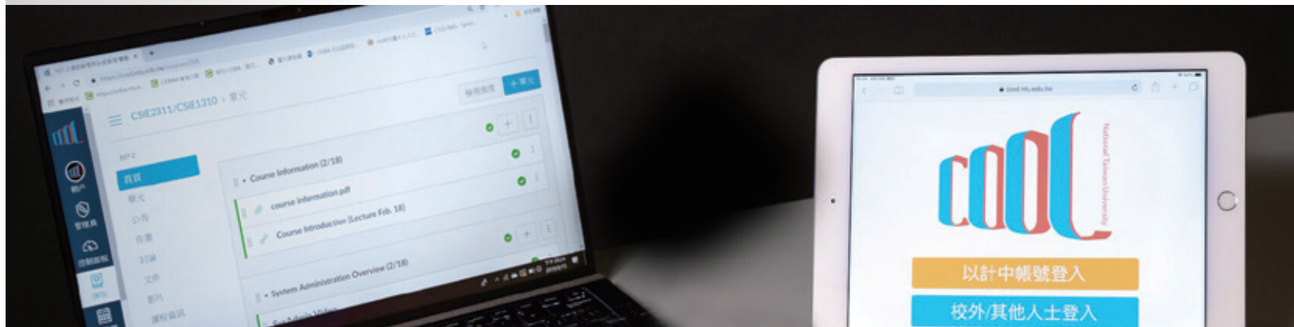
left VR curriculum design workshop

01 Three channels receive the YouTube Silver Creator Award for reaching 100K subscribers.

02 Tennis Instruction VR curriculum

03 NTU COOL supports online teaching and learning, and provides users with learning footprint tracking and analytic data.

03



Events to Connect Us

- Bringing the World to NTU
- Sending NTU to the World
- Launching Career Development
- Fostering an Altruistic Spirit
- The Importance of Arts

Cultures Come Together at the 2023 NTU World Carnival

The NTU World Carnival, organized by the Office of International Affairs and Office of Student Affairs, was held in March 2023. The festival included an opening ceremony and a vibrant multicultural fair.

The NTU Vice President for International Affairs Hsiao-Wei Yuan, Vice President for Student Affairs Shih-Wei Chu and NTNU's Vice President for International Affairs Yi-De Liu all spoke at the opening ceremony. Special guests included Minister Carlos Vidal Pintos from the Embassy of the Republic of Paraguay, Deputy Director General Saraswati Revanna from the India-Taipei Association, Charge d'Affaires Abbigail Pieterse from the Embassy of the Kingdom of Eswatini and Junior Officer Josephine Rüegsegger from the Trade Office of Swiss Industries.

Student organizations put on captivating performances, including a lion dance by Malaysian students, traditional dances from Myanmar, Indonesia and Paraguay and musical numbers by Japanese students.

Nearly 100 students from more than 30 countries participated in the fair, sharing their cultures with thousands of visitors. The multicultural fair provided opportunities to taste food and beverages from around the world, including Japanese juebing, Thai bua loi, Indian masala tea and Latin American empanadas. NTU Far From Home and other booths organized cultural activities including games and sports competitions.

Building a Sustainable Future for East Asia

In December 2023, the 7th NTU-UTokyo Joint Conference united scholars from both universities under the theme "Towards a Sustainable Future Challenges and Resilience." The conference featured an opening ceremony, plenary session and 18 parallel sessions. NTU President Wen-Chang Chen and UTokyo President Teruo Fujii both spoke at the opening ceremony, reflecting on 20 years of strategic partnership and reaffirming mutual goals to advance research, education and society. The plenary session included an International Collaboration Panel in which four professors shared their experiences spearheading international research collaborations.

Over 350 faculty and students joined the parallel sessions, discussing the latest research trends and engaging in interdisciplinary collaboration focused on sustainability. Topics included agriculture and engineering, medicine and public health, environmental and material sciences and the humanities. By bringing together researchers from different disciplines and highlighting common goals, the conference sparked innovative ideas for further research collaborations between the two universities.

