



2023 NTU

Social Responsibility and
Sustainability Report

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STARS (Sustainability Tracking Assessment & Rating System)
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About This Report

Reporting Framework

This report has been prepared according to the Sustainability Tracking Assessment & Rating System (STARS) framework developed by the Association for the Advancement of Sustainability in Higher Education (AASHE).

Reporting Period

The figures and content disclosed in this report mainly concern the time period between January 1 and December 31, 2023. The information about the Academic Year (AY) refers to information from AY2022 and the first semester of AY2023 (from August 1st, 2022 to January 31st, 2024). However, for the sake of comprehensiveness, some figures used in the report are from the year 2022 or prior to AY2022; latest information in 2024 is also represented in the report.

Scope

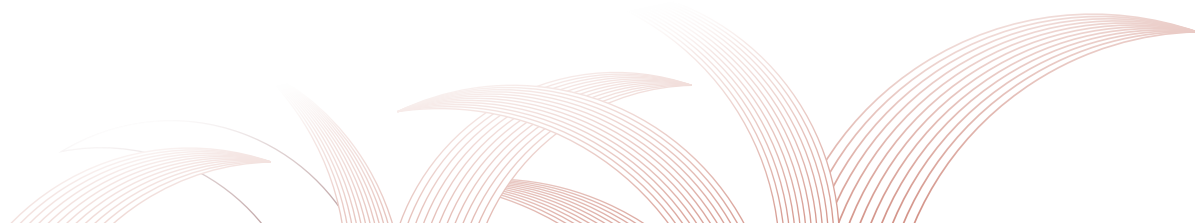
This report is composed of National Taiwan University's efforts and results in carrying out social responsibilities, while the information may also include performance of several institutions affiliated with NTU.

Basis for Calculations

All information and statistical data in this report have been collected and compiled by NTU. The financial figures are expressed in New Taiwan Dollars (NTD), and the collection, measurement, and calculation of numerical information comply with relevant regulations. Where no local regulations apply, international standards are referred to instead.

Publication

This report is NTU's fifth Social Responsibility and Sustainability Report. All reports are published regularly and available for download on the NTU website.



A Word from the President

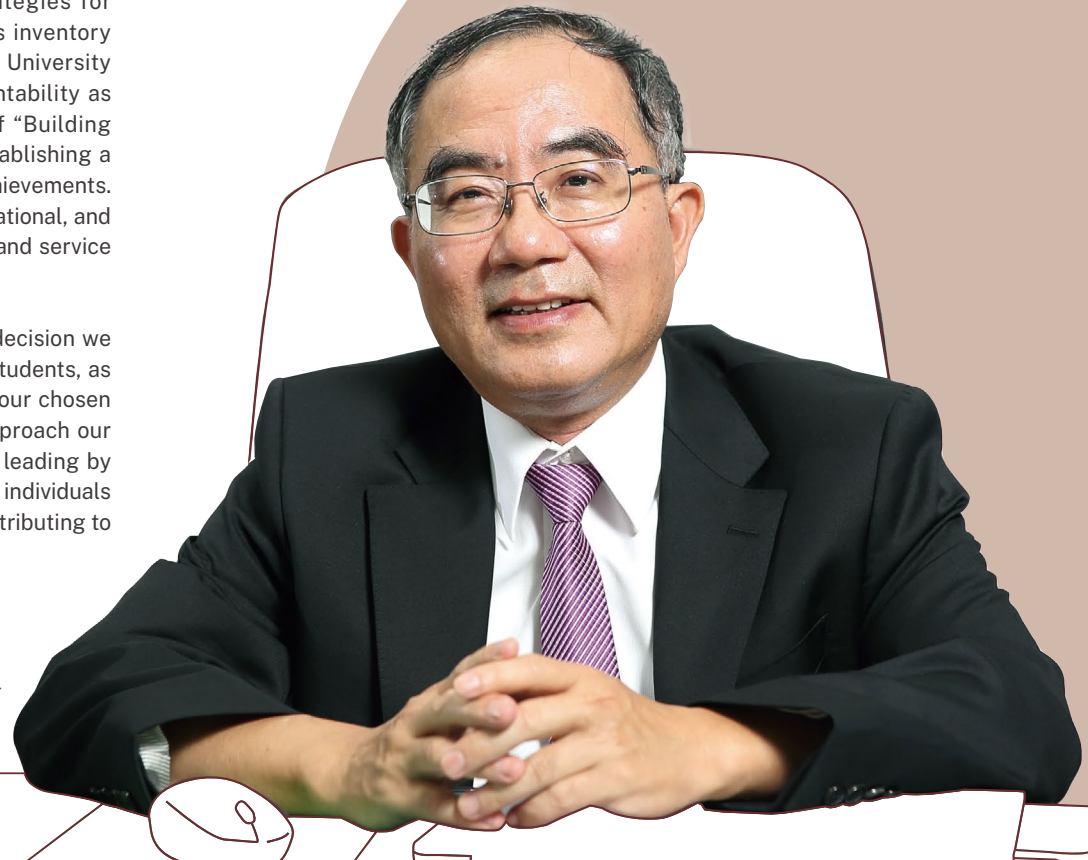
In this era of rapid advancements and intense competition, National Taiwan University (NTU), as a world-class university, bears increasingly pivotal societal responsibilities and faces heightened civil expectations. Above all else, talent cultivation remains our top priority. In recent years, we have actively promoted a “learner-centered open university” model, encouraging faculty and students to expand their horizons and actively engage with the United Nations’ 17 Sustainable Development Goals. We have also collaborated with international teams to develop innovative solutions to overcome climate change challenges. Our aim is to cultivate professionals with impeccable creativity, leadership, and practicality capabilities. More importantly, we strive to foster an altruistic spirit within our scholars and graduates, empowering them to develop and guide our society and nation toward a sustainable future.

This year marks the fifth anniversary of the inaugural edition of NTU’s Social Responsibility and Sustainability Report. We have not only delineated our pathways and strategies for achieving carbon neutrality but also initiated our university-wide greenhouse gas inventory efforts. Furthermore, we conscientiously participate in the Ministry of Education’s University Social Responsibility Implementation Projects, taking charge of our social accountability as a leading higher education institution. This year’s report continues the theme of “Building Campus Sustainability and Expanding Social Influence.” Internally, we focus on establishing a smart and sustainable campus, diligently assessing our measures as well as our achievements. Externally, we collaborate with industry, government, and academia at various local, national, and international levels, leveraging the power of knowledge through teaching, research, and service to manifest positive societal impacts.

Since the founding of our institution, NTU has meticulously considered every decision we have made, and we are deeply grateful for the dedication of our faculty, staff, and students, as well as the substantial support of our alumni community over the years. Guided by our chosen motto “A Centenary of Perseverance Preluding a Century of Prominence” as we approach our centennial celebration, we remain committed to surpassing our past achievements, leading by institutional example, and shaping our future-oriented vision. We hope to inspire more individuals to join us in advancing sustainable development, promoting human well-being, and contributing to a better world.

President

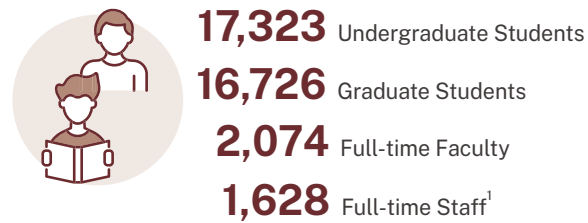
Wen-Chang Chen



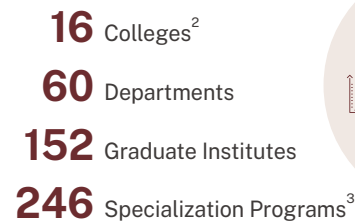
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DATA NTU

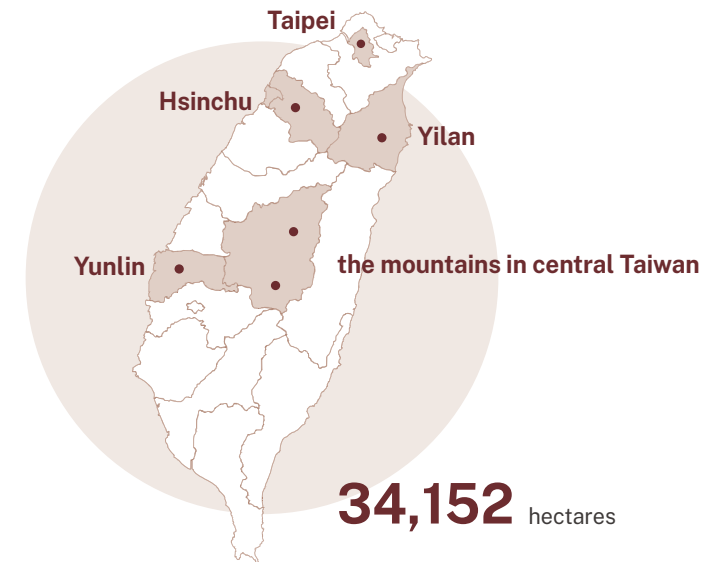
Faculty and Students



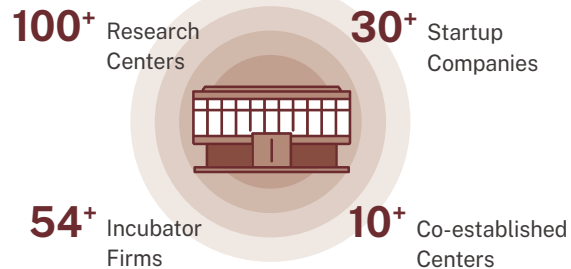
Academics



Total Campus Area



Research Outcomes



Global NTU



Note 1 Including quota-based and on-contract personals from "2023 University Institution Database."

Note 2 Including Graduate School of Advanced Technology, D-School, Center for General Education, International College, and SPECS.

Note 3 Specialization Program is a series of program that consist 12 to 15 credits, representing a core competence or an innovation trend in a professional field.

Note 4 University-level partner universities and agreements refer to NTU's partnerships with overseas educational and research institutions assured with mutually signed agreements of academic collaboration effective as of 2023.

International Sustainable Rankings



THE (Times Higher Education)
Impact Rankings 2023

#67 in the world



QS World University Rankings:
Sustainability 2024



#1 in Taiwan



#94 in the world

TOP 100 SDGs



#32 in the world

End hunger, achieve food security and improved nutrition, and promote sustainable agriculture



#11 in the world

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation



#98 in the world

Ensure sustainable consumption and production patterns

NTU Sustainability Timeline

Dec.

- Establishment of the Office of Institutional Research and Social Responsibility

Jun.

- Declaration of NTU's carbon neutrality goals
- Publication of the University's first Social Responsibility and Sustainability Report



Publication of NTU's first Social Responsibility and Sustainability Report. (June 23, 2020)

Nov.

- Invited to showcase a water recycling system at the Tuvalu Pavilion during COP26



Container house showcasing the water recycling system.

Jan.

- Establishment of the Sustainable Development Promotion Committee and the Office of Sustainability

2019

2020

2021

- Divestment from high-polluting and high carbon-emitting industries
First university in Asia to complete divestment in these industries.

Dec.

Dec.

- Completion of the NTU Social Responsibility and Sustainability Governance Action Plan
- Completion of the 2020 GHG inventory in accordance with ISO 14064-1:2018 standards, the results of which are certified after an external audit by the British Standards Institution (BSI)
First university in Taiwan to conduct an GHG inventory using ISO 14064-1:2018 standards.

Oct. • Inaugural “NTU Sustainable Campus & ESG Student Creative Competition”



Award ceremony for the “NTU Sustainable Campus & ESG Student Creative Competition.” (December 6, 2022)

Apr. • Five projects approved under the Ministry of Education’s University Social Responsibility Implementation Projects – Phrase III
NTU emerged as one of the universities with the highest number of approved projects nationwide.

Aug. • Co-organization of the “2023 Net Zero Tech International Contest @ Taiwan” and a corporate forum with TECO Technology Foundation
Participation of 146 teams from 10 countries and joint exhibition of net-zero emission technologies with 11 corporate partners.

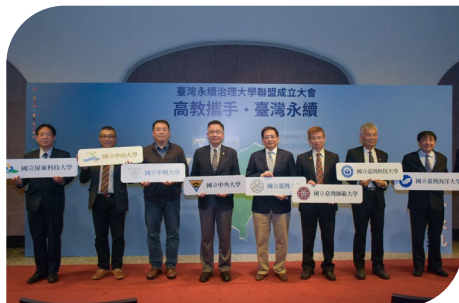


Award ceremony for the “2023 Net Zero Tech International Contest @ Taiwan.” (August 22, 2023)

2022

2023

Nov. • Establishment of the Taiwan University Alliance for Sustainable Governance
Joint promotion with National Taiwan Normal University, National Taiwan University of Science and Technology, National Central University, National Chung Hsing University, National Sun Yat-sen University, National Taiwan Ocean University, National Pingtung University of Science and Technology, and National Dong Hwa University.



NTU partners with higher education institutions to establish the Taiwan University Alliance for Sustainable Governance, marking a new chapter of cooperation in sustainability. (November 18, 2022)

Jul. • Publication of NTU’s Pathway to Carbon-Neutrality

Oct. • Co-organization of the “2023 USR Exhibition of Engaged Scholarship” for the northern region with National Taiwan Normal University and National Taiwan University of Science and Technology



Opening ceremony for the “2023 USR Exhibition of Engaged Scholarship” for the northern region. (October 6, 2023)

02

NTU Sustainability Governance

- 2.1 Governance Structure & Governance Diversity
- 2.2 Endowment Management and Sustainable Investment





2.1 Governance Structure & Governance Diversity

I. Governance Structure

To exercise the autonomy and academic freedom granted by the University Act, NTU has established the “National Taiwan University Organizational Charter.” The Charter defines the organizational governance structure, outlining the roles of university leadership, decision-making councils, and academic and administrative units. NTU is committed to upholding moral integrity in university governance and strives for administrative efficiency. The NTU Affairs Meeting serves as the University’s supreme decision-making body. To ensure inclusivity and balanced decision-making, the meeting includes representatives from NTU administrators, faculty, staff, and the student body.

Important Decision-Making Bodies and Meetings at NTU¹

Level	Name	Responsibilities
Leadership in University Affairs	 NTU Affairs Meeting	Reviewing university development and budget; establishment, modification, merger, and discontinuation of colleges, departments, institutes, and affiliated institutions; important matters and regulations concerning university affairs; matters instructed by the president; and other important proposals.
	NTU President Selection Committee	Selecting the new president.
Decision-Making Councils	 Administrative Meeting	Making decisions on matters specified in the National Taiwan University Organizational Charter and other important administrative matters.
	Academic Affairs Meeting	Discussing important academic affairs and related rules and regulations.
	Other Committees	Various committees are established according to laws and regulations, such as the Teacher Evaluation Committee, Student Counseling Committee, and Institutional Development & Planning Committee.

¹ For the composition of each meeting, please refer to the [NTU Organizational Charter](#).

Composition of Participants in NTU Affairs Meetings & Administrative Meetings in AY2023

Unit: Person

Representatives	NTU Affairs Meeting	Administrative Meeting
Total	173	39
Academic Staff ¹	146	32
Non-academic Staff ²	9	7
Student Representatives	18	- ³
Female Representatives	47	12

¹ Academic staff includes campus administrators, representatives from colleges and non-college units, faculty, researchers, and teaching assistants.

² Non-academic staff includes administrative staff and janitors.

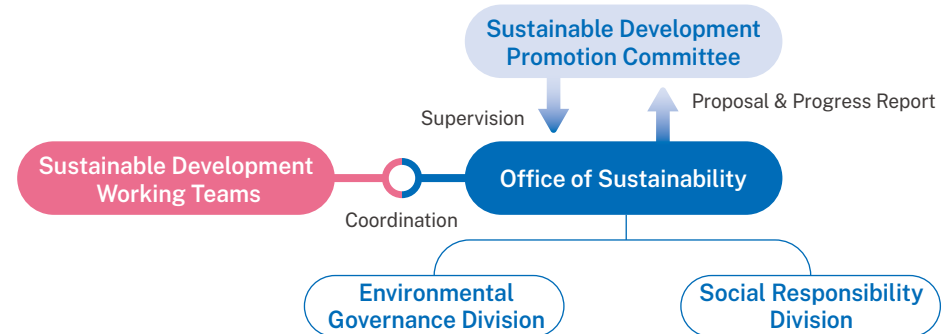
³ Student representatives are invited to attend meetings when proposals concerning the rights and obligations of students are discussed.





II. NTU Sustainability Governance Framework

To effectively integrate the research and development capabilities of its colleges and strengthen the implementation capacity of its administrative units, NTU established the Sustainable Development Promotion Committee and the Office of Sustainability. These bodies are dedicated to planning and promoting sustainable development initiatives, demonstrating NTU's commitment to this crucial goal. The Sustainable Development Promotion Committee, chaired by the NTU President, comprises 15 members, including administrative executives, student representatives, and professors from various relevant disciplines. Its responsibilities include reviewing and supervising the implementation of strategies for a smart and sustainable campus and evaluating the results of action plans. The Office of Sustainability, with its Environmental Governance and Social Responsibility divisions, coordinates internally with administrative and academic units to plan and promote sustainable development action plans. Externally, the Office engages with businesses and communities to build partnerships, jointly address social issues, and ensure that academic research aligns with societal needs, thereby maximizing its impact.