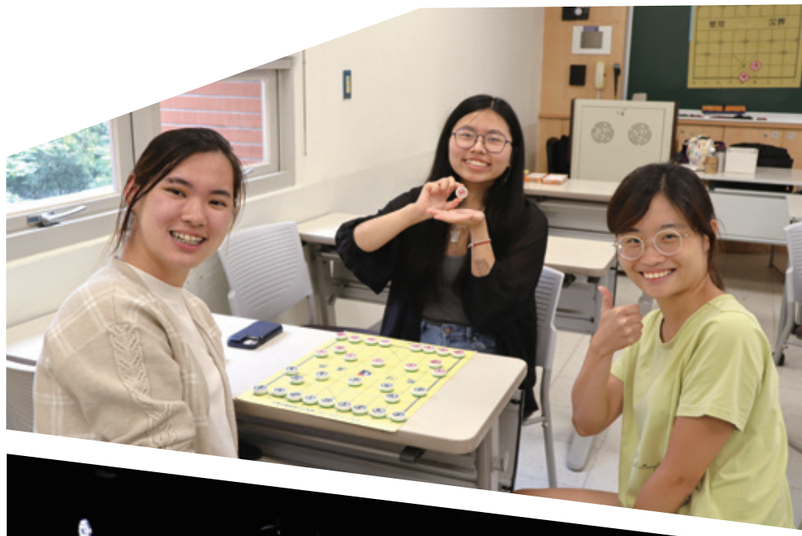
Global Initiatives Symposium Fosters Interdisciplinary Dialogue

The NTU Global Initiatives Symposium (GIS) actively introduces students to prominent international leaders. These leaders share their experiences with students, passing on knowledge of globalization and internationalization. Past speakers at the symposium include President Tsai Ing-Wen, Minister Audrey Tang, former Taipei Mayor Ko Wen-Je, Chairman of Quanta Computer Barry Lam, Nobel Laureate Yuan-Tseh Lee and Speaker of the Afghan Parliament Fawzia Koofi.

Since its establishment in 2008, GIS has been held 14 times. Students from around the world come together to discuss global trends, brainstorm action plans and promote local development. In 2023, the GIS student team organized the symposium around three main topics: international trends, humanities and society and competition among technology, business and management. Students not only benefit from the experiences of industry leaders, but are also inspired to think innovatively.

The Harvard Taipei Academy Welcomes Exceptional International Students

The Harvard Taipei Academy (HTA) welcomed its first group of students in June 2023. Nearly 60 students from Harvard, Yale, Cornell, the University of Pennsylvania and Williams College came to NTU for this two-month language program. This collaboration between Harvard and NTU is supported by the Ministry of Education, Ministry of Foreign Affairs and Harvard Club of R.O.C.



Extending beyond linguistic proficiency, the program immersed participants in Taiwan's diverse society. They visited famous local spots including the National Palace Museum, the Shilin Night Market and the Xinbeitou hot springs.

The program also featured a six-day trip across Taiwan. The students ventured through the forests of central Taiwan, learned about the island's complex history in the south and discovered indigenous cultures on the east coast. Through this journey, they gained a more comprehensive understanding of Taiwanese society while applying language skills learned in the classroom.

The success of this academic exchange demonstrates that both sides are committed to fostering cross-cultural understanding through language learning and cultural immersion. As programs like HTA prosper, the relationship between Taiwan and the US grows stronger.

The BEST Way to Study Mandarin

The Taiwan Huayu BEST Program (Bilingual Exchanges of Selected Talent) at NTU and its seven international partners work together to advance NTU's Mandarin language education resources. In 2023, NTU welcomed 53 students on exchange from partner institutions to study Mandarin with funding from the BEST program. These exchange students not only received intensive language training, but were immersed in the cultures of Taiwan.

The program's "Hands Together" initiative took BEST students to local elementary schools to interact with Taiwanese students. They participated in various school activities and sampled the Taiwanese public-school lifestyle. Through the BEST program, NTU has also sent three Chinese language faculty members and three student interns to partner institutions for exchange.

Furthermore, NTU partnered with Indiana University (IU) to establish the NTU-IU Taiwan Huayu BEST Program Office on IU's Bloomington campus. This office coordinates an array of Mandarin language resources and offers workshops, courses and programs related to Mandarin language and Taiwanese culture.

NTU Global High School Exchange Forum

In July 2023, the NTU Office of International Affairs (OIA) welcomed 32 principals and counselors from 24 overseas high schools for the NTU Global High School Exchange Forum. The participants came from Indonesia, Japan, Macau, Malaysia, South Korea, the Philippines, Thailand and Vietnam.

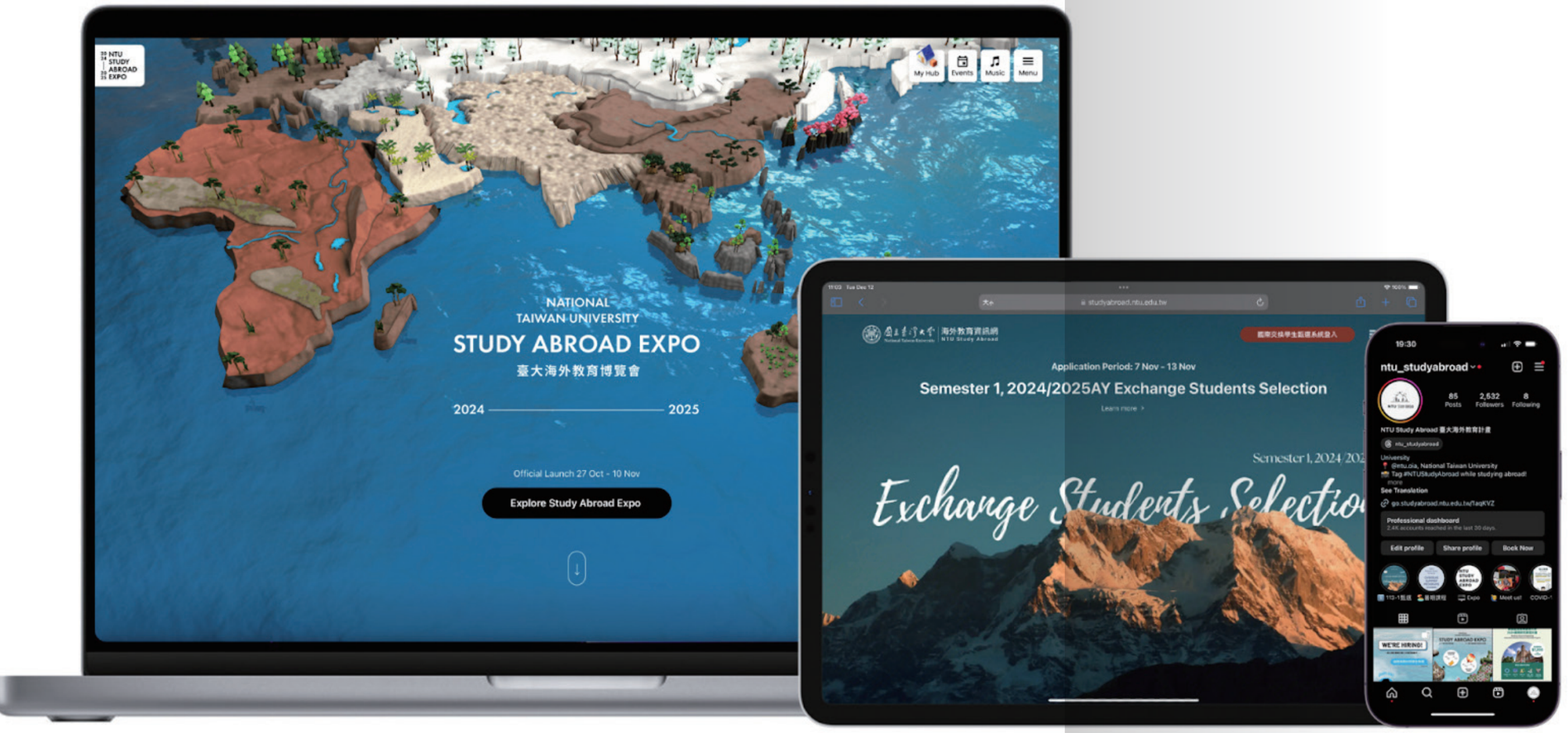
During the forum, NTU signed agreements with the Philippine Science High School System, Vietnam's Lawrence S. Ting School and Taipei School and Malaysia's Chinese Taipei School. To encourage high-achieving students from these schools to study at NTU, President Wen-Chang Chen invited them to join the NTU International High School Alliance.

Executive Vice President Shih-Torng Ding opened the forum with a seminar on the Future NTU Initiative. The next day, OIA introduced their student-support projects including the Study Abroad Program and the International Mentorship Program. The Center for the Advancement of Science Education also brought participants to visit popular departments and experience their world-class teaching and research environments.

International High School Alliance Recruits More Overseas Students

Seeking to recruit more exceptional overseas students, in 2023 the Office of International Affairs spearheaded the development of the International High School Alliance. The alliance began in May when NTU signed agreements with seven high schools in Malaysia. Throughout June, July and August schools from Thailand, Vietnam, the Philippines and Indonesia joined the alliance, bringing the total membership to 26 high schools across five countries.

Each of the participating schools signed an agreement with NTU or the NTU System (NTUS) to encourage their students to apply for NTUS universities. Participating high schools can recommend exceptional students to study at NTU. Qualifying students will receive prioritized admission, tuition subsidies and a monthly stipend of NTD 8,000 during their studies. The International High School Alliance encourages more outstanding overseas students to pursue their university degrees at NTU.



The NTU Study Abroad website was launched in the 2022/2023 academic year, giving students easy access to all the information they need to plan their study abroad adventure. The digital NTU Study Abroad Expo also provides year-round access to exchange university booths and information sessions. Additionally, NTU Study Abroad's social media platforms have amassed a combined following of 7,000, reaching many more people.