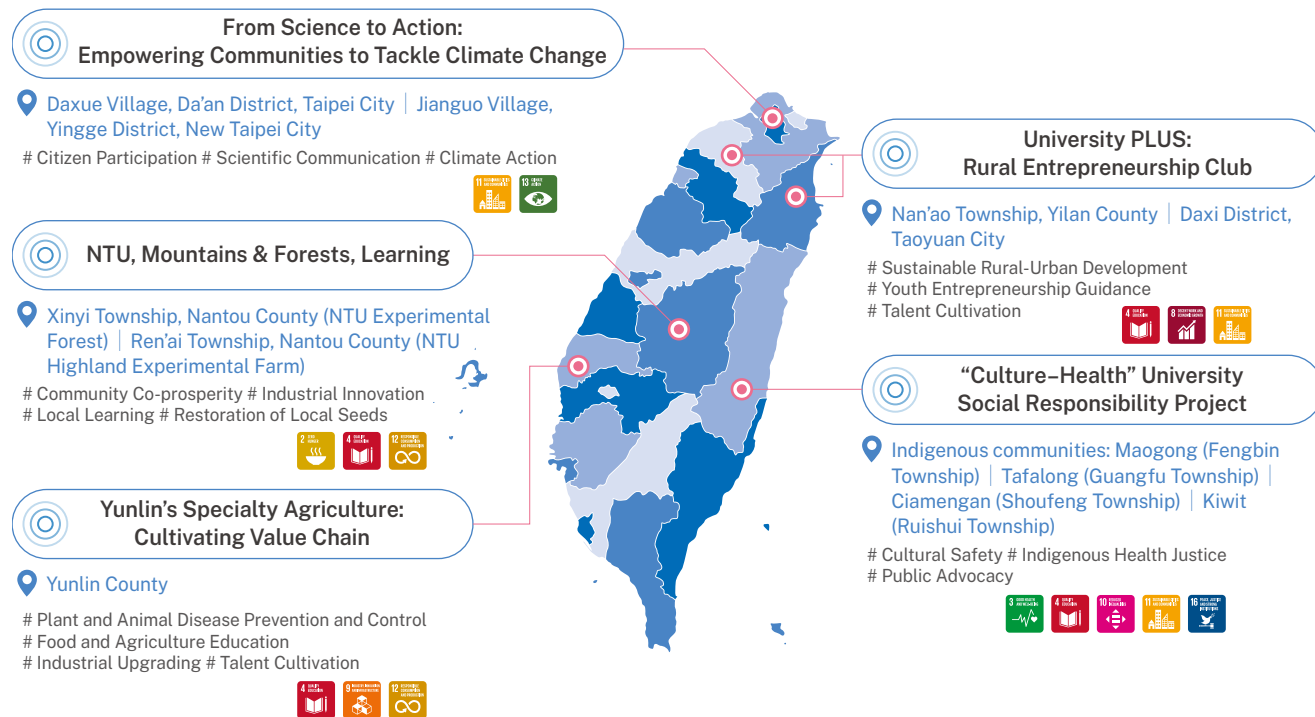
Name	Function
Sustainable Development Promotion Committee	Comprises 15 members, including NTU's administrative executives, student representatives, and professors from relevant fields. Chaired by the NTU President, it reviews and supervises the implementation strategies for a smart and sustainable campus and evaluates the results of action plans.
Office of Sustainability	A top-level university administrative unit with Environmental Governance and Social Responsibility divisions. Internally, it coordinates with administrative and academic units to plan and promote sustainable development action plans. Externally, it participates in social sustainability efforts and extends its influence.
Sustainable Development Working Teams	Based on the promotion strategies, the Office of Sustainability, NTU faculty and student teams, and administrative units collaborate and divide tasks to implement NTU's sustainable development action plans.

III. NTU Sustainable Development Initiatives

Since its establishment in 2022, the NTU Office of Sustainability has actively promoted environmental sustainability and social responsibility initiatives. Regarding environmental sustainability, the Office prioritizes energy, transportation, buildings, and digitalization, establishing close collaborations with various university units. For example, it collaborates with the Office of General Affairs to analyze electricity consumption in campus buildings and with the Office of Academic Affairs to monitor indoor air quality in classrooms at the Boya Lecture Building. Backed by science and with the support of many students, faculty members, and departments, we formulated five major strategies to help us reach our carbon neutrality goals — implementing equipment electrification, using

decarbonized electricity and low-carbon energy, improving energy efficiency, developing negative emissions technologies, and adopting carbon offset certificates. We have also formulated carbon neutrality pathways for various scenarios, aiming to achieve 50% carbon neutrality by 2028 and 100% carbon neutrality by 2048. Concerning social responsibility, we encourage all colleges to embrace the UN Sustainable Development Goals. Leveraging their strengths and addressing societal needs, the colleges have proposed numerous University Social Responsibility (USR) projects. These diverse projects, spanning various fields, fully demonstrate NTU's commitment to multi-faceted and autonomous development.

MOE's USR Implementation Projects (2023–24) and Locations Served



Office of Sustainability X Sustainability Club Exchange Meeting

On September 21, 2023, the NTU Office of Sustainability held the "Office of Sustainability X Sustainability Club Exchange Meeting" at the restaurant located at MK Innovation Hall. To promote sustainable dining, the event featured environmentally friendly vegetarian cuisine. Participating student groups included the Department of Sustainability of the NTU Student Association, Climate Action Club, Roots & Shoots, uCup, and Conserve. The Office of Sustainability first outlined the University's current sustainability initiatives and goals, followed by presentations from each club sharing their concerns, past achievements, and future plans. The exchange meeting aimed to foster familiarity and collaboration between the University and student sustainability clubs, working together to promote campus sustainability.



Office of Sustainability X Sustainability Club Exchange Meeting. (September 21, 2023)

IV. Stakeholder Communication

NTU engages with a wide range of stakeholders, including internal faculty, staff, and students, as well as external organizations, groups, and individuals. These stakeholders have varying degrees of influence on NTU’s operations, teaching, research, and impact on the environment and society. To enhance the transparency of university governance, NTU provides diverse channels for stakeholder communication. These channels offer stakeholders opportunities to provide feedback, participate in campus decision-making, and contribute to a more inclusive and sustainable campus.

Major public communication channels of NTU

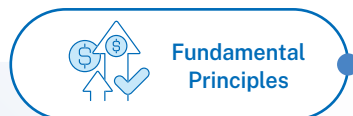
- [Official NTU website](#)
- [NTU Annual Reports](#)
- [NTU e-Newsletter](#)
- [NTU Spotlights](#)
- [NTU FB](#)
- [NTU YouTube](#)
- [NTU HIGHLIGHTS](#)
- [NTU BEATS](#)
- [NTU Alumni Bimonthly](#)

Stakeholder	Faculty	Students	Staff	Government agencies	Alumni	Students' parents	Business enterprises	Media	Academic partners	Local communities/ general public
NTU Contact	<ul style="list-style-type: none"> College and department offices Administrative departments 	<ul style="list-style-type: none"> College and department offices Administrative departments Student Associations & Graduate Student Association 	<ul style="list-style-type: none"> Personnel Department Faculty and Staff Recreation Association 	<ul style="list-style-type: none"> Administrative departments College and department offices 	<ul style="list-style-type: none"> NTU Alumni Center Career Center, Office of Student Affairs Office of Financial Affairs College and department offices 	<ul style="list-style-type: none"> Office of Student Affairs College and department offices 	<ul style="list-style-type: none"> College and department offices Office of Research and Development Career Center, Office of Student Affairs 	<ul style="list-style-type: none"> Media & Press Center, Secretariat 	<ul style="list-style-type: none"> College and department offices Office of Research and Development research centers Office of NTU System 	<ul style="list-style-type: none"> Visitor Center, Secretariat University Library/ NTU Museums Office of General Affairs Office of Student Affairs Campus Planning Office College and department offices
	Form of Communication	<ul style="list-style-type: none"> University/ Department/ Institute Affairs Meetings Administrative Meetings and Committees NTU Suggestion System 	<ul style="list-style-type: none"> University-wide faculty and student forums University/ Department/ Institute Affairs Meetings Administrative Meetings and Committees NTU Suggestion System Meetings with advisors Opinion surveys 	<ul style="list-style-type: none"> NTU Suggestion System Labor-Management meetings Faculty and Staff Recreation Activities Promotion Committee 	<ul style="list-style-type: none"> Official correspondence Evaluations and on-site visits Project grants and subsidies Research reports and publications Advisory meetings 	<ul style="list-style-type: none"> Alumni Association alumni reunion activities NTU Alumni Bimonthly / e-Newsletter NTU career fairs Support through various donations Opinion surveys 	<ul style="list-style-type: none"> Student recruitment seminars Parents Day for freshman students 	<ul style="list-style-type: none"> Industry-academia collaboration Student internships NTU career fairs Employer surveys 	<ul style="list-style-type: none"> Press releases press conferences 	<ul style="list-style-type: none"> Newsletters from each research center Project collaboration Academic collaboration agreements NTU System Consensus Meeting Workshop

2.2 Endowment Management and Sustainable Investment

To fulfill its social responsibility, NTU's Endowment Fund adheres to the Principles for Responsible Investment (PRI) and the UN Sustainable Development Goals, incorporating Environmental, Social, and Governance (ESG) factors into its investment decisions. The NTU Committee for Investor Responsibility comprises eight internal and external members with expertise in investment management and a strong reputation in wealth management, including three administrative executives and five external experts. The Committee formulates investment guidelines, policies, and asset allocation principles for the following year based on the "NTU Directions for Investment Income and Expenditure Management." For specific details, please refer to the [NTU financial planning report](#) for each year.

NTU's Responsible Investment Policy Principles



Fundamental Principles

- Companies listed on the Taiwan Stock Exchange (TWSE) or Taipei Exchange (TPEX) in which the Endowment Fund invests, including their stocks, corporate bonds, and convertible corporate bonds, must prioritize sustainable and stable operations, environmental protection, and social responsibility.
- The sustainability ratings of invested companies in the past two years must meet a certain standard as assessed by reputable ESG rating agencies.
- The tangible impact of companies' Corporate Social Responsibility (CSR) practices should be considered in investment decisions.
- Investment projects should align with NTU's USR vision.
- The Endowment Fund should diversify its investment in sustainability-related financial products to mitigate risks.



Environmental Principles

- Invested companies must address climate change, and those with net-zero emissions pathways or carbon reduction plans receive higher priorities for investment.
- Invested companies should focus on environmental sustainability issues such as waste reduction and the use of green energy.



Social and Corporate Governance Principles

- Companies whose ESG achievements are related to their products or expertise should be prioritized for investment.
- Invested companies should uphold business ethics, ensuring that their products comply with fair trade principles and respect intellectual property rights.
- Invested companies should promote gender equality, embrace gender diversity, and prioritize human rights.

NTU Endowment Fund Investment Targets¹

	Year (Amounts in NT\$1,000)	2021		2022		2023	
		Amount	%	Amount	%	Amount	%
Investment targets and the amounts invested	Electronics	1,011,474	39.5%	786,257	34.9%	1,019,645	37.8%
	Telecommunications	458,192	17.9%	454,980	20.2%	501,373	18.6%
	Food Distribution	135,318	5.3%	132,605	5.9%	141,715	5.2%
	Raw Materials	66,299	2.6%	66,468	3%	77,943	2.9%
	Financial	544,262	21.2%	472,778	21%	429,918	15.9%
	Automobile Manufacturing	15,147	0.6%	10,737	0.5%	0	0%
	Machinery and Equipment Manufacturing	0	0%	0	0%	28,200	1%
	Construction	64,244	2.5%	79,198	3.5%	40,986	1.5%
	Funds	267,954	10.5%	248,101	11.0%	460,234	17.0%
Total Endowment Fund Investment ²		2,562,891	100%	2,251,124	100%	2,700,014	100%

Note 1 The amounts and percentages for each investment target are rounded.

Note 2 These amounts include only investments in stocks and funds.

NTU regularly reviews and updates its sustainable investment policy principles at the Committee for Investor Responsibility meetings, examining major ESG issues across industries, responsible investment principles, corporate governance, sustainability-related events, and ensuring that the Endowment Fund’s investments align with the spirit of USR, ESG, and PRI. Starting in 2019, NTU gradually divested from high-polluting industries, completing full divestment from high-polluting and high-emission industries in December 2020, becoming the first university in Asia to commit to fully divesting from such industries. In 2018, sustainable investments accounted for about 59.9% of the Endowment Fund. By 2023, this figure had increased to 82.8%. NTU will continue to promote sustainable investment, striving to invest the Endowment Fund in companies and mutual funds that demonstrate benchmark sustainability performance, fulfilling its social responsibility and advancing sustainable development.

In 2023,

NTU’s sustainable investment ratio reached **82.8** %.

NTU’s Screening Principles for Stock and Fund Investments¹

Individual stocks

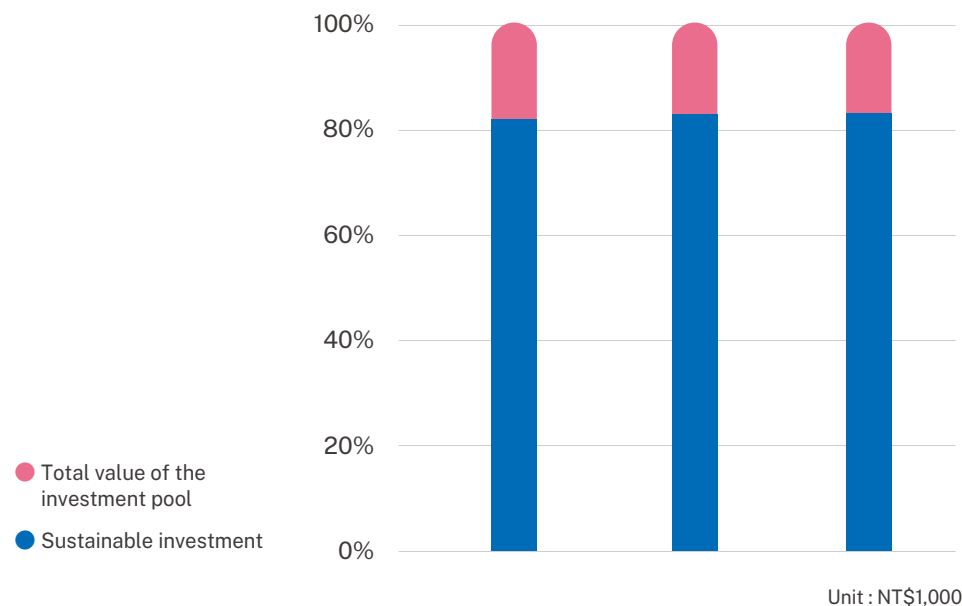
NTU prioritizes investments in companies with sustainable and stable operations that demonstrate commitments to environmental protection and social responsibility, adhering to ESG and CSR concepts. Reference sources for evaluating companies include CommonWealth Magazine’s CSR ranking, the Taiwan Sustainability Index, the TDCC platform, and other reputable domestic and international evaluation indicators.

Funds

If a fund holds shares in companies with controversial ESG practices, the shareholding of any individual stock shall not exceed 5%, and the total shareholding in such companies shall not exceed 20% of the fund’s portfolio. If a fund’s holdings violate these principles, and no actions are taken to rectify the situation after communication and coordination with the investment trust, NTU will immediately redeem the fund.

Note 1 If there are concerns regarding a company’s sustainability and governance practices, NTU will consider taking practical actions. These actions may include reducing or divesting holdings if engagement and improvement opportunities within a reasonable timeframe are not possible.

Ratio of Sustainable Investment



Year	2021	2022	2023
Total value of the investment pool ¹	2,562,891	2,251,124	2,700,014
Sustainable investment ²	2,090,695	1,859,503	2,235,074
Ratio of sustainable investment	81.6%	82.6%	82.8%

Note 1 Investment in equities and funds only.

Note 2 Including investment in corporations and mutual funds with benchmark sustainability performance.

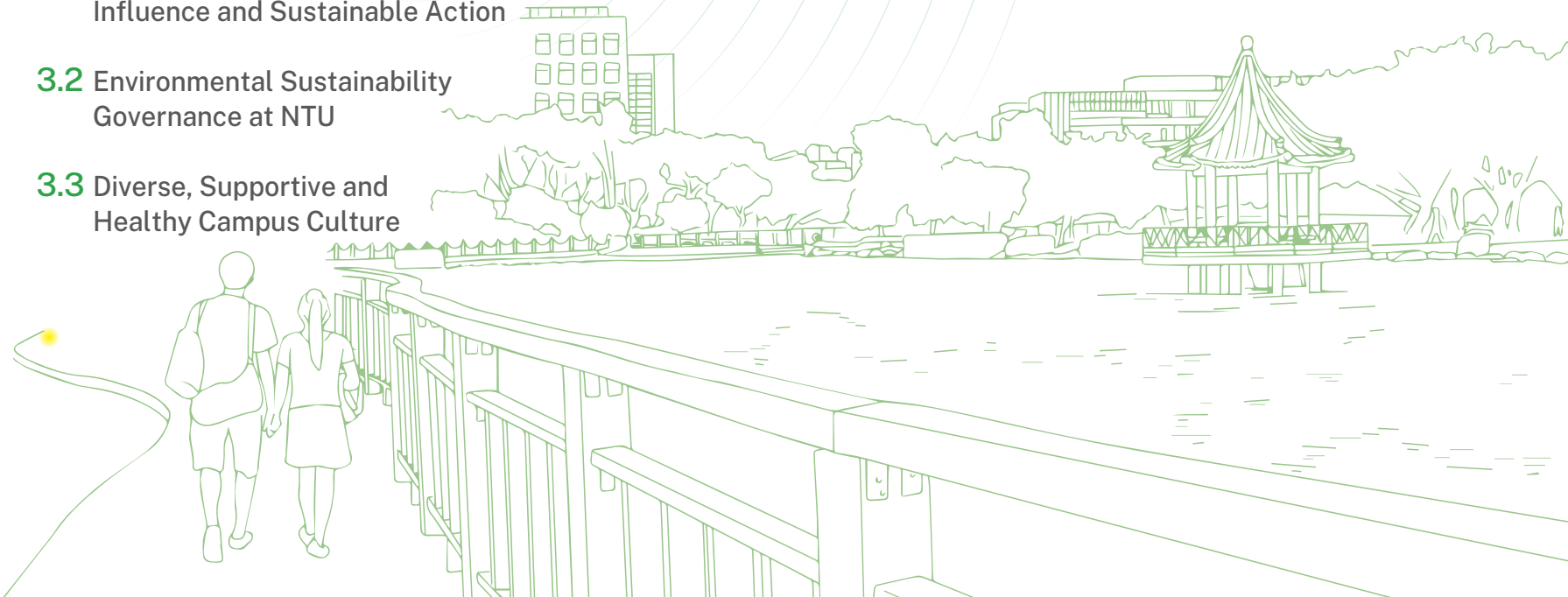
03

Campus Sustainability

3.1 Our Academic and Research Influence and Sustainable Action

3.2 Environmental Sustainability Governance at NTU

3.3 Diverse, Supportive and Healthy Campus Culture



3.1 Our Academic and Research Influence and Sustainable Action

I. Cultivating Transdisciplinary Leaders in a Learner-Centered Environment

The 21st century presents unprecedented challenges to higher education, driven by rapid technological advancements and global transformations. In September 2023, NTU held the inauguration ceremony of the “Office of Future NTU Initiatives,” signifying the launch of a learner-centered open university. This initiative fosters an exploratory learning environment through institutional and environmental building, aiming to cultivate international leaders equipped for future challenges. NTU actively promotes diverse and flexible learning approaches, including Specialization Programs, the University-level Interdisciplinary Bachelor’s Program, and Exploration Credits. These initiatives enrich study subjects, aligning it with students’ needs and interests, and encourage transdisciplinary learning beyond existing frameworks to unlock individual potential.