Sending NTU to the World

NTU's Growing Study Abroad Program Cultivates Global Citizens

As the world emerged from the pandemic, NTU updated its study abroad programs, notably in recruitment strategies and the student selection process. The changes have significantly increased study abroad opportunities for NTU students, reflecting a steadfast commitment to global education.

The University-wide exchange student selection process is now conducted on a semester basis, which led to a 200% surge in applications during the second semester. Students can study at a growing number of prestigious universities, including Cornell University, Northwestern University and UT Austin. Furthermore, students now have the option to participate in a second exchange program during their studies.

NEW EXCHANGE UNIVERSITIES SINCE 2023/2024AY

Universidad de los Andes Colombia
Northwestern University
TEXAS The University of Texas at Austin
Cornell University
TEL AVIV UNIVERSITY אוניברסיטת תל אביב
경희대학교 KYUNG HEE UNIVERSITY
TECHNISCHE UNIVERSITÄT DRESDEN
University of St Andrews
OST Ostschweizer Fachhochschule
UCL
HELLENIC REPUBLIC National and Kapodistrian University of Athens

Building Partnerships and Exploring Innovation: President Chen Leads a Delegation to the USA

From July 29 to August 9, 2023, President Wen-Chang Chen led a delegation including Executive Vice President Shih-Torng Ding, Vice President for International Affairs Hsiao-Wei Yuan and Vice President for Academic Affairs Hung-Jen Wang to the USA. The visit strengthened the collaboration between NTU and its partner universities in the USA and explored the innovative initiatives at these institutions.

President Chen first visited the University of Rochester, where the two universities signed agreements on academic cooperation and discussed joint research funding, student exchanges and other collaborative projects. Executive Vice President Ding, Vice President Yuan and Vice President Wang traveled to New York to visit Cornell University's innovation base, Cornell Tech. They also visited Columbia University to discuss collaborations between their respective engineering colleges, a joint dual-degree program and potential short-term student courses.

The delegation then traveled to Chicago, where they first visited Northwestern University to discuss research collaborations as well as Northwestern's visit to NTU in December 2023. They then visited the University of Illinois

Chicago, where they signed an agreement with the entire University of Illinois System for a joint seed funding project. This is NTU's largest joint funding agreement to date.

After a tight schedule in Chicago, the delegation flew to the West Coast to visit the University of Washington and the Global Innovation Exchange (GIX). GIX will send a group of students to NTU for short-term programs in summer 2024. Their final stop was the University of California, Berkeley, where they discussed student exchanges and joint degree programs.

Launching Career Development

Mentorship Programs Launch Students' Career Development

NTU now runs two mentorship-style internship programs: the International Mentorship Program designed for international students, and the Taiwan Internship Program designed for local students. Both of these programs build bridges between academia and industry, partnering with corporations to cultivate talents and help students launch their careers.

These programs stand out as experienced executives personally mentor students during their internships. Participating students gain interdisciplinary knowledge and apply their learning to solve real-world problems. By matching students with internships, the programs create a positive cycle of talent development involving students, NTU and industries.

The Office of International Affairs (OIA) launched the International Mentorship Program in 2022, while the Office of Student Affairs(OSA) manages the Taiwan Mentorship Program. These internship programs have changed the course of students' lives, as many students have been offered full-time positions following their internship, giving them the chance to build the life they want here in Taiwan. The success of these programs shows the positive impact of mentorship-style internships on talent development.

Working Abroad through the Overseas Internship Program

In the age of globalization, developing global mobility and cross-cultural communication skills is essential. This year the Office of International Affairs (OIA) launched the Overseas Internship Program (OIP) to help students at NTU gain global competence and experience working abroad. OIP sends students to pursue internships at overseas organizations during the summer. With the support of OIA and a mentor in their host organization, students are guided in their transition to working in a foreign country.

In 2023, OIP partnered with 14 organizations including IBM Research, Key Gardens, Step30, the California Institute of Technology and the University of Chicago. The program sent nearly 30 students to internships around the world. They experienced the working culture in different countries, actively engaging in cross-cultural communications and international affairs.

In preparation for the summer 2024 program, OIP has partnered with more than 30 organizations, including MediaTek, Delta Electronics and ASUS. With current partners spreading across many fields and countries, students can pursue internships abroad in whichever area piques their interest. As the program continues to expand, NTU students will have even more international opportunities to pursue their future careers and become global citizens.

Fostering an Altruistic Spirit

Students Create Social Change through the NTU-YLL Project

Mr. Y.L. Lin, founder of the Hontai Group, established the NTU-YLL Project in 2019 to perpetuate his commitment to education and nurture local talent. Through this project, students participate in training courses and propose social programs that give back to Taiwanese society.

NTU has actively managed the project since its founding. In the past four years, more than 250 exceptional students have participated, receiving up to NTD 180,000 in funding to pursue internships abroad and up to NTD 300,000 to develop social programs.