Furthermore, NTU addresses global challenges and the UN Sustainable Development Goals through problem-based learning and training, nurturing international talent capable of tackling critical issues facing humanity. Established in 2021, the NTU International College currently offers the following four master’s programs: Smart Agriculture, Biodiversity, Smart Medicine, and Disaster Prevention and Risk Reduction. The College aims to cultivate professionals with specialized knowledge and a global perspective on sustainability. Various degree programs offered by NTU also address sustainability issues. For example, the Master’s Program in Global Health teaches public health practitioners with a strong understanding of health and human rights, a global vision, and professional competence, contributing to the well-being of all. NTU remains committed to integrating interdisciplinary resources, fostering students’ sustainable thinking and capabilities, and responding to the challenges of global societal development.

Achievements for NTU’s Educational Resource Sharing

Platform	Description
NTU OCW	NTU OCW offers 286 high-quality courses, accumulating over 19 million views. Course materials are freely available for self-learning by the general public and serve as valuable resources for students, educators, and researchers worldwide in learning, teaching, and research.
NTU MOOCS	Through the Coursera platform, NTU provides access to its exceptional courses for global learners, transcending geographical limitations and promoting the free flow of knowledge. Currently, 69 courses are available, with a cumulative 1,522,055 enrollments and 70,982 course completions.
NTU Speech	NTU, with its abundant faculty and course resources, regularly hosts lectures and seminars. The NTU Speech website preserves speech recordings, having accumulated over 3,000 videos to date. The platform’s YouTube channel has garnered nearly 18 million views and receives an average of 10,000 views daily.
NTU MOOC Project for High School Students	Launched as a pilot program in 2019, this initiative shares NTU’s OCW and MOOC courses as elective courses for high school students’ self-learning. In 2022, the project expanded nationwide to include all public and private high schools, with approximately 70 schools and 1,500 students participating each semester.



Formulating the concept of sustainability on campus

NTU Orientation Camp

Since 2008, NTU has organized the Orientation Camp, offering diverse courses and activities to help freshmen adapt to university life. The program familiarizes students with the campus environment and resources, guiding them to understand the differences between high school and university. Starting in 2022, some Orientation Camp activities have been integrated into online platforms. For example, the “NTU Reality” activity utilizes QR code scanning to access web pages, reducing printed materials. Concept of recycling and waste reduction is also being introduced, enhancing freshmen’s environmental awareness. Additionally, the Freshman Guide incorporates topics such as gender equality and diversity, fostering respect and inclusivity among freshmen.


In **2023**,
the Orientation Camp
 reached approximately **4,000** freshmen.



On-the-job Training for Faculty and Staff

Based on the career development needs of faculty and staff, NTU provides a wide range of training resources. NTU encourages faculty and staff to participate in sustainability-related courses covering topics such as renewable energy development, resilient cities, disaster preparedness, ecological and environmental education, and circular economy. These courses aim to broaden and deepen their understanding of sustainability. For instance, the New Faculty Orientation program includes sessions on university policies, teaching methodologies, research resources, digital teaching, student diversity, mental health and gender equality, and ecological conservation and tours. This program helps new faculty members build up their social networks. It also encourages teachers to embrace innovative teaching practices, integrate sustainability concepts into their classrooms, and foster a high-quality sustainable campus culture.

In **2023**, faculty and staff members
 contributed to a total of **700**¹
 participations in
sustainability-related courses.



¹ Included on-and-off campus courses from the Civil Servant Learning Credit database.

NTU D-School: Fostering Transdisciplinary Innovation and Practice

The D-School fosters innovation, entrepreneurship, and creation by integrating resources and courses from various colleges. The Exploratory Learning Program supports students’ self-directed learning in diverse locations, both domestically and internationally. The Design Your Own Courses project empowers students to propose and develop their own official credit-awarding courses. For example, “Watch Movies and Learn How to Love,” launched in Spring 2022, is the first student-initiated course to become an official interdisciplinary liberal education module, spanning literature, arts, philosophy, and moral reasoning. This course attracted over 2,000 students during the initial course selection phase.

The D-School also brings together the University’s two most active credit-awarding programs: the NTU Creativity and Entrepreneurship Program and the NTU Leadership Program. Building upon a foundation of entrepreneurship, the Creativity and Entrepreneurship Program aims to build up students’ practical abilities and showcase their creativity while fostering a never-say-never attitude and entrepreneurial mindset. The program provides guidance to students, encouraging them to transform creativity into entrepreneurial ventures, thus laying a solid foundation for their futures as entrepreneurs. The Leadership Program offers systematic training in leadership soft skills, a comprehensive interdisciplinary curriculum, and practical experience in addressing real-world issues. The program expects students to enhance their leadership and teamwork skills, serve society, accumulate practical experience, drive positive societal impact, and demonstrate altruism.

As of **2023**,
64 students have joined the
 Exploratory Learning Program.



the Design Your Own Courses project
 has received **45** proposals.



Design Your Own Courses: Empowering students to propose course content designs.

II. Supporting Social Development with Academic Research

NTU encourages faculty and researchers to address critical social issues through research, including climate change, disaster preparedness and control, public health, social welfare, civic engagement, and equity for minorities. NTU strives to advance societal development through high-quality research. In recent years, NTU has established internationally renowned research centers, such as the Ying-shih Yü International Center for History and the Chinese Humanities and the NVIDIA-NTU AI center. In addition, NTU is developing the Advanced Research Institute in Asia, inviting Nobel laureates and world-class scholars from critical domains to conduct research as resident scholars, fostering international academic collaboration while attracting top talent. In 2023, NTU published 5,227 papers in SCI, SSCI, and A&HCI journals. To enhance the accessibility of research findings, 3,041 papers were published in Open Access journals.

NTU's Publications in 2023

Journals	Number of Publications
SCI (Science citation index)	4,969
SSCI (Social science citation index)	504
A&HCI (Arts & Humanities Citation Index)	26
Total	5,227

Note 1 The number of articles and reviews retrieved from the database of Web of Science as of April 30, 2023.

Note 2 The same publication may be categorized as SCI, SSCI, and A&HCI at once. After removing double counting cases, the number of NTU's publications in Web of Science in total is 5,227.

Open Access



publications accounted for nearly **50%** of NTU's total scholarly output, with **3,041** papers published in Open Access journals.

In response to the government's policy requirements of development in culture, economy, and technology, NTU is often commissioned by the government to carry out research or practical projects in specialized fields to provide an academic and research basis when the government makes important policies and explores solutions to social issues. In 2023, NTU colleges and research centers conducted 3,041 research projects, 410 of which were directly related to sustainability.

Sustainability-Related Research Projects in 2023

College/Center	Number of Projects
College of Liberal Arts	4
College of Science	52
College of Social Sciences	28
College of Medicine	51
College of Engineering	50
College of Bioresources & Agriculture	136
College of Management	18
College of Public Health	26
College of Electrical Engineering & Computer Science	11
College of Law	13
College of Life Science	20
Others	33

Note Data retrieved using sustainability-related keywords defined by NTU.

Promoting Open Access for Knowledge Dissemination

To advance open science, NTU Library encourages its scholars to publish in Open Access (OA) journals to enhance the visibility and impact of their research. The library has established agreements with publishers such as Cambridge University Press (CUP), Elsevier, and IEEE, providing NTU faculty and students with article processing charge waivers or discounts when publishing in their OA journals. This initiative encouraged academic sharing and facilitates knowledge dissemination. From May 1 to December 31, 2023, 100 faculty members and doctoral students applied for this subsidy, submitting a total of 112 articles.

Furthermore, NTU's Office of Research and Development offers various individual and group research grants, such as the Higher Education SPROUT Project – Study Abroad Program Grant, the Jade Picking Project, and the Seed Projects for Interdisciplinary Research. These grants encourage faculty and students to pursue cutting-edge research and delve into fundamental issues. NTU also collaborates closely with industry, facilitating technology transfer and fostering startup incubation.

Technology Transfer and Startup Incubation Initiatives and Achievements

Initiative	Description
Startup encouragement measures	To stimulate innovation, entrepreneurship, and interdisciplinary/inter-institutional collaboration, NTU established the "Seed Seeker Project" funding program in 2023. This program encourages teams to conduct preliminary validation or develop prototypes of their innovative ideas, facilitating commercialization or entrepreneurship. The project has attracted over 50 teams for consultation, with 13 teams currently in the implementation phase.
Spin-off company establishment	To encourage the commercialization of research outcomes and drive industrial innovation, NTU has facilitated the establishment of over 30 spin-off companies since 2016, leveraging faculty expertise and university technologies.
Technology transfer	The "NTU Online Technology Information & Marketplace System" showcases nearly 3,000 patented technologies, providing a platform for businesses to access NTU's research achievements. Through licensing and sales of patents and technologies, NTU assists companies in overcoming research and development bottlenecks, pushing forward industrial upgrading and corporate transition.
Innovation incubation	NTU's Shuiyuan Campus houses an Incubation Center with approximately 6,240 square meters of space, providing short- to medium-term support for businesses and laboratory facilities. The center has nurtured over 200 companies, with six companies successfully completing initial public offerings (IPOs). By connecting incubated companies with NTU's entrepreneurial resources and research capabilities, the center offers comprehensive and tailored services.



Embracing 2025: A New Health Forum for Taiwan's Super-Aged Society

The NTU EMBA Alumni Foundation organized the "Embracing 2025: A New Health Forum for Taiwan's Super-Aged Society," focusing on the societal and healthcare challenges of an aging population. The forum emphasized health promotion and preventive medicine, aiming to foster dialogue among industry leaders, scholars, and experts to share insights and innovative practices for a healthier future. Dr. Ming-Shiang Wu, Superintendent of NTU Hospital, and Professor Wen-Yih Tseng, Chief Scientist and Chief Medical Officer of AcroViz Technology, presented on "Future Trends in Healthcare and Healthy Aging" and "Research on Brain Age Gap and Dementia Prevention," respectively. Their insights encouraged collaborative efforts to enhance societal health and quality of life.



● Embracing 2025: A New Health Forum for Taiwan's Super-Aged Society. (September 10, 2023)

III. Social Care and Sustainability Promotion Led by Students

NTU boasts over 400 active student clubs, including service-oriented groups, fitness clubs, and academic and artistic societies. These clubs showcase NTU students' diverse creativity and talents through events such as the Azalea Festival, club exhibitions, and university ceremonies. In 2023, NTU student clubs formed 54 social service teams with approximately 1,462 students, delivering services to around 3,475 individuals. Additionally, 9,724 students participated in service-learning courses, demonstrating their commitment to social responsibility. Since 2016, NTU has promoted the Green Campus Initiative, providing annual subsidies to student clubs for organizing environmental activities. Various student organizations, including the Student Association, Jane Goodall's Roots & Shoots, the College of Medicine Student Social Service Group, the Ci You Yi Guang Group, and NTU Country Youth Life Study Club, actively engage in sustainability initiatives, amplifying the social impact of young people.

From **2020** to **2023**
the Green Campus Initiative

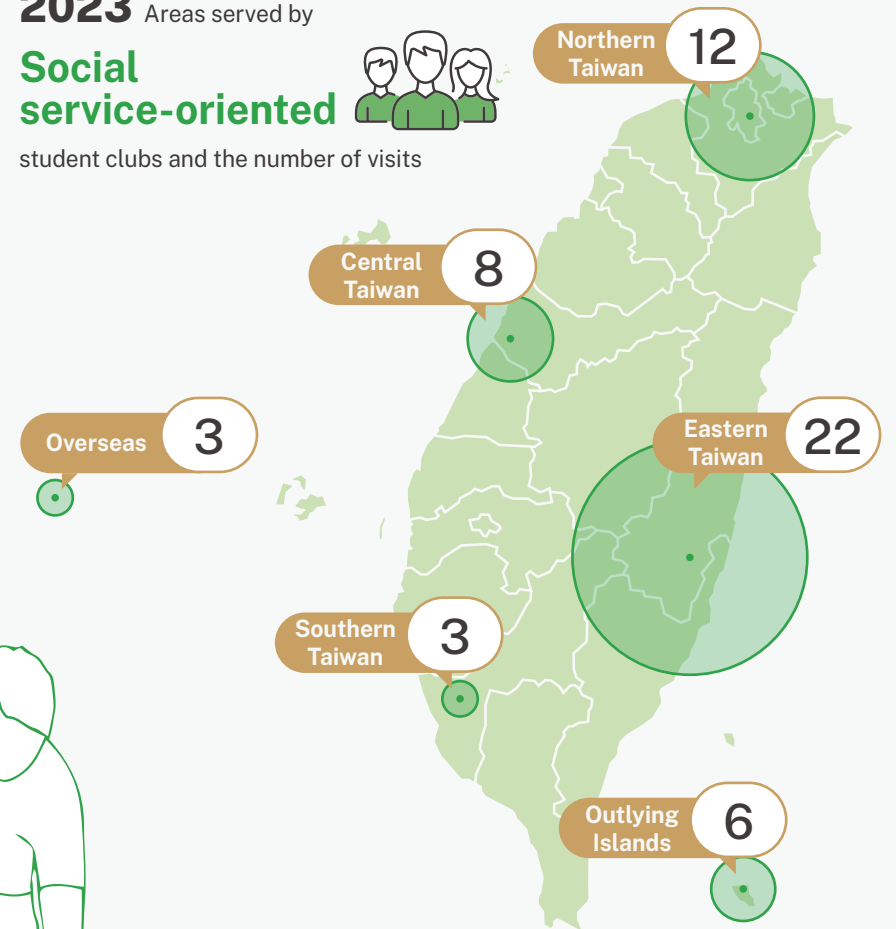
has funded **51** student-club activities.

2023 Areas served by

Social service-oriented



student clubs and the number of visits



Green Campus Initiative Achievements



International Youth Culture Summit

The NTU Chapter of AIESEC organized the International Youth Culture Summit from July 13 to 16, 2023, focusing on SDG 3, SDG 4, and SDG 11. The summit successfully introduced 93 high school students to these SDGs and increased their engagement through brainstorming sessions and presentations of their creative projects.

| Instructor leading students in a discussion on SDGs.

River cleaning with children

The Ci You Yi Guang Group, in collaboration with the Tatung Children's Home (operated by Taiwan Fund for Children and Families) and the Taipei City Department of Environmental Protection, organized a river cleaning activity on May 28, 2023. Engaging activities such as environmental trivia, waste sorting games, guided tours of local flora, and a pineapple cake-making workshop which educated children about environmental conservation and its significance.



Participants engaging in a waste sorting game, incentivized by a point system to collect waste. |



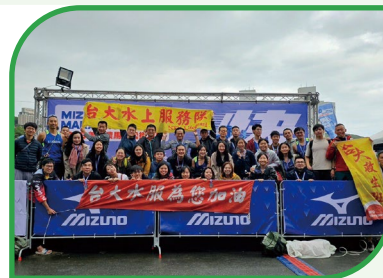
NTU Trail Action | Students constructing an eco-craft trail.

Established a decade ago, NTU Trail Action is the only service-oriented student club in Taiwan dedicated to promoting eco-craft trails and long-distance greenways. During the semester, the club conducts trail surface surveys in the suburbs of Taipei. Every winter and summer break, they collaborate with the Taiwan Thousand Miles Trail Association to provide eco-craft trail services at NTU's Mei-Feng Farm, offering university students opportunities to learn trail construction techniques and understand the forest environment of Taiwan's mid- to high-altitude regions.

NTU Lifeguard

To promote water safety education and equip individuals with lifesaving skills, the NTU Lifeguard team offers courses in surf lifesaving, rope rescue, first aid, and CPR each semester. The team learn self-rescue and rescue capabilities in its members, teaching essential lifesaving techniques and first aid knowledge applicable to everyday life.

Group photo of the Water Rescue Team during training. |



Campus composting¹

In April 2023, Jane Goodall's Roots & Shoots launched a five-month campus composting initiative, which includes workshops on composting techniques and DIY sessions on building compost bins. The first compost bin, installed near the Global Change Research Center, serves as a model for on-campus food waste recycling, and has processed approximately 20 kg of food waste within two months. The project plans to expand to two additional locations, encouraging broader student participation and raising awareness of campus sustainability.

| A compost bin assembled based on natural principles.

28th NTU Arts Festival

The central exhibition of the 28th NTU Arts Festival: "The Realm of Sojourn" . |

The 28th NTU Arts Festival commenced on May 5th, 2023, with the theme "Reviver," symbolizing fluidity, infinite cycles, and aligning with the concept of sustainability. The festival's central exhibition, "The Realm of Sojourn," featured a Möbius strip constructed from infinite mirrors, allowing visitors to experience the sensation of infinity and grasp the essence of "Reviver." Additional lectures and workshops, such as "This Land & This Home: Interweaving Sustainable Living and Local Culture" and "Silkscreen Printing Workshop: Sustainable Proposals for Everyday Clothing," explored sustainability across psychological, environmental, and lifestyle dimensions.



14th Global Initiatives Symposium in Taiwan²

The 14th Global Initiatives Symposium in Taiwan (GIS Taiwan) took place February 7-11, 2023, bringing together nearly 200 university and high school students from 11 countries and dozens of distinguished speakers for in-depth academic and cultural exchange. Themed "Fragments of the Future," the forum encouraged student delegates to envision and explore the future, addressing societal changes and preparing for upcoming challenges. Four prominent contemporary issues — "Monetary Revolution," "New Trends in Healthcare," "Metaverse," and "Sustainable Green Energy" — were explored through keynote speeches, brainstorming sessions, and project-based activities. These sessions facilitated close interaction between student delegates and professionals from industry, government, and academia, providing fresh perspectives and enriching experiences.

| The 14th Global Initiatives Symposium in Taiwan (GIS Taiwan) brings together young people from around the world to brainstorm ideas.

Note 1 Composting is a carbon sequestration method that reduces emissions associated with food waste processing and transportation. Compost bins, with their ability to produce fertilizer and conserve water, can also contribute to building resilient communities.

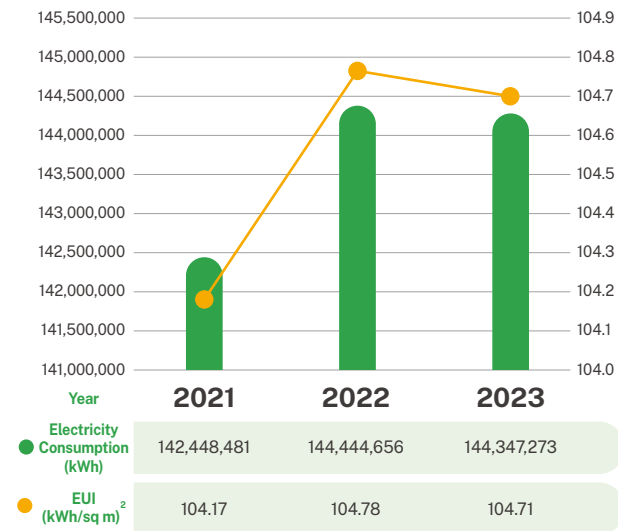
Note 2 The Global Initiatives Symposium in Taiwan (GIS Taiwan) is an international student academic forum organized by a team of students, dedicated to promoting academic research and international exchange. It aims to create a platform for collaboration among industry, government, and academia.

3.2 Environmental Sustainability Governance at NTU

I. Low-Carbon Campus

NTU actively promotes energy conservation and carbon reduction, aiming to achieve negative growth in total electricity consumption. Through actions such as replacing outdated air conditioners, upgrading to energy-efficient lighting, improving heat pump performance, and monitoring electricity usage in campus buildings, NTU strives to create a low-carbon campus. As of 2023, NTU has 12 certified green buildings and mandates that all new construction projects achieve equivalent green building certification.

Electricity Consumption and Electricity Usage Intensity (EUI) in the Last Three Years¹



Note 1 Statistics of NTU's Main Campus, Shuiyuan Campus, College of Public Health, College of Medicine (excl. NTUH), College of Social Sciences' old building, and Zhubei Campus.

Note 2 Covering a total floor area of 1,367,443 m² in 2021, 1,378,500 m² in 2022, and 1,378,500 m² in 2023.

Certified green buildings of NTU in 2023¹





 Silver National Taiwan University Cancer Center Hospital 2023	 Silver MK Innovation Hall 2020	 Silver Tseng Jiang Hall 2019
 Silver Zonghe Lecture Building 2019	 Bronze College of Engineering Building 2023	 Bronze Construction of Leung Center for Cosmology and Particle Astrophysics 2021
 Bronze NTU Motorcycle Parking Lot 2021	 Bronze Yonglin Biomedical Engineering Hall 2019	 Certified Lixian Hall 2023
 Certified Agricultural Incubation and Extension Center 2019	 Certified Construction of the Faculty and Staff Dorm 2018	 Certified Animal Resource Center 2017

Note 1 Buildings that passed Green Building Certification (Class Certified and above) as of December 31, 2023.

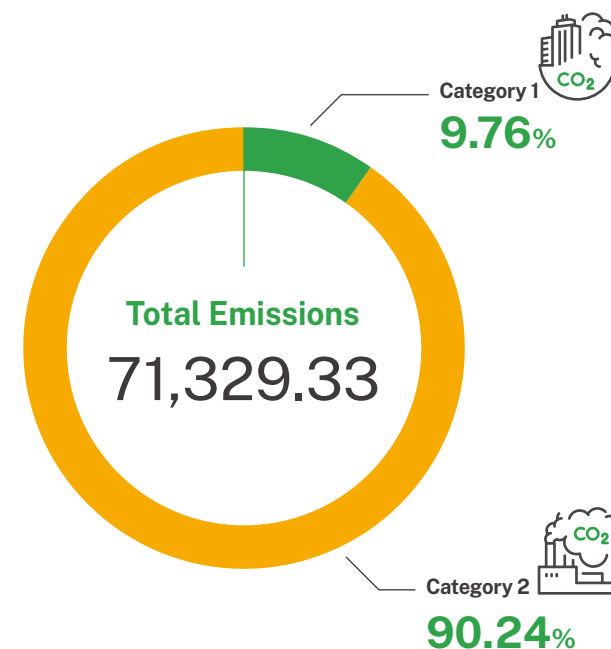


Regarding greenhouse gas (GHG) inventory, NTU obtained the ISO 14064 GHG verification statement in 2011. In 2021, NTU conducted its 2020 GHG inventory using the ISO 14064-1:2018 standard, becoming the first educational institution in Taiwan to conduct a GHG inventory based on this updated standard. The inventory was externally verified by the British Standards Institution (BSI). For 2023 GHG emissions, NTU initiated an internal inventory process, focusing on Category 1 (direct GHG emissions) and Category 2 (indirect GHG emissions from imported energy). The primary sources of Category 1 emissions include fuel consumption by research vessels, boiler combustion, natural gas combustion, and refrigerant leakage from refrigeration equipment. Category 2 emissions, fully from purchased electricity, constitute the largest source of NTU's GHG emissions. In the future, NTU will conduct regular inventories to track carbon emissions and adjust its carbon neutrality pathways and strategies accordingly.

Practical Measures for Energy Conservation and Carbon Reduction

Measure	Details
 <p>Replacing old air conditioners</p>	<ul style="list-style-type: none"> From 2017 to 2023, a total of 3,535 air conditioners that were nine years or older were replaced with high-efficiency models, with an estimated energy saving rate of about 25%.
 <p>Switching to energy-efficient lights</p>	<ul style="list-style-type: none"> Indoor lighting: Since 2019, around 63,800 T5/T8 fluorescent lights have been replaced with LED lights, achieving an energy saving rate of over 40%. Fire safety lighting: From 2011 to 2023, around 6,261 fire safety lights were replaced with LED lights, reducing energy consumption by 90%. Outdoor lighting: All outdoor lighting in NTU's Main Campus has been replaced with LED lights since 2011. Since 2017, smart street lighting systems have been installed in phases, with 331 lights replaced to date. Smart street lights consume 67% less electricity than LED lights.
 <p>Improving heat pump performance</p>	<ul style="list-style-type: none"> Water-to-water heat pump systems have been installed in the sports center, 1st Men's Graduate Dorm, 1st Women's Graduate Dorm, 2nd Women's Dorm, and 7th Men's Dorm. The energy efficiency of these systems is examined and certified every year.
 <p>Monitoring electricity consumption</p>	<ul style="list-style-type: none"> Electricity consumption patterns in each building are tracked monthly using digital meters. Abnormalities are addressed, and regular meetings are held to review consumption patterns. The energy efficiency of larger air conditioning systems, such as those in the Life Science Building, Main Library, and Second Activity Center, is continuously monitored to ensure energy-saving effectiveness.

2023 GHG Emissions¹



Unit: tCO₂e

Emission category	Definition (ISO 140641-1:2018)	Emissions
● Category 1	Direct GHG emissions and removals	6,958.52
● Category 2	Indirect GHG emissions from imported energy	64,370.81
	Total Emissions	71,329.33

Note 1 Inventory boundary includes nine areas, which are NTU's Main Campus, School of Professional Education & Continuing Studies, Downtown Campus, Experimental Farm, NTU Veterinary Hospital, Highland Experimental Farm, Experimental Forest, Zhubei Campus, and Yunlin Campus.

II. Convenient Smart Transportation

To reduce carbon emissions, NTU has gradually replaced its fossil-fuel based university vehicles with electric car and scooters and provided EasyCards for short-distance business travel. To encourage faculty and students to adopt low-pollution, low-energy green transportation, NTU has installed charging stations for electric vehicles on campus. In 2020, NTU partnered with Tesla to launch Taiwan's first Tesla V3 Supercharger facility and introduced the GOGORO smart charging station, a scalable battery swapping network, providing convenient charging services for electric vehicles. In 2023, NTU collaborated with external vendors to install a total of 15 electric vehicle charging spaces in the Gongguan area and Sports Center parking lots, further promoting carbon reduction through green transportation.

To promote the concept of shared mobility in smart transportation, NTU partnered with a car rental company to provide a 24-hour self-service car rental service in campus parking lots through a car-sharing mechanism. NTU also collaborated with the Taipei City Department of Transportation and YouBike Company on the "YouBike 2.0 Upgrade Project," installing 123 YouBike 2.0 rental stations on campus and in surrounding areas. To encourage the use of public transportation, NTU offered a subsidy program, where students would get NT\$100 back when their YouBike 2.0 spending reached NT\$500.

In academic year 2022-2023,

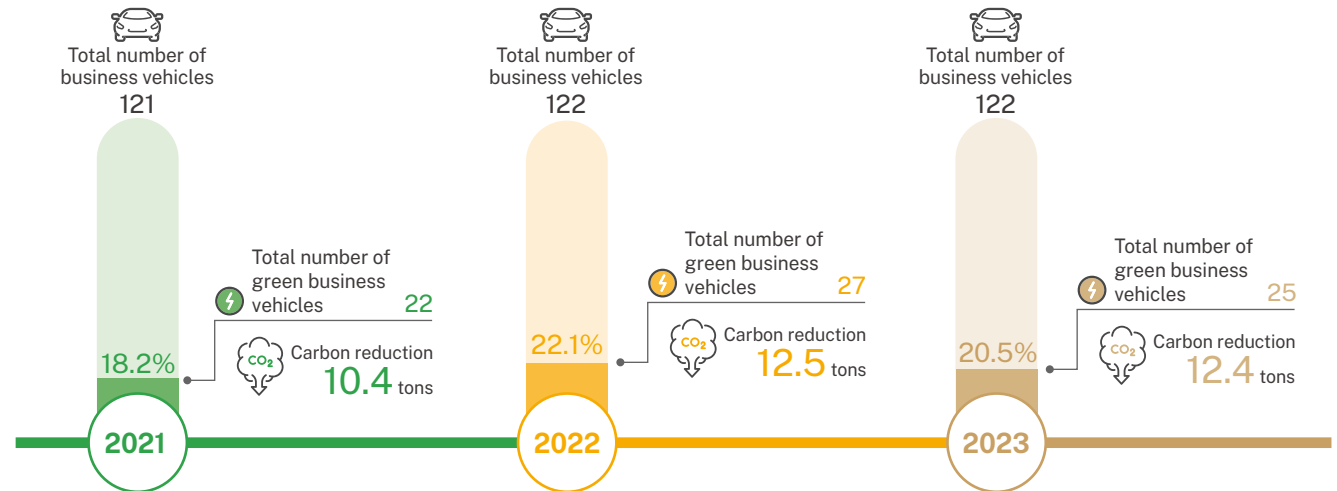
the "NTU Student YouBike 2.0 Subsidy Program"

attracted **5,802** student applications,

with a total of **NT\$81,300** in subsidies provided.



Number and Percentage of Green Business Vehicles in the Last Three Years

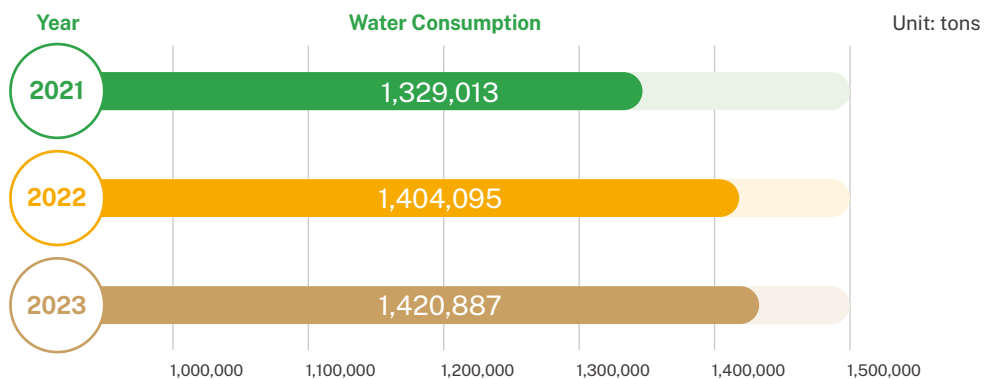


To enhance the on-campus transportation environment, NTU improved pedestrian and bicycle traffic flow and implemented signage for separating pedestrian and vehicle lanes on campus.

III. Water Management & Recycling

Beginning in 2018, NTU gradually replaced traditional water meters with digital meters. In 2019, a digital monitoring system was installed to enhance the monitoring of water consumption on campus and minimize water wastage. Meter recordings are checked monthly, and regular campus patrols are conducted to detect and repair leaks. In 2023, a total of 483 water-saving improvement projects were completed in campus buildings and dormitories. In addition, NTU has implemented measures such as upgrading main water pipes, using water-saving equipment, and promoting water conservation to improve water usage.

Water Consumption in the Last Three Years



Note 1 Statistics include NTU’s Main Campus, Shuiyuan Campus, College of Public Health, College of Medicine (excluding NTUH), the old College of Social Sciences building, and Zhubei Campus.

Note 2 Due to campus closure and partial work-from-home arrangements from May to September 2021 caused by the pandemic, campus water demand was relatively low in 2021.

Other Water Management Measures

- Rooftop rainwater and swimming pool water is channeled into the Drunken Moon Lake.
- Water from lakes and raft foundations is channeled into the ecological pond for landscaping or used for irrigation at the farm.
- New buildings have rainwater recycling systems to collect rainwater for flushing the toilet and watering the plants.
- Rain gardens are built along roadside planted areas, where surface runoff is absorbed by soil, increasing water retention capacity.

Revitalized Courtyard at the College of Bioresources and Agriculture Wins Taiwan Landscape Award



The beautiful scenery of the revitalized courtyard.

The courtyard situated between Building No. 4 of the Department of Horticulture and Landscape Architecture (DHHLA) and Building No. 5 of the Department of Bioenvironmental Systems Engineering at NTU’s Main Campus had long suffered from neglect. Overgrown trees with unpruned branches cast deep shadows, and exposed roots created uneven terrain. With generous support from DHHLA alumni, the department office and alumni association collaborated to transform the once-overgrown courtyard into a refined garden with ecological educational value. The courtyard’s soil presented a challenge, with a dense clay layer starting just 50 cm below the surface, hindering drainage and restricting root growth. The renovation project employed low-impact development design methods, laying Water Harvesting Modules nearly a story high. A significant amount of organic matter provided by NTU Farm was also incorporated into the soil. These measures effectively addressed the courtyard’s drainage issues while achieving sustainable water resource utilization, contributing to the least environmental impact and, soil and water conservation. The revitalized courtyard was awarded the Merit Award in the “Parks, Green Spaces, and Public Open Spaces Category” of the 10th Taiwan Landscape Awards.

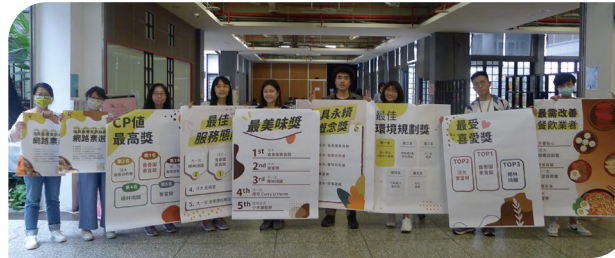


Laying Water Harvesting Modules to improve drainage in the courtyard.

IV. Sustainable Dining

In line with government policies on promoting food safety, reducing food waste, and using eco-friendly tableware, NTU established the NTU Dining Service Committee. It oversees the management of on-campus restaurants and convenience stores, ensuring safe and delicious dining options for everyone. To promote sustainable dining, the Committee added a “Sustainable Dining” category to its annual online poll for outstanding campus vendors in 2023. This initiative encourages campus vendors to prioritize ingredients with eco-friendly, animal welfare, and organic certifications, while also encouraging faculty and students to embrace sustainable dining practices. Furthermore, NTU’s College of Bioresources and Agriculture leverages its expertise and abundant farm

resources to organize educational events and farmers’ markets regularly, promoting sustainable farming and sustainable food culture that integrate environmental awareness and agricultural education.



An annual online poll is conducted to select outstanding food vendors, with “Sustainable Dining” added as an evaluation criterion in 2023.

NTU Sustainable Dining Related Activities and Plans

Theme	Activity/Plan	Description
<p>Food safety</p>	MOE Campus Food Ingredients Registration Platform	In compliance with Ministry of Education (MOE) regulations, NTU provides guidance to campus restaurants for registering their information on the MOE campus food ingredients registration platform. This enhances transparency for food on campus, establishes a food risk management mechanism, and creates a campus food safety protection network.
	Regular food inspections	Food inspections are carried out in restaurants and convenience stores on campus every semester. Samples are sent to accredited laboratories for microbiological and chemical testing. If results fall below safety standards, products are retested or removed from shelves, penalties are imposed, and improvements are mandated within specified timeframes.
	On-site inspections of food safety and sanitation	Food safety and sanitation inspections are conducted in restaurants and convenience stores on campus every semester. The responsible agencies and food service providers are notified of inspection results and guided in implementing improvements. Major violations are subject to penalties and recorded according to regulations.
	Food safety and sanitation education and training	Responsible agencies and food service providers are called to meetings every semester to propagate government policies and discuss sanitation inspection matters. Educational training is also provided to reinforce food safety education.