The 7th edition of the NTU-YLL Project launched in 2023. Participating students tackle problems faced by non-profit organizations (NPOs) to address social issues. The program includes a 9-month training curriculum and a wide range of resources. Participants will ultimately design their own programs to address social issues. Select students will receive financial support to intern abroad and implement their proposed initiatives upon return to Taiwan, making a positive contribution to Taiwanese society.

The iNGO Academy Nurtures Altruistic Students

NTU's Office of International Affairs collaborated with Impact Hub Taipei to launch a training program for promoting student interest in sustainability and non-profit work. The iNGO Academy is a pre-incubation program based on the United Nations' Sustainable Development Goals (SDGs). In 2023, the Academy offered students six training courses, two visits to iNGOs and a 16-week internship with an iNGO partner.

The Academy partnered with nine different iNGOs in 2023. The training courses covered topics including sustainability, research and communication, project management and fundraising. Ultimately, 15 students from five different countries were matched with internships across the participating iNGOs.

Through the courses and internship, students learn how their host organization tackles different social issues and promotes SDGs. They gain knowledge and experience necessary for a future career working with NGOs. Furthermore, NGOs in Taiwan benefit from the participation of NTU's exceptional students and the network built by the academy.

The Student Social Devotion Special Award

NTU established the Student Social Devotion Special Award to honor altruistic students who care for the disadvantaged. In 2023, Yi-Ting Yang and Kung-Shiun Kuo won the Student Social Devotion Special Award for individuals.

Yang founded the NGO Love Binti International and visited Ugandan rural areas to promote the use of cloth sanitary pads and relevant healthcare education. She also facilitated the construction of infrastructure to enrich local life and empower the community, devoting herself to both environmental protection and sustainable development.

Kuo has devoted herself to the altruistic work of the Indigenous Children and Youth Career Education Association. Working together with this organization, she planned tours and invited professionals from various fields to advise indigenous youth on possible life-changing career paths.

The group award went to the student club Pinglin Sprout. This club provides weekly academic counseling for Pinglin Elementary School students and holds extracurricular cultural activities to strengthen their creativity and communication skills. By providing stable support to students, the club supports the development of community.

Cooperating to Address Malnutrition in Africa

The Taiwan-Africa Vegetable Initiative is a collaborative project between the Department of Agronomy at NTU, World Vegetable Center in Tainan, World Agroforestry Centre in Kenya and University of Abomey-Calavi in Benin. Led by the World Vegetable Center, this initiative addresses malnutrition by increasing the production and consumption of nutritious vegetables, utilizing Africa's vegetable biodiversity. It is being implemented amongst several countries including Tanzania, Madagascar and Taiwan's diplomatic ally Eswatini.

The academic research of this initiative focuses on revitalizing forgotten food crops from sub-Saharan Africa. The international research team, including NTU Professor Yann-Rong Lin and Ph.D. candidate Wei-Hsun Hsieh, collaborates to analyze these crops and their wild relatives. The goal is to find germplasm resources that are better adapted to future climate conditions and have high nutritional value. The research team will then recommend forgotten crops for cultivation in sub-Saharan Africa. This initiative is helping to improve food and nutrition security in Africa.

The Importance of Arts

A New Museum to Enrich Arts Education

The NTU Art Museum's journey began in 2017 when the Graduate Institute of Art History established the NTU Art Museum Preparatory Office. In 2021, this office began coordinating with other museums on campus, integrating campus cultural heritages and collections and providing teaching resources.

The museum's collections currently include paintings, calligraphy, ceramic relics, educational materials and books, as well as manuscripts donated by scholars, private collectors and foundations. In the future, the Art Museum will focus on ancient artifacts, artworks and other related materials before expanding to modern and contemporary artworks.

After six years of hard work, the Art Museum was inaugurated on May 31, 2023. This also marked the opening of the museum's first exhibition: "Endless Joy – Donated Han Dynasty Pottery Collection." The core mission of the Art Museum goes beyond collecting artworks; they are committed to supporting research and education. The museum will continue to host exhibitions that promote art on campus. These exhibitions will provide practical learning resources, developing a first-class art museum for NTU.

A Space to Explore the Perpetuating Possibilities of Performance Art

Inaugurated in 2023, the University Players Theatre is NTU's newest experimental theater space. "Players" comes from Zhuangzi (莊子) which connotes a "playful heart" or "the heart of playing" (遊戲的心). This title reflects the theater's purpose to provide a versatile space and flexible equipment that is suitable for all forms of performance art.

During its inaugural year, the theater hosted numerous artistic events including dramas, dances, traditional operas and workshops, adding vibrancy and innovation to the artistic environment on campus. In 2024, more experimental and participatory performances will take place, including sound exhibitions and creative projects by upcoming artists.