溫室氣體排放資訊揭露之飲食減排效益

2023. 05. 01 - 05. 30

目標1 校園餐點 碳排放量 分布調查

目標2 校園餐點 碳排標示 與宣傳

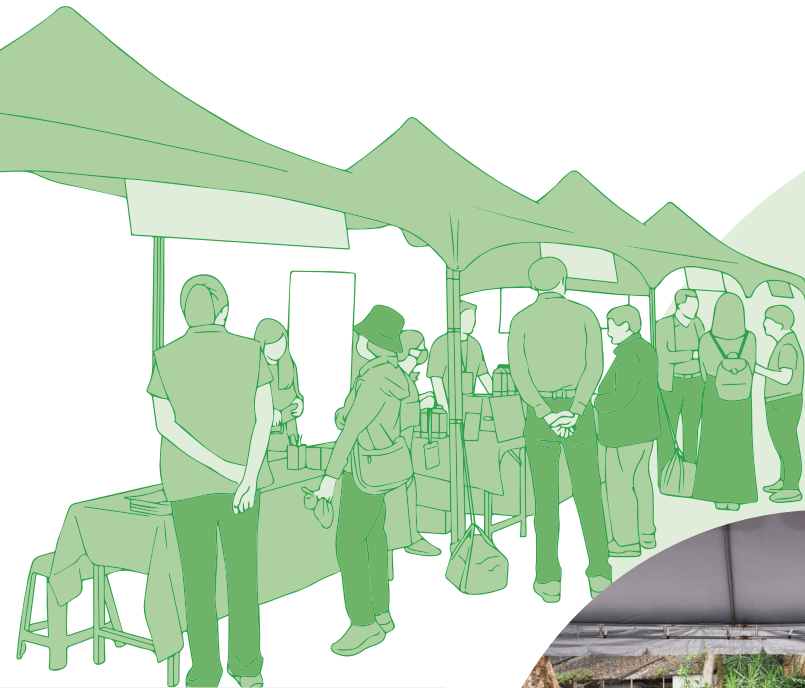
目標3 學生飲食 選擇行為 變化調查

本計畫的懶人包，歡迎掃描觀看！



熱心參與店家列表

- 男一餐廳
- 大一女美食廣場
- 小福樓
- 活大
- 樓寶樓
- 早餐部
- 厚宅咖哩
- 早口福
- 海音Brunch
- 丹堤咖啡
- 桔客
- 稻香商號
- 韓風小舖
- 肯德基
- 開心廚房
- isaac 愛特別韓國
- 綠食
- 重慶抄手
- 哈拉羅上飯
- 奶油吐司專賣
- 四海遊龍
- 路易莎
- 麻拌拌
- 摩斯漢堡

Poster for the “Carbon-Neutral + Healthy Diet” project.



To create a friendly dining environment, NTU created and published the “Muslim-Friendly Restaurants” map on the website.

Theme	Activity/Plan	Description
 <p>Reducing food waste, promoting sustainable dining</p>	“Low-Carbon Food” education & training	“Low-carbon food” courses are designed to educate food service providers about cherishing food, reducing food waste, using local ingredients, and shortening the distance between farm and table. The goal is to promote “cherish 100% of food to achieve zero food waste.”
	Sustainable ingredients	Create a sustainable ingredients webpage and encourage campus restaurants to use ingredients with eco-friendly, animal welfare, and organic certifications. Incorporating “Use of Certified Ingredients” as a criterion for evaluating and selecting contract vendors, highlighting the importance of ingredient traceability and sourcing.
	Carbon-Neutral + Healthy Diet project	Prof. Wen-Ling Adela Chen from the College of Public Health implemented the “Carbon-Neutral + Healthy Diet” project, in which the carbon footprint of meals served in student restaurants was calculated and classified as low, medium, or high carbon emissions. This information is displayed in restaurants for diners to consider.
 <p>Promotion of sustainable agriculture, livestock, and aquatic products</p>	NTU Farm	NTU Farm actively assists faculty and students with teaching, internships, experiment, and research projects. In addition to serving as a model farm for sustainability, it leverages its unique environmental features to provide abundant green spaces and promote environmental awareness and agricultural education.

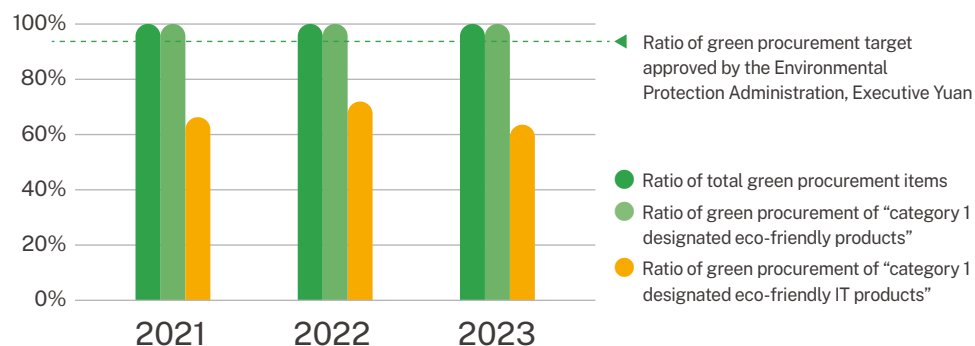


NTU’s College of Bioresources and Agriculture has long been promoting USR projects in Yunlin County. The “NTU USR Yunlin Farmers’ Market” was held on campus, inviting Yunlin farmers to showcase and sell their high-quality agricultural and livestock products. (November 11–12, 2023)

V. Sustainable Procurement

In compliance with the “Government Agency Green Procurement Plan” and relevant assessment guidelines, NTU has put in place a sustainable procurement policy and continues to encourage all departments and offices to prioritize the use of recyclable, low-pollution, and resource-efficient products. NTU also encourages the procurement of eco-friendly products certified with Green Mark. The Office of General Affairs set up the “Green Procurement” section on its website, listing relevant regulations and reference materials to assist departments in implementing sustainable procurement practices. In the past three years, NTU has consistently exceeded the green procurement target ratio set by the government, demonstrating significant achievements.

Sustainable Procurement Ratio¹



Year	2021	2022	2023
Ratio of green procurement target approved by the Environmental Protection Administration, Executive Yuan	95%	95%	95%
Ratio of total green procurement items ²	100.00%	100.00%	100.00%
Ratio of green procurement of “category 1 designated eco-friendly products” ³	100.00%	100.00%	100.00%
Ratio of green procurement of “category 1 designated eco-friendly IT products” ⁴	66.15%	71.13%	64.11%

- Note 1** Statistics of procurements made by all campuses in the name of “NTU”.
- Note 2** (Procurement amount of designated eco-friendly products + Procurement amount of green products) / (Total procurement amount of designated items + Procurement amount of green products).
- Note 3** Procurement amount of designated products with Green Mark / Total procurement amount of designated items.
- Note 4** Procurement amount of designated IT products with Green Mark / Total procurement amount of designated items.

VI. Waste Reduction & Recycling

NTU has been consistently promoting waste reduction and recycling classification systems for many years. Waste is managed based on categories such as general waste, recyclables, and food waste, with the implementation of designated garbage bags and policies to prevent littering. In 2023, NTU further intensified its waste reduction initiatives by mandating a decrease in the use of disposable tableware and bottled water by departments. Moreover, enhanced inspections were carried out at waste collection points. As a result, the total waste output in 2023 decreased by 34.57 tons compared to the previous year, making a reduction of 2.21%. To ensure the proper management of laboratory waste, NTU has established the “Regulations for the Storage, Disposal, and Handling of Laboratory Waste,” which outlines classification standards and regulations for storage, removal, and treatment. Additionally, the “Chemical Resource Sharing Platform” has been established to alleviate the burden of chemical storage and disposal, thereby effectively managing hazardous industrial waste.

Waste Generation in the Last Three Years



Waste Category	2021 ¹	2022	2023
Landfilled Waste ²	43.34	74.68	57.49
Incinerated Waste	877.87	860.36	839.00
Recycled Waste	330.43	411.54	389.17
Shredded Branches and Leaves	186.00	206.00	229.00
Food Waste	10.58	14.31	15.91
Total Waste	1,448.22	1,566.89	1,530.57

- Note 1** The pandemic control measures implemented in 2021 led to a significant decrease in the number of people entering the campus. With most on-site courses and meetings canceled or moved online, there was a substantial reduction in both total waste and recyclable materials.
- Note 2** Taipei City no longer has public landfill sites, so NTU’s waste has primarily been incinerated in recent years. However, large fallen branches on campus require shredding before being incinerated at the Beitou Refuse Incineration Plant. In cases where the plant’s shredder malfunctions, the branches are sent to the Shanshuilu Eco Park (formerly the Shanzhukeng Landfill) for processing. Consequently, NTU occasionally generates data reflecting a small amount of landfilled waste.

VII. Biodiversity

NTU has been conducting regular biodiversity surveys on campus since 2009, covering various species such as birds, mammals, reptiles, insects, plants and green coverage. These surveys aim to understand the distribution of species within the campus and monitor changes in native and non-native species, providing valuable data for biodiversity management. In 2021, NTU initiated a firefly restoration project, releasing over 2,200 firefly larvae into designated restoration areas on campus. By continuously introducing new larvae, the project aims to increase genetic diversity within the firefly population, enhancing their adaptability to the environment and promoting population stability. In addition, NTU regularly carries out activities such as brown root rot disease prevention and control, tree health checks, lychee giant stink bugs management, bird-window collisions prevention, and maintenance of azalea, camellia, and crape myrtle populations to ensure a diverse and visually appealing ecological environment on campus.

Between 2021 and 2023,
NTU campus tours 

attracted a total of **18,440** participants from the general public.



NTU's Visitor Center regularly organizes campus tours and training for tour guides, enhancing the understanding of campus ecology among NTU students, faculty, and members of the public.



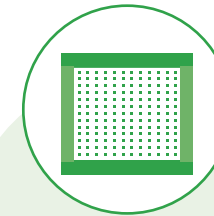
Lychee giant stink bug management

Instead of using pesticide sprays, NTU employs biological control methods by introducing *Anastatus formosanus*, a parasitic wasp that effectively reduces lychee stink bug populations. This approach has yielded positive results, significantly decreasing the number of lychee stink bugs on campus.



Azalea maintenance

Recent climate change, characterized by hot, dry summers and insufficiently cold winters, has posed challenges to azalea growth and flowering. However, through the dedicated efforts of the Office of General Affairs and the Department of Horticulture and Landscape Architecture, azaleas throughout the campus continue to produce vibrant blooms.



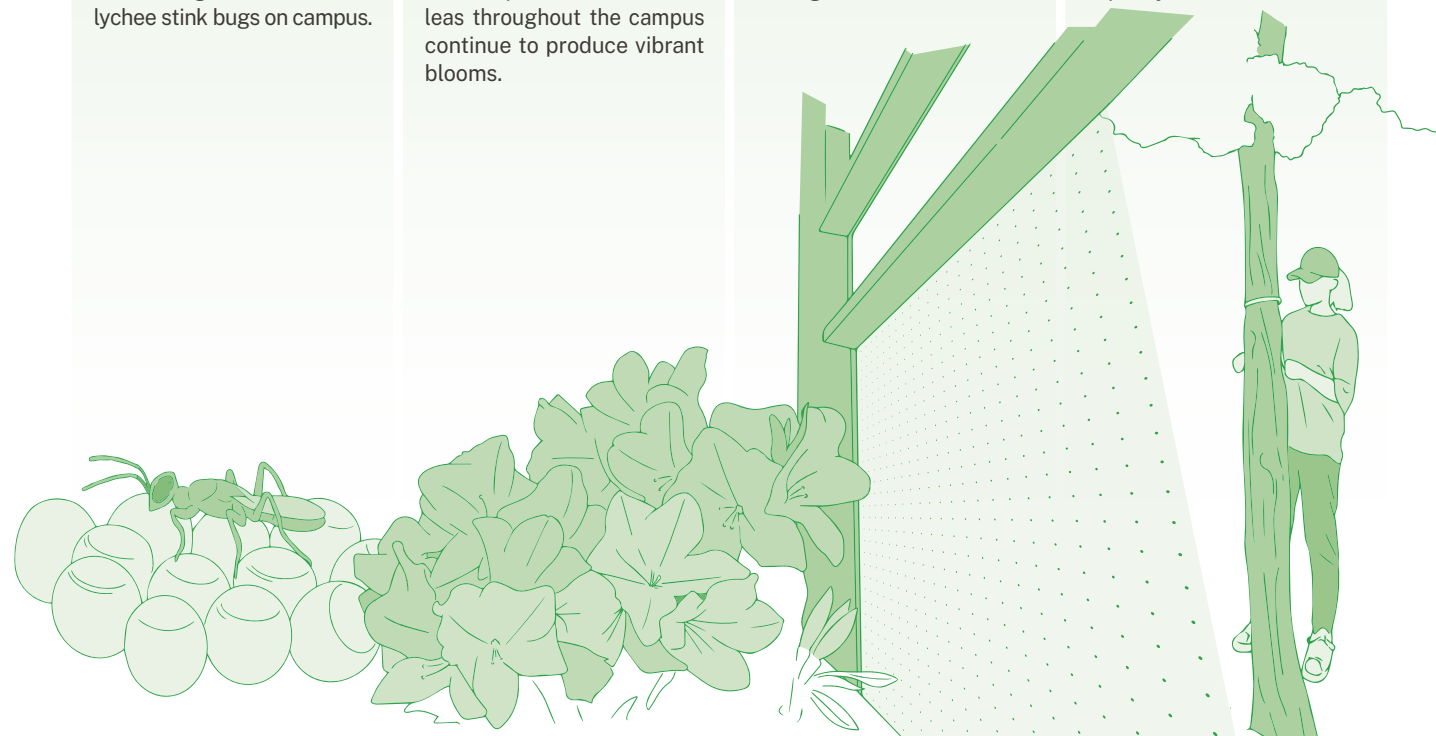
Bird-window collision mitigation

To address bird-window collision hotspots in campus buildings, the Office of General Affairs provides funding to encourage all university units to apply dot patterns or other visual cues to windows, reducing the likelihood of birds accidentally colliding with glass.



Campus tree re-survey project

In 2023, NTU commissioned a sample survey of campus trees by professors from the School of Forestry and Resource Conservation. The survey aims to understand tree mortality, growth patterns over the past decade, and potential carbon storage capacity.



3.3 Diverse, Supportive and Healthy Campus Culture

I. Diverse and Inclusive Campus

(I) Diversified Recruitment & Student Counseling

To support underprivileged students, NTU launched the “Hope Admission Program”, which includes two admission pathways: “Early Admission without GSAT – Hope Group” and “Individual Application – Hope Group,” specifically for students from disadvantaged backgrounds. In addition to students from low-income and mid-low-income families, families in hardship, and indigenous families, NTU began admitting more students from MOE-approved remote areas and “non-mountain non-urban” areas in 2021. This admission process aligns with the goal of the “NTU without Borders” initiative, which includes providing greater access to higher education and extending NTU’s educational resources for disadvantaged students in remote areas.

Number of students admitted through Hope Admission Program



In addition to offering multiple admission programs, NTU also provides “Hope Stipends” and “Hope Scholarship” and is committed to the “Dream Field Comprehensive Support Program.” This program rewards learning hours substituting part-time jobs and provides diversified counseling and financial support mechanisms as comprehensive assistance to financially disadvantaged students. The support also includes living allowances and meals, international exchanges opportunities, and domestic and overseas internships. Through scholarships, the program aims to reduce the financial burden of education and create a more level playing field for all.

Funding and beneficiaries of

the Dream Field Comprehensive Support Program

have been increasing yearly,

In 2023,

with funding reaching NT\$19.7 million

accepted students reaching 3,247

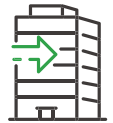
the number of beneficiaries reaching 638



Priority is given to students with disabilities and those from financially disadvantaged backgrounds for on-campus housing.

In 2023,

126 students were given priority for dormitory placement.



Initiative	Beneficiary	Support Offered
<p>Indigenous Students Resource Center</p>	Indigenous students	The Indigenous Students Resource Center organizes freshmen orientation, ethnic education, cultural learning, international exchanges, and career consultation among other activities. The Center integrates with the “Higher Education Sprout Project” and offers scholarships design for indigenous students, such as the “Indigenous Language Inheritance Scholarships” and “Indigenous Culture Inheritance Scholarships” in order to create a friendly learning environment. Furthermore, with the aim of creating a campus culture that is friendly towards diverse ethnic groups, the Center has actively integrated resources from both on and off-campus in recent years to implement “human rights education” projects and promote “Indigenous education for all” through thematic lectures on campus.
<p>Disability Support Services, Student Counseling Center</p>	Students with disabilities	The Center offers continuous support and individualized guidance for special education students from enrollment to graduation in order to help students reach their full potential and successfully complete their studies. Services include conducting special education assessment, loaning of assistive device, providing special education resources, improving on barrier-free environment, providing adaptation counseling and career counseling, holding activities for empowerment, and giving scholarships funded by the Higher Education Sprout Project, among others. Additionally, the Center collaborates with Micron Technology to implement the Micron Accompanying Flight Program and establish the Micron Accompanying Flight Scholarship to help students transitioning from academia into the workforce.
<p>Scholarships and grants from NTU and private sources</p>	Eligibility varies between types of grants	Financial support initiatives, scholarships, and grants are available for eligible students. There are more than 338 scholarships and grants from private sources. In 2023, self-raised and funded scholarships and grants (excluding government scholarships, grants, and emergency aid) amounted to NT\$380 million, benefiting 49,249 students.