Reflecting the theater's functionality and aspirations, the University Players Theatre invites us to unleash our imagination and explore the perpetuating possibilities of art. This black box offers new opportunities for the NTU community to engage with contemporary performance art.

NTU Highlights Digest ✦

Vol. 96 -

A Multifaceted Approach to Cultivating International Talents

In our globalized world, promoting comprehensive internationalization is the key to cultivating globally-minded talents with international mobility. NTU's internationalization strategy takes a multifaceted approach, integrating policies and programs to help students and faculty stay globally connected. This issue of NTU Highlights overviews the University's strategies for preparing students to become global leaders and transforming NTU into a hub for international talents.

One of NTU's chief goals is to help students foster creativity and leadership skills. It is crucial to equip students with advanced knowledge and hands-on experience, preparing them to launch their careers. NTU's Mentorship Programs are key initiatives that give students the chance to apply their knowledge through internships.

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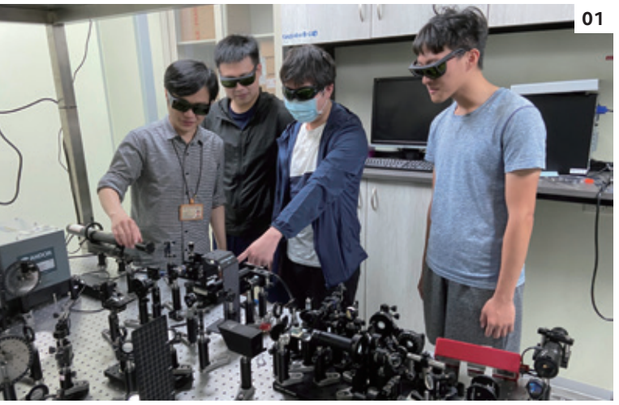

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Students have ample opportunities for international experiences, helping them to cultivate a global mindset. With over 600 partner institutions abroad, NTU's study abroad programs give students the international mobility they need. NTU also offers multiple funding sources for faculty to pursue international research collaborations.

On campus, a growing number of EMI courses and international programs offer chances to learn in English, attracting more international talents by promoting a bilingual campus environment.

Full text

01 Professor Yong and his team setting up optical paths for the newly home-built ultrafast multiphoton spectroscopy/microscopy system.

02 Students and faculty exchanging and connecting through the international degree program meet-and-greet session.

Vol. 97 -

Champions of a Resilient Environment

As the leader of higher education and academic research in Taiwan, NTU is actively addressing the challenges of climate change. These issues are critical, especially since Taiwan has a higher risk of natural disasters and warming rates that exceed the global average.

Collaborating with organizations like the National Science and Technology Center for Disaster Reduction and National Center for Research on Earthquake Engineering, NTU conducts comprehensive research on tracking and responding to natural disasters like typhoons and earthquakes. This research covers geological mechanics, seismic-resistant construction and flood prevention. Key centers at NTU, including the Center for Weather and Climate Disaster Research, emphasize interdisciplinary collaboration and global impact to confront climate change.

NTU's Research Center for Future Earth further addresses environmental changes, climate disasters and sustainable development by encouraging international research collaborations. Through education and research, NTU aims to cultivate sustainably-minded professionals and contribute to sustainable development, fulfilling its social responsibility as a global leader of higher education.

Full text

left NCREE houses a 5-meter by 5-meter Tri-Axial Seismic Simulator for conducting earthquake simulations on small structures.

01 Dr. Yagraj Banerjee of the NTU Research Center for Future Earth.

02 WCDR has developed a platform that integrates meteorological and hydrological information to deliver real-time operational services.


01


02

Vol. 98 -

Weaving Your Future: A Learner-Centered Open University

Full text

02

01

At NTU, higher education is being reimagined. The traditional boundaries of the classroom are breaking down and a culture of innovation is growing. With the goal of creating a learner-centered university, new programs provide students with freedom and flexibility to study what really matters to them.

For example, specialization programs integrate four to five courses into a module around a key theme, facilitating interdisciplinary learning and career development. As of 2022, there are a total of 270 specialization programs available at NTU. Furthermore, new interdisciplinary bachelor programs breach the boundaries of departments. Available at the university or college level, these programs allow students to create a personalized degree program by combining different fields of study.

For those struggling to find a suitable study path, the Academic Advising Office provides personalized academic advising services. They help students find programs that best align with their interests and abilities. NTU also offers "exploration credits" that have a flexible grading system to encourage interdisciplinary learning. This reduces the anxiety associated with exploring new fields.

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01 During the T+ camp, professors engage in a lively discussion of the pool of specialization programs proposed by students.

02 Students attend an information session about NTU's interdisciplinary bachelor's programs.

Vol. 99 -

Pathways to a Carbon-Neutral Future

As climate change threatens life on our planet, higher education institutions have a social responsibility to build a sustainable future. NTU is a leader in the global fight against climate change, actively participating in talent cultivation and developing cutting-edge technology. This issue of NTU Highlights introduces the University's progress towards carbon neutrality, breakthroughs in wind energy and negative emissions technologies and our commitment to sustainable talent development.

In June 2020, NTU made history as the first university in Taiwan to set up a carbon-neutral initiative. By analysing energy use, we built a roadmap to achieve 50% carbon neutrality by 2028 and 100% carbon neutrality by 2048. NTU also leads research on sustainable energy by working with government agencies and higher education institutions to optimise Taiwan's offshore wind power capacity and advance agricultural net-zero technology.

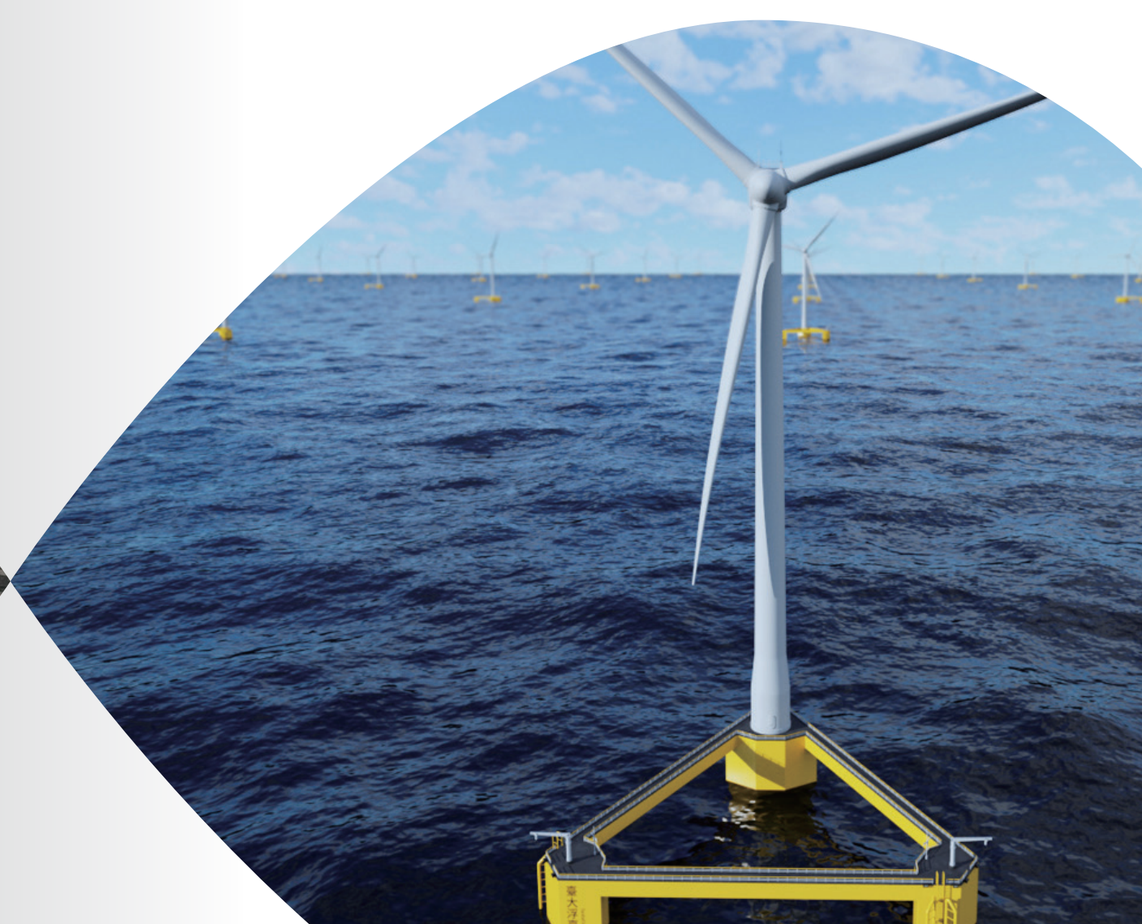
Since 2016, NTU's International Degree Program in Climate Change and Sustainable Development has cultivated leaders to combat climate change. By prioritising sustainable development research and talent cultivation, NTU continues to build a path towards carbon neutrality.

Full text

left Devices measuring soil greenhouse gas flux installed in a rice paddy test area to establish a carbon emission coefficient for paddy soil.

right The 15 MW semi-submerged floating offshore wind turbine on NTU's TaidaFloat, an innovative semi-submersible floating platform.

top IPCS faculty and student team installing sensors on campus.