(II) Committees, Campus Planning, and Grievance Mechanisms Facilitating Campus Diversity and Equality

To promote diversity and inclusiveness on campus, NTU has established relevant committees and grievance mechanisms. Additionally, various administrative units have formulated and implemented programs that support a friendly campus environment.

1. Committees on Diversity and Equality

Committee	Description
Gender Equality Education Committee	Dedicated to promoting gender equality education on campus to create a friendly and inclusive environment.
Special Education Implementation Committee	Integrates resources, plans, and develops special education strategies, and improves the infrastructure and design of barrier-free environments to respond to the needs of special education students.
Advisory Committee of Indigenous Students Resource Center	Established to provide support for indigenous students in their daily lives and to foster a campus environment that respects diverse cultures. The Advisory Committee meets each semester, providing advices and evaluations on the Center's operations and development to facilitate the promotion of indigenous culture and education.
Campus Planning Office Committee	Formulates principles for inclusive campus planning to promote campus diversity, anti-discrimination, and assistance for the underprivileged. Measures include human-oriented traffic/sidewalks/public bicycles, barrier-free spaces and facilities, gender-friendly spaces, campus signpost system, and a foreigner-friendly design.

NTU Human Rights Week: "Island Resonance – Human Rights from an Indigenous Perspective"

The NTU Indigenous Students Resource Center collaborated with the National Human Rights Commission of the Control Yuan to implement the "Indigenous Peoples' Human Rights Education Project." In early November 2023, the center organized a week-long event on campus titled "Island Resonance – Human Rights from an Indigenous Perspective." The event invited partners from within and outside of the campus who are engaged in ethnic or human rights issues. Expert shared and exchanged ideas on indigenous peoples' human rights with faculty, staff, and students. By fostering a renewed sense of mutual understanding, challenging preconceived notions, and exploring the multifaceted nature of human rights, the event aimed to build a more inclusive and diverse campus culture.



Through situational alteration and sensory stimulation, participants were able to empathize with the experience of "discrimination" and consider the perspectives of indigenous peoples.



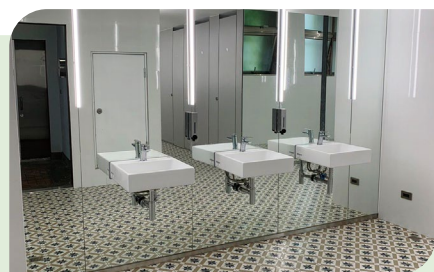
Physical labels were created to represent discriminatory experiences encountered by both indigenous and non-indigenous students on campus. Participants were invited to remove the labels that resonated most deeply with them. This symbolic act of "removing labels," combined with in-depth discussions, promoted empathy and inclusivity.

2. Campus Plans and Measures Related to Diversity and Equality

Plan & Measure	Details
Barrier-free facilities	From 2022 to 2023, NTU improved accessibility in various locations, including restrooms in the Liberal Arts Research Building, Graduate Institute of Journalism, and Department of Social Work. Four barrier-free elevators were upgraded in the 2nd Student Activity Center, along with one in Jan Shu Hall and one in the Administration Building. These improvements, totaling over NT\$9 million, aim to enhance the user experience for individuals with mobility impairments.
Map of barrier-free facilities	In December 2015, NTU created a map of barrier-free facilities, accessible on computers and smartphones. The map, supplemented with photos and text descriptions, displays information on barrier-free ramps and entrances, restrooms, elevators, and designated parking spaces for cars and scooters. These resources help individuals with mobility impairments to learn about the location and condition of facilities in advance. The map is continuously updated with new photos and descriptions and includes an error reporting mechanism to ensure the information provided is accurate and up-to-date.
All gender restrooms	To further promote the concepts of a friendly campus and gender equality, NTU established the “NTU Regulations for the Establishment of All Gender Restrooms.” The regulations require new buildings to provide all gender restrooms, while existing buildings must prioritize gender inclusivity when remodeling and improving restrooms according to their individual preconditions. As of December 2023, 21 buildings on campus have completed the installation of all gender restrooms, with four under construction and 11 in the planning and design phase, totaling 36 buildings. These include administration buildings, teaching and research buildings, student activity centers, dormitories, NTU Hospital buildings, medical staff dormitories, parking lots, and plant nurseries.
Employment Plan for People with Disabilities	To protect the rights and interests of people with disabilities and provide employment opportunities for NTU students and alumni with disabilities, NTU established the “Employment Plan for People with Disabilities.” This plan aims to help individuals with disabilities to find suitable jobs within NTU, aligning with the principles of equality, inclusivity, and reasonable accommodation outlined in the Convention on the Rights of Persons with Disabilities (CRPD). As of the end of 2023, the number of individuals with disabilities employed by NTU reached 339.



Barrier-free elevator in the Administration Building.



All gender restroom on the first floor of the College of Engineering Building.

3. Grievance Mechanisms Related to Diversity and Equality

Mechanism/System	Description								
NTU Suggestion System	A two-way communication platform that welcomes faculty, staff, students, and alumni to provide constructive suggestions on university development, administrative operations, and other public issues. Through systematic collaboration among departments and administration, the system aims to create an excellent and friendly learning environment at NTU.								
	<table border="1"> <thead> <tr> <th>Number of Suggestions</th> <th>2021</th> <th>2022</th> <th>2023</th> </tr> </thead> <tbody> <tr> <td></td> <td>712</td> <td>484</td> <td>374</td> </tr> </tbody> </table>	Number of Suggestions	2021	2022	2023		712	484	374
Number of Suggestions	2021	2022	2023						
	712	484	374						
NTU Workplace Sex Discrimination Grievance and Appeal Committee, NTU Sexual Harassment Prevention and Resolution Committee	Established to protect the rights of faculty and staff, the committees aim to build a working environment free of gender discrimination, prevent sexual harassment, and protect the rights of victims.								
	<table border="1"> <thead> <tr> <th>Number of Reported Cases</th> <th>2021</th> <th>2022</th> <th>2023</th> </tr> </thead> <tbody> <tr> <td></td> <td>137</td> <td>183</td> <td>255</td> </tr> </tbody> </table>	Number of Reported Cases	2021	2022	2023		137	183	255
Number of Reported Cases	2021	2022	2023						
	137	183	255						
Faculty Member Grievances Committee	Pursuant to Article 7 of the “NTU Organizational and Review Directions for the Faculty Member Grievances Committee”, full-time NTU faculty members may file an appeal to this committee if they believe that measures imposed by NTU are illegal or inappropriate and further damaging their rights and interests.								
	<table border="1"> <thead> <tr> <th>Number of Complaints</th> <th>2021</th> <th>2022</th> <th>2023</th> </tr> </thead> <tbody> <tr> <td></td> <td>6</td> <td>3</td> <td>3</td> </tr> </tbody> </table>	Number of Complaints	2021	2022	2023		6	3	3
Number of Complaints	2021	2022	2023						
	6	3	3						
Staff Member Grievance Committee	Pursuant to Article 2 of the “NTU Regulations for Staff Member Grievances”, NTU staff members may file an appeal to the committee if they believe that management measures or the handling of working conditions imposed by NTU are inappropriate and damage their rights and interests.								
	<table border="1"> <thead> <tr> <th>Number of Complaints</th> <th>2021</th> <th>2022</th> <th>2023</th> </tr> </thead> <tbody> <tr> <td></td> <td>2</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	Number of Complaints	2021	2022	2023		2	1	1
Number of Complaints	2021	2022	2023						
	2	1	1						

(III) Faculty and Student Composition

Number of Full-time and Part-time Faculty in 2023

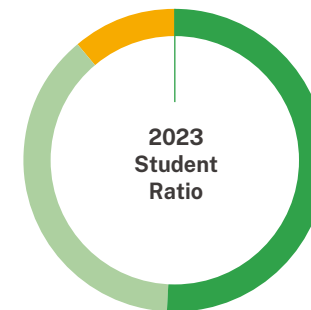
Position	Full-time ¹			Part-time		
	Male	Female	Total	Male	Female	Total
● Professor	902	299	1,201	719	154	873
● Associate Professor	312	225	537	286	107	393
● Assistant Professor	211	126	337	381	148	529
● Lecturer	15	9	24	314	192	506
Total	1,440	659	2,099	1,700	601	2,301



- Professor
- Associate Professor
- Assistant Professor
- Lecturer

Number of Students in 2023

Degree	Male	Female	Total
● Undergraduate	9,652	7,671	17,323
● Master's	7,777	5,247	13,024
● Doctoral	2,491	1,211	3,702
Total	19,920	14,129	34,049



- Undergraduate
- Master's
- Doctoral

Note 1 There are 83 full-time foreign faculty members in 2023.

Student Diversity in 2023

Category	International Students	Children of Diplomats	International Science Fair Participants	Special Education (Including Students with Disabilities)	Athletic Excellence Admissions	Students from Outlying Islands	Indigenous Students	Students from 4-Year Technical and 2-Year Junior Colleges	Overseas Chinese Students (Including Hong Kong and Macao)	Students from Mainland China
Undergraduate	502	62	30	145	21	129	270	10	1,292	3
Master's	460	0	0	22	0	0	43	0	347	299
Doctoral	360	0	0	17	0	0	12	0	71	107
Total	1,322	62	30	184	21	129	325	10	1,710	409
%	3.88%	0.18%	0.09%	0.54%	0.06%	0.38%	0.95%	0.03%	5.02%	1.20%

II. Campus Health and Well-being

(I) Remuneration and Benefits for Faculty and Staff


The remuneration of NTU faculty members is governed by the “Teacher Remuneration Act,” “Civil Service Pay Act,” and “Regulations Governing the Payment of Remuneration to Military, Public and Teaching Personnel.” Remuneration for contract staff is governed by the “Contract Staff Management Guidelines” and the “Remuneration Criteria for Contract Staff.” The current salary standard for all full-time and part-time faculty and staff members is higher than the minimum wage (NT\$26,400 in 2023). NTU continuously adjusts salary levels in line with revisions by the Ministry of Labor to ensure the rights and interests of all employees. For more details on remuneration and benefits for faculty and staff, please visit the [NTU Personnel Department website](#).

To actively recruit and retain top teaching and research talent, NTU has expanded faculty housing and established awards such as the NTU Eminence Chair Professorship and the Distinguished Professorship of Practical Contribution in 2019. NTU also encourages new faculty and researchers to apply for the Yushan (Young) Scholar Program in which 20 added recipients is awarded from 2021 to 2023. Additionally, NTU provides startup funds for new and early-career faculty. In 2023, over 40% of faculty and researchers received additional bonus payments. Furthermore, to encourage administrative staff to generate income for the university, over 50% of administrative staff (full-time and contract workers) received bonuses or additional remunerations in 2023.

(II) Physical and Mental Health Services for Faculty, Staff, and Students

In 2021, NTU launched the “[NTU Faculty and Staff Holistic Care Service](#),” initiating cross-unit collaboration to promote the holistic well-being of its employees and create a happy campus. In 2023, a total of 994 faculty and staff members received health checkups through the Good Liver Foundation’s health screening program and the low-dose computed tomography (CT) lung screening program jointly provided by NTU Hospital Cancer Center and Taipei City Hospital. After the checkups, six consultation sessions were provided, offering one-on-one guidance on diet, exercise, and health from professionals. For mental health, diverse counseling channels are available (including in-person, telephone, and online), with psychologists providing mental health consultation services. Each individual is entitled to six free counseling sessions, and a total of 706 individuals received these services.

In 2023,

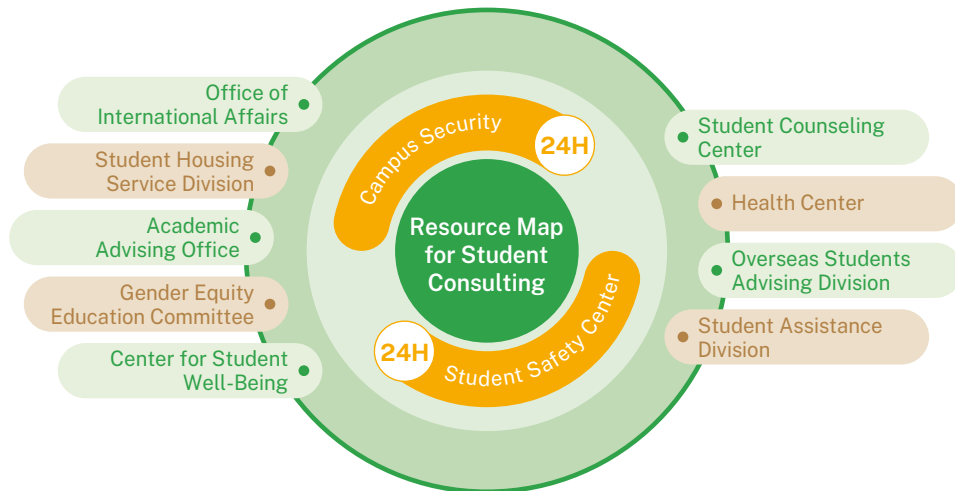
the “**NTU Faculty and Staff Holistic Care Service**”  organized **70** in-person and online activities, with over **6,100** participants.



- (Left) The “Renaissance Court Dance Banquet” workshop, led by Turkish early music vocalist and historical dance expert Ozan Karagöz, guided participants in dancing Renaissance French dances from different periods.
- (Right) The “Healthy Feast” workshop, featuring practical instruction from lecturer Wei-Chung Liu.

For strengthening the student support network, NTU has established the Health Center, Student Counseling Center, and Center for Student Well-being, providing healthcare and mental health promotion services. Professional counseling staff are also stationed in each college, serving as consultants for students adapting to campus life, providing support, referring students to various resources within the university, and assisting all students in their healthy development. In 2021, the Academic Advising Office (AAO) was established, drawing on international “academic advising” practices to help students utilize university resources effectively. The AAO also brings together experts and peers from diverse backgrounds to guide students in course planning and accumulating the knowledge and skills needed for their future through ongoing dialogue, providing comprehensive learning support.

In 2023,
964 academic advising interviews were completed,
 with **90.97%** of students expressing
 high career clarity and resource mastery after the interviews.



The Center for Student Well-being sets up a booth at the Club Exhibition to promote awareness of counseling resources available on campus.

(III) Workplace Health and Safety

In the spirit of preserving lives, the NTU Environmental Protection & Occupational Safety & Health Center promotes and implements health and safety measures on campus. In compliance with EHS-related laws and regulations, the Center provides EHS education and training and is committed to protecting people and the environment on campus. In 2023, the Center organized 68 training sessions on laboratory hygiene and safety, with a total of 9,379 participants. To further enhance campus safety, NTU has established a Campus Security team and the Student Safety Center, responsible for handling student accidents, promoting safety education, and conducting various guidance and prevention efforts.

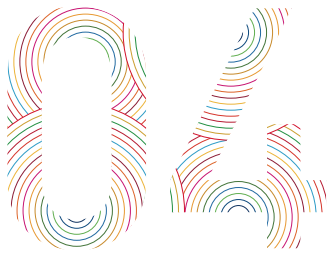
Statistics of Incidents & Crisis

Unit: Case

Year	2021	2022	2023
Campus incidents and crisis ¹	21	35	19
Disabling injury and occupational illness ²	3	3	1

Note 1 Statistics of faculty, staff, and students.

Note 2 Statistics of faculty and staff members covered by labor insurance and civil servants' insurance. Insurance applications are reviewed and approved by the Bureau of Labor Insurance after the applicants submit required documents (including certificate of diagnosis from doctors) and confirmed by their employer.



Our Social Impact

SDG 1 No Poverty

SDG 2 Zero Hunger

SDG 3 Good Health and Well-Being

SDG 4 Quality Education

SDG 5 Gender Equality

SDG 6 Clean Water and Sanitation

SDG 7 Affordable and Clean Energy

SDG 8 Decent Work and Economic Growth

SDG 9 Industry, Innovation and Infrastructure

SDG 10 Reduced Inequalities

SDG 11 Sustainable Cities and Communities

SDG 12 Responsible Consumption and Production

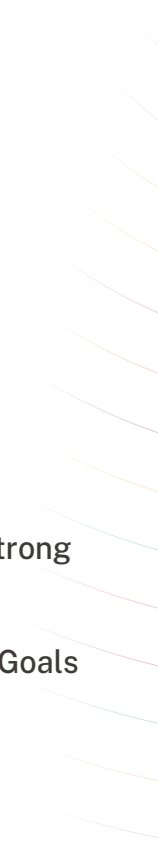
SDG 13 Climate Action

SDG 14 Life Below Water

SDG 15 Life on Land

SDG 16 Peace, Justice and Strong Institutions

SDG 17 Partnerships for the Goals







1 NO POVERTY

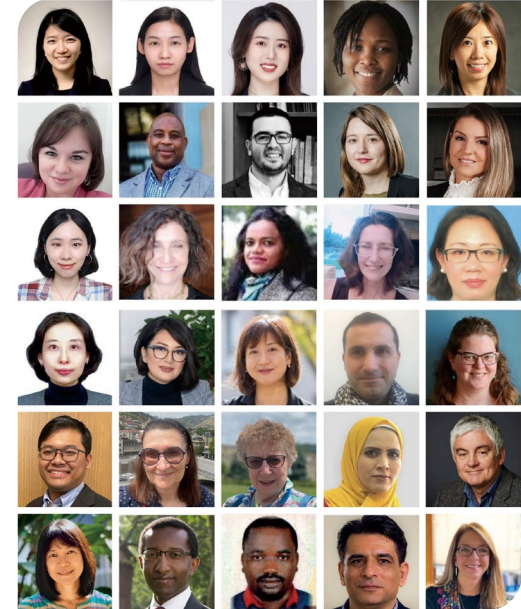


Building a Global Welfare Research Network

Eradicating poverty is a critical global objective. Comparative analysis of welfare policies across nations can furnish governments with evidence-based data to critically evaluate existing systems and glean insights from the experiences of other countries. Dr. Julia Shu-Huah Wang, Associate Professor at NTU's Department of Social Work, has spearheaded the Global Welfare Research project, an international collaborative endeavor involving interdisciplinary scholars from over 20 countries. This initiative has garnered support from the National Science and Technology Council's (NSTC) International Outstanding Young Scholars program, the Ministry of Education's Higher Education Sprout Project, and Hong Kong's Research Grants Council (RGC). Additionally, Dr. Wang has partnered with researchers at the University of Antwerp in Belgium to compute Model Family data for over 20 European nations using the EUROMOD database's Hypothetical Household Tools. This collaboration aims to establish a novel international social welfare database to examine the efficacy of poverty reduction welfare systems in over 40 countries.