Vol. 100 -

Semiconductor R&D and Talent Cultivation at NTU

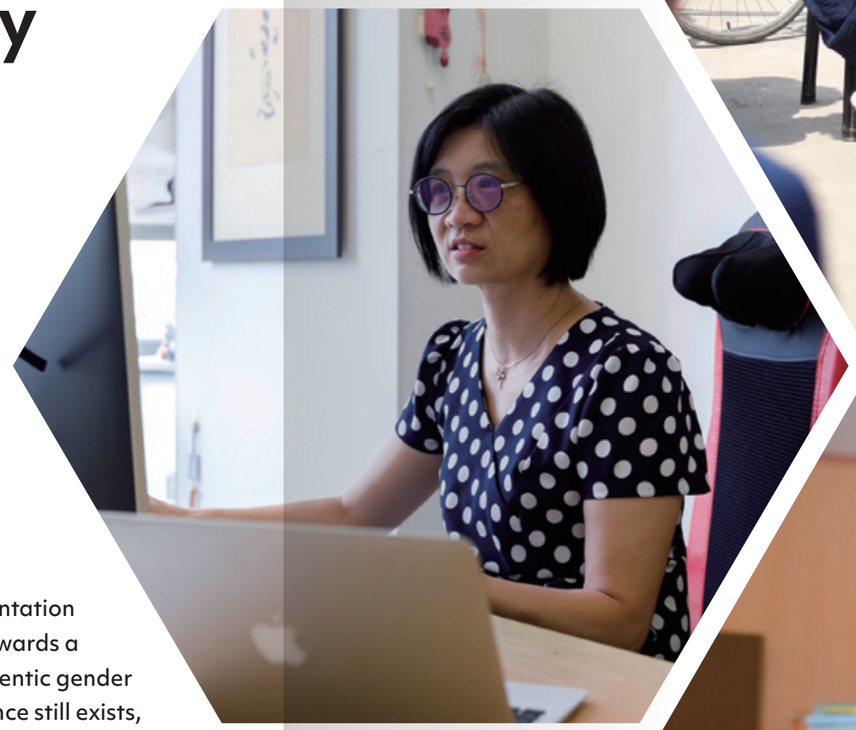
In recent years, NTU has published remarkable achievements in semiconductor research and vastly improved programs to cultivate talents in related fields. This issue of NTU Highlights showcases the diversity and innovation of semiconductor research here at NTU and highlights NTU's efforts in cultivating semiconductor talent.

Departments that specialize in semiconductor-related research have fostered an environment conducive to cutting-edge research, keeping pace with international high-tech industries and cultivating skilled professionals. Academic courses have been designed by incorporating the latest technological trends and collaborating with seasoned industry experts to structure syllabi best suited for advanced technology curriculums. Moreover, NTU forges robust partnerships with prominent international industry leaders by establishing academia-industry collaboration centers. The Graduate Institute of Advanced Technology has become a bridge connecting academia and industry in the semiconductor field. Lastly, this issue introduces world-leading semiconductor research and discusses the prospects it brings to NTU faculty and students.

Full text →

Vol. 101 -

Promoting Gender Equality on Campus



NTU promotes gender equality by prioritizing equal opportunities and actively supporting women and gender minorities. All departments and offices within NTU are urged to pursue inclusivity by respecting individuals of all genders.

This issue explores NTU's actions to promote gender equality and introduces some influential figures, including Executive Vice President Wanjiun Liao, who was the first women faculty member of the Department of Electrical Engineering. Learn more about her journey, as well as that of Professors Hsiao-Wei Yuan, Shenglin Elijah Chang and Sieh-Chuan Huang, who have all overcome gender barriers to build incredible careers.

NTU evaluates gender representation across departments to work towards a campus environment with authentic gender equality. While gender imbalance still exists, especially in STEM fields on campus, NTU is committed to supporting women and gender minorities and providing them with a safe space to learn and grow.

Full text →

From Crisis to Innovation: NTU's Multifaceted Approach to Pandemic Challenges

In the face of the worst pandemic in a century, the NTU community rose to the challenge, joining national and global efforts with concrete actions. For example, numerous NTU faculty members actively supported the Central Epidemic Command Center (CECC) under the Executive Yuan by contributing their expertise to policy-making, while others dedicated their efforts to antibody testing and vaccine development.

The collaborative efforts to combat the pandemic on the NTU campus were featured in top international medical journals, serving as a role model for universities worldwide as they prepared to reopen their campuses. Taiwan's efforts in fighting the pandemic attracted global attention, and the achievements of NTU and Taiwan have inspired the international community. Although the disturbance caused by COVID-19 has not yet ended, NTU will persist in fulfilling its social responsibilities by uniting to establish a new normal in the post-pandemic era.

Full text

NATIONAL TAIWAN UNIVERSITY IN FOCUS 2023-2024

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