Cross-country comparisons of welfare policies present a significant challenge due to the inherent complexity of social welfare systems, which encompass a multitude of policies, each with its own distinct characteristics, including eligibility requirements and benefit levels. To address these complexities, the research team employs a Model Family research design, establishing cross-national comparability by standardizing household income and composition. The team collects data on household income and expenditure structures, capturing subsidies from various poverty reduction welfare programs to facilitate meaningful cross-country comparisons. In 2023, the Global Welfare Research project hosted a series of online seminars, inviting scholars from various countries to share and exchange knowledge on the current state of social assistance within their respective countries. The team is also actively engaged in collecting relevant data, aspiring to make groundbreaking contributions to global poverty reduction policies and provide valuable insights for governments seeking to refine their social welfare systems.



The Global Welfare Research project brings together an international research team of interdisciplinary scholars from over 20 countries.

Home Run for Charity: NTU EMBA Supports Young Athletes' Dreams

Baseball plays a prominent role in Taiwan. To help children achieve their baseball dreams and provide them with better training resources, the NTU College of Management EMBA Softball Club, in collaboration with the NTU Department of Athletics, has visited elementary schools in remote communities for the second consecutive year. These schools often face resource constraints, resulting in outdated practice equipment, gear, and footwear, alongside limited team operating budgets. To address these challenges, Club members have joined forces to demonstrate their support by donating baseball equipment and financial resources to bolster team operations. Additionally, they facilitate visits from professional guest coaches to provide instruction on playing techniques, fostering the development of young athletes into exceptional baseball players.

The EMBA Softball Club's "Home Run for Charity" donation project exemplifies their dedication to social responsibility through tangible actions. The Club aspires to extend this support to additional teams in need, igniting and nurturing the passion for this "national sport" from a young age and empowering children to continue to swing, run, sweat, and persevere in their pursuit of their dreams.



The NTU EMBA Softball Club actively supports elementary school baseball teams in remote communities, helping young athletes step up to the plate and realize their aspirations.

Community Outreach Activities in Indigenous Villages

During the harsh winter months, the Meifeng Highland Experimental Farm, under the auspices of NTU's College of Bioresources and Agriculture, collaborates with the Department of Bio-Industry Communication and Development's EMBA program to conduct charitable outreach initiatives. Farm personnel deliver essential provisions, including rice and cooking oil, to remote indigenous communities such as Faxiang, Qin'ai, Wanfeng, Lushan, and Duda, providing support to elders and children during the winter season and fostering a sense of shared community as they welcome the New Year together.

Furthermore, EMBA students have proactively garnered financial support to establish a community outreach fund, which aims to provide timely assistance to these villages in addressing future emergency needs and unforeseen challenges. Complementing this effort, the Highland Experimental Farm has established the Yeou-Der Kang Scholarship, which recognizes and nurtures exceptional local talent within indigenous communities. Through these combined endeavors, NTU seeks to cultivate a harmonious and mutually beneficial relationship with local indigenous communities, fostering shared prosperity and well-being.



NTU Highland Experimental Farm's indigenous community outreach activities.

2 ZERO HUNGER



Flooding submerges rice fields in the Philippines.

On the Pillars of Food Security in Extreme Climates

2 | 12 | 17

Toward the end of July 2023, Typhoon Doksuri swept through the Philippines and caused severe flooding, submerging and destroying hundreds of hectares of paddy fields. Earlier that year, Taiwan, separated from the Philippines only by the Bashi Channel, faced a water shortage in the rice fields of the Chiayi-Tainan Plain, forcing an unprecedented fallow period for several irrigation areas. This clearly illustrates the impact of extreme climates on agriculture.

Professor Yann-Rong Lin is a faculty member in the Department of Agronomy at NTU. Driven by her awareness of food scarcity in remote areas and farmers' livelihoods being entirely climate dependent, Prof. Lin has dedicated decades of research on crop seed conservation and genetic breeding. Through genotype screening technology, she was able to develop new crop varieties, thereby gradually promoting "resilient agriculture"¹ to mitigate the impact of extreme climates. Resilient agriculture not only benefits commercial crop production but also ensures a stable food supply and

economic benefits for vulnerable areas most affected by climate change.

Prof. Lin and her team were invited to work with the World Vegetable Center (WorldVeg), World Agroforestry (CIFOR-ICRAF) in Kenya, and the University of Abomey-Calavi in the Republic of Benin to implement the Taiwan-Africa Vegetable Initiative (TAVI), which aims to conserve Africa's native vegetable species, increase local food self-sufficiency rates, as well as ensure nutrition and food safety. The team selected 138 "forgotten" crops in sub-Saharan Africa and evaluated their adaptability with the help of climate research. In the end, several alternative crops were listed, including leafy amaranth and spider plant that are rich in iron, as well as mung beans and plumed cockscombs that are rich in folate. This noteworthy project for crop and dietary health was later published in March 2023². Prof. Lin, with the ideal of "From the community, for the community," applies agricultural technology to various regions to advance sustainable agriculture.



Farmers in Eswatini cultivate African kale.

Note 1 Resilient agriculture seeks to increase the resistance of crops against such hurdles. As the global climate becomes increasingly extreme, improving crop resistance seems all the more urgent.

Note 2 This initiative for crop and dietary health was published in the Proceedings of the National Academy of Sciences of the United States of America in March 2023.

Queenless Beehive Completes Pollination in Greenhouse

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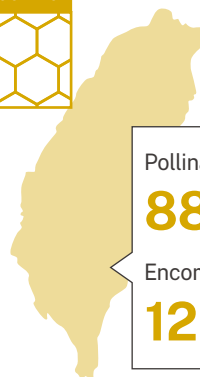
Climate change has demonstrably affected the distribution and pollination behavior of honey bees, leading to reduced precision in crop pollination, diminished yields, and compromised quality. The decline in available nectar sources has further exacerbated this issue, resulting in a significant decrease in bee populations. Global research indicates a rapid decline in both the number and diversity of insect species over the past three decades, raising concerns about the potential ramifications for agricultural production as the mass disappearance of pollinating insects continues. While manual pollination could serve as an alternative, the associated costs would likely trigger a surge in agricultural product prices.

Professor En-Cheng Yang and Associate Professor Hui-Yun Tseng, along with their research team from NTU's Department of Entomology, have investigated the relationship between the size and distribution of regional bee colonies and flowering plants. Their findings suggest that under extreme climate scenarios, pollinating bee populations originally inhabiting mid- to high-altitude mountainous regions are gradually migrating to still higher elevations due to rising temperatures. Building upon these insights, Prof. Yang's team has developed an innovative queenless beehive technology. This system utilizes pheromones and a single brood comb to replace the queen bee within the hive, effectively maintaining a stable honey bee population without the need for manual feeding. This technology presents a significant advancement over traditional greenhouse pollination methods, addressing concerns related to excessive bee populations in conventional hives and mitigating the risk of beekeeper injury during hive maintenance.



Prof. En-Cheng Yang's team developed the queenless beehive technology, which can solve the long-term dilemma of melon and fruit farmers who struggle to find bees for pollination.

Following successful product development and patent acquisition, the queenless beehive technology, housed within a specially designed paper hive, has been implemented in pollination trials across 88 greenhouses in Taiwan, encompassing 12 different crop varieties. These trials have consistently yielded exceptional pollination results, leading to increased crop yields and enhanced quality. Furthermore, this innovation fosters the development of a sustainable honey bee pollination industry while mitigating the potential ecological risks associated with reliance on imported bumblebee populations.



Pollination trials in **88** greenhouses, Encompassing **12** crop varieties.

Yielded Exceptional **Pollination Results**



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

NTU's D-School, in partnership with Talent Field, a youth empowerment and community placemaking enterprise, introduced the Operation Egg Industry Transformation augmented reality (AR) board game to NTU. This initiative provided students with an engaging platform to explore the intersection of game experience design, AR technology, and sustainability issues. Through the design of activities and interactive gameplay, participants learned how to gamify complex issues and understood the importance of transforming the egg industry.



The Operation Egg Industry Transformation board game effectively engages participants with sustainability issues through gameplay.

Eggs play an important role in our diets, with Taiwan's annual demand reaching 8 billion eggs, equating to an average daily consumption of one egg per citizen. Operation Egg Industry Transformation is a pioneering board game in Taiwan that integrates animal welfare with AR technology. Ms. Chia-Chi Tsai, CEO of Talent Field, aptly stated, "Did you know that hens can fly? Ensuring the well-being of hens is fundamental to producing safe and high-quality eggs." Ms. Tsai encouraged students to make conscious consumer choices by opting for cage-free eggs whenever possible, aligning their purchasing decisions with the consideration of food safety and animal welfare. Such consumer choices have the power to directly impact the living conditions of hens, thereby contributing to the improvement of health and quality of life for both hens and the eggs in Taiwan.



3 GOOD HEALTH AND WELL-BEING

Patient-centered Seamless Transition and Referral System (P-STARs)

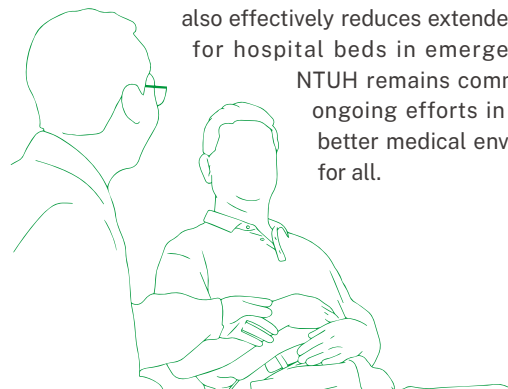
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When illness strikes, choosing the right medical facility is crucial. It ensures timely diagnosis and treatment while minimizing the time and expense associated with outpatient visits to multiple specialty departments. To facilitate patient-centered, continuous, and integrated care, and in alignment with the national policy on hierarchical medical care system, the National Taiwan University Hospital (NTUH) launched the NTUH Patient-centered Seamless Transition and Referral System (P-STARs) in 2018. This initiative also included the establishment of the Referral Management Center (RMC), a dedicated unit for hierarchical and transitional care, fostering collaboration across departments, institutions, and professions. To date, the program has successfully connected 593 medical institutions across Taipei City, New Taipei City, Keelung City, and Yilan County, with over 2,000 participating physicians. Through resource integration and two-way communication channels, P-STARs facilitates the vertical integration of the healthcare system and streamlines care delivery. This translates to faster case management

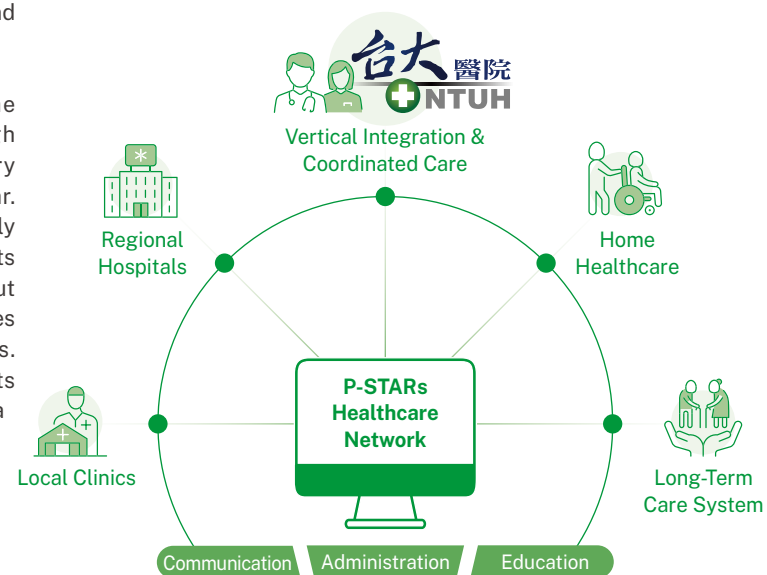
for referrals, enhanced utilization of medical resources, and ultimately, better and more appropriate care for patients.

Within five years of P-STARs' implementation, the proportion of new outpatients at NTUH arriving through referrals has increased by 50%, while the rate of primary care in outpatient clinics has steadily declined each year. This success in promoting hierarchical medical care not only facilitates the transfer of emergency and hospitalized patients to community hospitals for inpatient care but also effectively reduces extended wait times for hospital beds in emergency rooms.

NTUH remains committed to its ongoing efforts in creating a better medical environment for all.



P-STARs Healthcare Network



Addressing the Critical Need for Pediatric Transport: A Sustainable Approach to Children's Healthcare 3 10

In the context of Taiwan's low birth rate, ensuring the health and well-being of every child is of paramount importance. However, the mortality rates of newborns and critically ill children remain alarmingly high. Pediatric healthcare faces urban-rural disparities. Even within resource-rich cities, pediatric care, especially critical care services for children, often lacks prioritization.

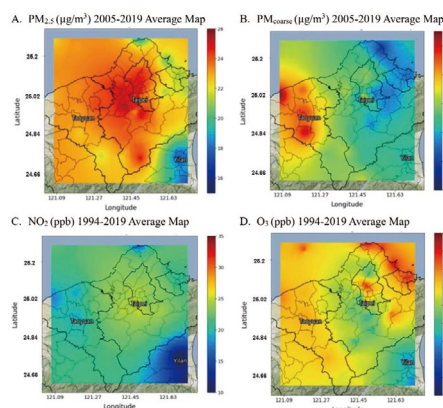
To address this critical need and uphold its commitment to children's health, the National Taiwan University Children's Hospital (NTUCH) pioneered the establishment of Taiwan's first "all-age" critical care pediatric transport team in 2019. This initiative included the development of the country's first "mobile pediatric intensive care unit," equipped with advanced mobile medical equipment and staffed by a dedicated team of pediatric specialists from various disciplines. In recent years, NTUCH has integrated real-time video consultations, enabling senior physicians to remotely assess and provide guidance on pediatric cases, ensuring optimal and timely interventions. Concurrent with strengthening the pediatric referral network and establishing a robust operational model for the transport team, NTUCH has established horizontal connections with other medical centers. Through educational lectures and specialized training courses, the hospital actively promotes the expansion of critical care pediatric transport services, with over 1,000 healthcare professionals participating to date. NTUCH remains dedicated to its vision of ensuring equitable access to medical resources for all children in Taiwan, regardless of their geographical location, thereby fostering a more comprehensive and resilient pediatric healthcare system.

Investigating the Link Between Air Pollution and Dementia Risk: Insights from NTU Interdisciplinary Research 3 11

Recognizing dementia as a pressing concern, the World Health Organization (WHO) designated it a public health priority in 2012. Recent years have witnessed a growing body of research suggesting a potential association between air pollution and an increased risk of dementia. However, due to the slow progression of dementia and the need for long-term observation to discern the effects of air pollution on cognitive function, the nature of this relationship remains complex and requires further investigation.

Professor Yen-Ching Cheng and her team at NTU's College of Public Health have been at the forefront of research on cognitive function and dementia epidemiology since 2007. In 2011, they partnered with Dr. Jen-Hau Chen of National Taiwan University Hospital to launch the "Taiwan Initiative for Geriatric Epidemiological Research." This ongoing initiative involves conducting biennial cognitive function assessments among senior citizens from local communities without a dementia diagnosis. Furthermore, the team has actively participated in several global research alliances over the years, aiming to identify pertinent risk factors during the preclinical stage to facilitate early intervention and prevention strategies for dementia in older populations.

Through interdisciplinary collaboration with the College of Bioresources and Agriculture and the College of Science, Prof. Cheng's team has made discoveries regarding environmental factors and dementia risk. Their research indicates that prolonged exposure to low concentrations of particulate matter (below established air quality standards) and inadequate indoor ventilation can elevate the incidence of cognitive impairment and dementia in older adults. To address this concern, the team developed a novel "ventilation score" as a tool for epidemiological research to assess indoor air quality. The team advocates for government agencies to consider these findings when revising air quality standards and to emphasize the importance of maintaining optimal indoor air quality to mitigate the detrimental effects of air pollution on the cognitive health of senior citizens. These impactful research findings were published in the esteemed journal *Environmental Research* in February 2023.



Long-term (1994-2019) concentration distribution map of air pollutants in the Greater Taipei Area.

Combating Drug Abuse Among Adolescents Through Music and Mentorship

Data from the National Police Agency, Ministry of the Interior, indicates a concerning rise in the seizure of Category II and III narcotics in Taiwan in recent years. This trend is accompanied by the emergence of novel drugs and a disturbing increase in drug offenses among youth. Responding to this public health challenge, the NTU EMBA Student Association, NTU EMBA Alumni Foundation, and several alumni from Keelung collaboratively sponsored the "2023 Keelung Dream Chasing Youth Anti-Drug Character Music Camp." This event encompassed three anti-drug awareness lectures and a public welfare music camp, held consecutively throughout June and July 2023.

The program integrated musical instrument instruction with character education and a drug awareness campaign. Through personal testimonies from anti-drug counselors, participating adolescents gained valuable insights into the deceptive nature of narcotics and the associated health and social risks of drug use. Local school teachers and community volunteers were actively engaged in the program, fostering a supportive environment that empowers Keelung's youth to develop self-confidence, cultivate a sense of belonging, and resist the allure of narcotics.



An instructor engages participants with a character-building narrative during the "2023 Keelung Dream Chasing Youth Anti-Drug Character Music Camp."



4 QUALITY EDUCATION

TIWACT team volunteers.

TIWACT: A Collaborative International Initiative to Curb Dropout Rates in Malawi 4 17

TIWACT, a transnational educational endeavor, was co-founded by Renna Yokokawa, a sociology student at NTU, and Chirambo Blessing, a Malawian university student. The initiative seeks to address educational challenges in Malawi through international collaboration. The “TI” in the acronym TIWACT stands for “Tiwalimbikitse,” meaning “Let’s encourage them together” in a local Malawian language, and it reflects the program’s core concept: “Together we act.” TIWACT’s primary objectives are to reduce the national dropout rate in Malawi and foster international cooperation among students.

In August 2023, TIWACT facilitated two workshops at Chiputula Primary School in northern Malawi: an English Reading Workshop and a Future Career Workshop. The English Reading Workshop, led by the TIWACT team, engaged students in reading English picture books and guided them in articulating their comprehension and insights. The Future Career Workshop invited graduates from Chiputula Primary School and community members who have excelled in various

professions, including engineering, art, nursing, academia, journalism, and dance. These individuals shared their personal experiences and challenges during their primary school years, inspiring graduates to envision and illustrate their aspirations for the future. Through these workshops, TIWACT gained valuable insights into the children’s dreams and career ambitions, informing their ongoing efforts to cultivate a passion for learning and, ultimately, contribute to reducing the dropout rate in Malawi.



Students from Chiputula Primary School participating in the English Reading Workshop.

Note 1 English has been an official language of Malawi since 1968, with government-mandated instruction from primary school onwards. Entrance examinations and secondary school curricula are conducted in English, underscoring the critical importance of English proficiency for educational advancement in Malawi.

Summer College at NTU: Teaching that Transcends Time, Space and Campus 4 10

Established in 2019, the Summer College at NTU has consistently championed educational equity, striving to bridge learning disparities and foster fairness and justice within the educational landscape. Over the past four years, the program has forged partnerships with over 70 institutions across Taiwan, offering a diverse array of 127 general education courses accessible to students from all universities. In addition to facilitating mutual recognition of course credits, the program actively promotes inter-institutional and interdisciplinary exchange among faculty and students by selecting, integrating, and sharing distinctive courses from various universities.

To ensure that the spread of knowledge continues beyond the limits of standard classroom teaching, the Summer College organizes supplementary workshops that complement specific courses. For instance, a writing workshop on oracle bone script was conducted in conjunction with the “Understanding Oracle Bone Script and Ancient China” course, while a stone rubbing workshop, coordinated with Academia Historica, accompanied the “Cultural Asset Preservation and Regulations” course. These initiatives extend learning beyond the classroom, fostering sustained connections between instructors and students. Such endeavors not only demonstrate the potential for knowledge acquisition within local contexts in Taiwan but also reinforce the principles of holistic education and resource sharing.

Furthermore, the Summer College embraces diverse learning format, including synchronous and asynchronous distance learning options, effectively transcending temporal and spatial limitations to provide students with expanded learning opportunities. Recognizing the financial barriers faced by some students, the program offers tuition subsidies, which have supported 181 students over the past three years (61 in 2021, 63 in 2022, and 57 in 2023).



Demo session of the Stone Rubbing and Cultural Asset Preservation Workshop.

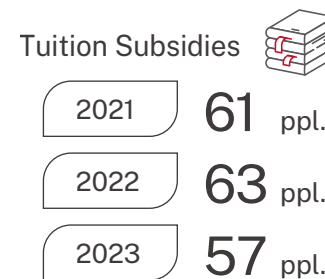
跨校修課，學分認抵

多元課程，盡情學習

上課模式彈性，隨時隨地學習

實體上課 同步遠距 非同步

The Summer College offers traditional in-person courses and also synchronous and asynchronous distance learning methods, as well as courses in various disciplines, providing students with diverse learning opportunities.



In total **181** students were benefited in the last three years.

Bridging the Financial Literacy Gap: NTU EMBA Alumni Empower Young Minds

Financial literacy is a crucial life skill, yet it is seldom addressed in the formal education system. Recognizing this gap, the Financial Literacy Education for Remote Communities team of the NTU EMBA Alumni Foundation has developed a series of engaging financial education modules. These modules aim to equip young students with essential knowledge and practical skills in finance, investment, and financial planning that they can readily apply in their daily lives and share with their families.



NTU EMBA's Financial Literacy Education for Remote Communities team conducts financial education activities at National Kinmen Agricultural & Industrial Vocational Senior High School. (December 16, 2023)

On December 16, 2023, under the guidance of Professor Yao-Min Chiang from NTU's Department of Finance, the team visited the National Kinmen Agricultural & Industrial Vocational Senior High School to conduct a financial education workshop. This event marked the tenth outreach activity undertaken during the current Alumni Association's term. The curriculum explored fundamental concepts such as probability and risk diversification, incorporating real-world financial scenarios like stock investment, to help young students gain a head start in learning to manage their finances. This initiative aligns with the core values of the NTU EMBA program, emphasizing the importance of contributing to society through knowledge dissemination and community engagement.



5 GENDER EQUALITY

Exploring Menstruation through Interdisciplinary Dialogue

NTU's "Period: Theory, Thoughts and Actions" course is the world's only higher education course dedicated to exploring menstruation. Since its launch in 2021, it has attracted thousands of students each semester, with over 500 students enrolled cumulatively. The course draws instructors and students from various colleges across the university. To foster a friendly, inclusive and engaging learning environment for both local and international students, the course alternates between being conducted in Chinese and English each semester, facilitating global perspectives and knowledge exchange.

The course explores how menstruation is portrayed and defined within societal contexts, analyzing its representation across various media such as film, drama, news, and advertising. On November 17, 2023, the course invited 100 NTU faculty members and students to a special screening of the stage play Shidi, produced by the Garden of Hope Foundation. Through themes including sexual violence, intimate partner

violence, and gender discrimination, the play encourages faculty and students to critically examine traditional gender roles and societal myths, fostering a society where individuals of all genders are free from violence.

In addition, D-School of NTU collaborated on the production of videos such as A Day in NTU and Sewing Cloth Menstrual Pads, expanding the influence of the course from NTU campus into the broader community. Furthermore, students enrolled in the "Period" course showcased their creativity by organizing campus exhibitions, launching social media campaigns, and installing "A Pad For Ü" menstrual product sharing boxes across lecture buildings under the theme of "Creating a Period-Friendly NTU Campus."



Students sharing menstrual product under the theme of "Creating a Period-Friendly NTU Campus."

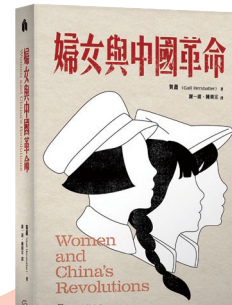


Illuminating Women’s Experiences: Historical Perspectives and Contemporary Implications

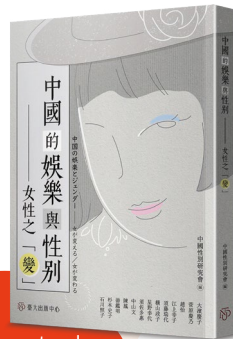
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In the field of Chinese historical research, women have often been overlooked compared to men, and studies focusing on women have been relatively scarce. In 2023, NTU Press published two books, Entertainment and Gender in China: Women’s “Changes” and Women and China’s Revolutions. These publications explore the multifaceted lives of Chinese women within the context of twentieth-century entertainment, examining the interaction between modern Chinese transformations and gender dynamics through the lenses of “women’s labor” and “gender symbolism.”

By publishing these works on women’s history, NTU contributes to a more nuanced understanding of Chinese history as a whole. These books offer readers insights into the diverse experiences of women from the lower social strata, encouraging contemporary society to engage with gender issues from multiple perspectives. This scholarly contribution fosters a deeper comprehension of the evolution of women’s social status and underscores the importance of gender equality in shaping a more equitable future.



Women and China’s Revolutions explores women’s labor and gender symbolism in the chronological context of Chinese history.



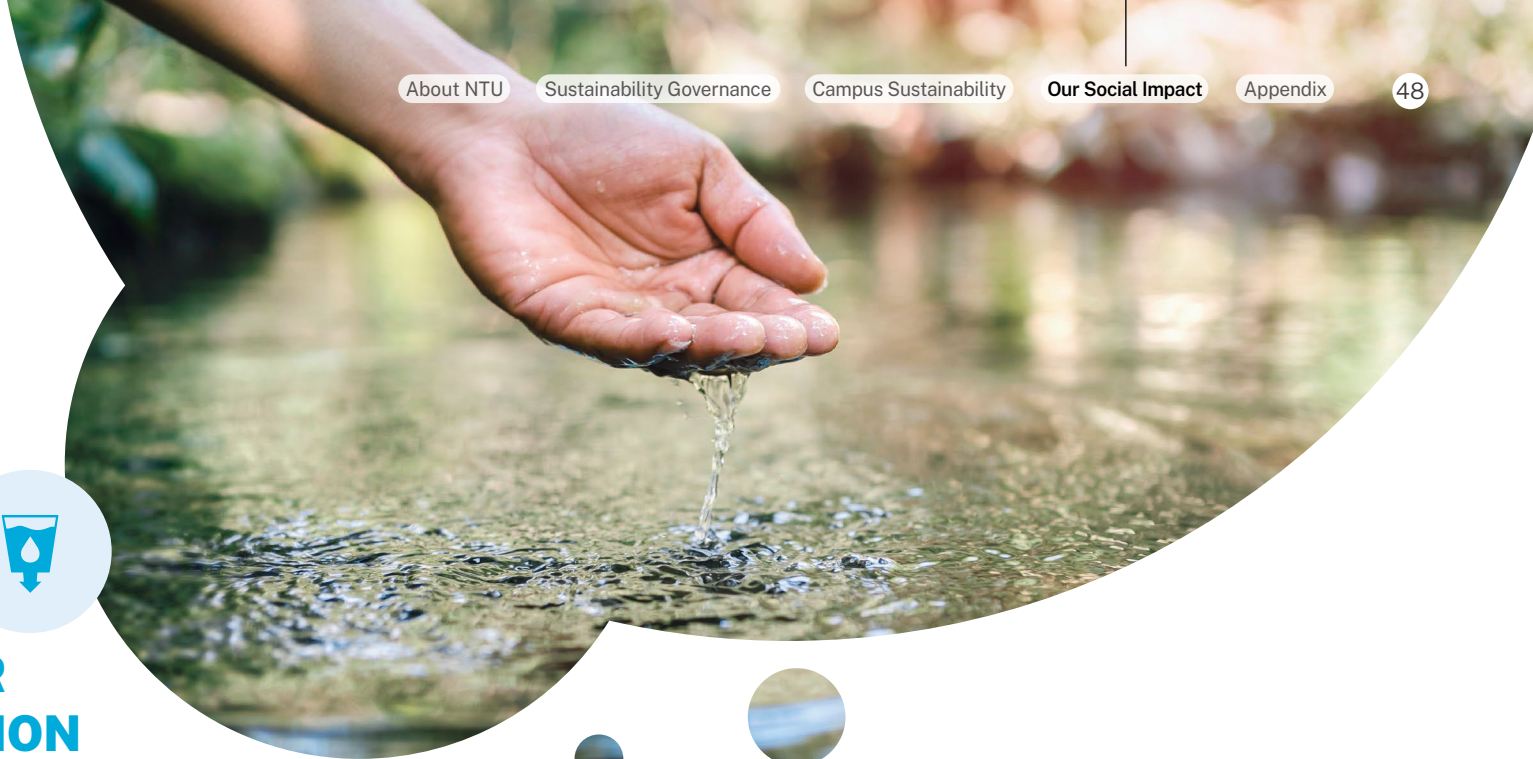
Entertainment and Gender in China: Women’s “Changes” explores the entertainment of Shanghaiese women and the image of women in entertainment in the 20th century.

Empowering Women in ESG Leadership: An NTU/ECCT Joint Seminar

On May 5, 2023, NTU and the European Chamber of Commerce Taiwan Low Carbon Initiative (ECCT LC) jointly hosted a seminar titled “Women in ESG Leadership.” This event brought together prominent women business leaders from various industries, including logistics and information technology, health care, personal care and cosmetics, energy, and automotive. These distinguished speakers shared their educational backgrounds and career journeys, offering valuable insights from their leadership experiences. They also highlighted their companies’ best practices in implementing ESG principles and pursuing net-zero carbon emissions. Examples included introducing family-friendly policies to support female employees and create a more inclusive workplace. This seminar aimed to cultivate future business leaders by encouraging students to engage actively with ESG principles and sustainable development practices.



“NTU x ECCT Women in ESG Leadership” invited women business leaders from Amazon Web Services (AWS), L’Oréal Groupe, Merck Taiwan, Ørsted, and Scania Taiwan to share their experiences in ESG and women’s careers.



6 CLEAN WATER AND SANITATION



Water Innovation, Low-Carbon and Environmental Sustainability Research Center (WinnER Center)

6 12

To advance industry-academia collaboration in crucial areas such as water technology, low-carbon emission, and sustainability, NTU's College of Engineering established the Water Innovation, Low-Carbon and Environmental Sustainability Research Center (WinnER Center). The Center leverages interdepartmental research expertise and capabilities to address challenges related to water resource management and net-zero emissions, both domestically and internationally. Its mission encompasses cultivating talent in water technology and carbon management, ultimately contributing to societal sustainability.

The WinnER Center has in recent years achieved notable progress in developing advanced wastewater treatment technologies, including biofilm reactors and ultrasonic oxidation, which enhance treatment efficiency and water purification while minimizing environmental impact. Furthermore, with respect to resource circulation, the research team has developed water resource recycling and reuse

technologies that effectively remove pollutants and recover useful resources from wastewater, providing new avenues for responsible water resource utilization. Complementing these advancements, the Center has implemented an IoT-based smart monitoring system for real-time water quality assessment, enabling the timely detection and mitigation of water quality issues to ensure water safety.

These accomplishments have yielded significant scholarly contributions while also garnering widespread recognition and application within industrial and governmental sectors. Looking ahead, the WinnER Center remains dedicated to research and development efforts focused on innovative solutions for addressing increasingly complex water resource challenges, thus promoting the sustainable use and protection of water resources in Taiwan.

The WinnER Center, the Construction and Planning Agency, Ministry of the Interior, and the Chinese Institute of Environmental Engineering jointly organized the "International Symposium on Advanced Nitrogen Removal Technologies in Wastewater and Electrochemical Water Reclamation Technologies." (April 25, 2023)



Membrane Distillation Technology Paves the Way for a Green Revolution and a New Era of Energy-Efficient Water Purification

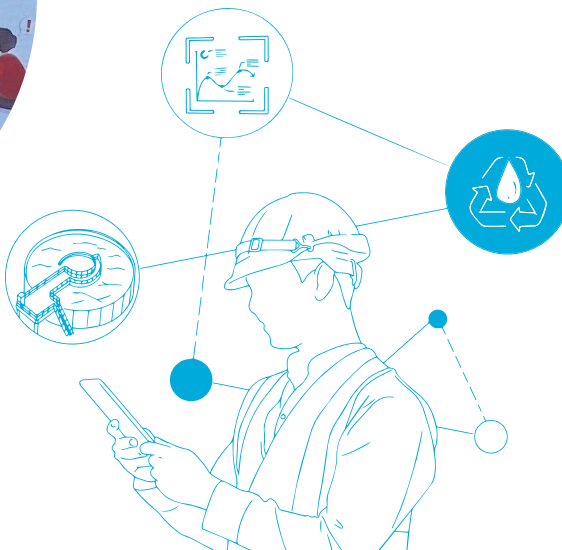
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The intensification of climate change has led to an increase in extreme weather events worldwide, with more countries facing the threat of drought. In recent years, Taiwan has also been affected by tight water supplies, impacting both industrial development and quality of life. Facing increasingly scarce freshwater resources, Professor Kuo-Lun Tung of NTU's Department of Chemical Engineering and his research team have been actively engaged in developing "Nanophotonics-enabled Solar Membrane Distillation (NESMD)" technology. This technology uses clean solar energy to purify seawater, converting it into drinkable water.

Traditional seawater desalination technologies require a significant amount of electricity, making their high operational costs unaffordable for regions lacking energy and water resources. Furthermore, the associated high carbon emissions conflict with global efforts towards low-carbon transition. In contrast, the NESMD technology developed by Prof. Tung's team offers advantages such as solar-powered operation, simplicity, and low cost, making it suitable for both industrial and domestic water consumption. The potential applications of this technology can help address the water and electricity shortages faced by developing countries and effectively mitigate the impacts of climate change.



A student team under the guidance of Prof. Kuo-Lun Tung won the gold medal at the Ministry of Education's "2023 Climate Change Creative Practice Competition" with their NESMD technology.



LTSER Feitsui Station: Core Observation Station for Forest-Tea Garden Socio-Ecosystems

6 15

The Taipei Water Management Branch of the Water Resources Agency is responsible for supplying domestic water to 6.5 million residents in the Taipei metropolitan area. This catchment area has abundant water resources and diverse ecosystems. It also serves as an important production area for pouchong tea in northern Taiwan and forms part of the traditional territory of the Atayal indigenous people.

To comprehensively assess the impacts of various environmental changes such as land-use alterations, hydrological changes, climate change, invasive species, and human activities on the local ecology, NTU has partnered with Academia Sinica, the Taipei Water Management Branch, and the Taiwan Forestry Research Institute to establish the Feitsui Agroforestry Long-Term Socio-Ecological Research (LTSER) observation station. The team has installed instruments on-site to monitor water quantity and quality, as well as energy and nutrient fluxes. Moreover, through the collection of socioeconomic data via interviews and questionnaires covering aspects like population, age, occupation, and income changes, the team outlines the socio-ecological issues in the area. For instance, they investigate the challenges faced by tea farmers in Pinglin due to changes in temperature and rainfall patterns brought about by climate change.

The scientific data collected at long-term socio-ecological research stations like Feitsui Station allows for a deeper understanding of the local ecosystem's characteristics and vulnerabilities. When facing social development challenges, this data provides a solid scientific basis for various stakeholders, including academia, government agencies, and the public to make informed decisions. Additionally, it facilitates potential scenario analyses to identify optimal strategies and serves as a reference for other regions aiming to achieve sustainable management goals.



The monitoring tasks of LTSER Feitsui Station.

7

AFFORDABLE AND CLEAN ENERGY



TaidaFloat, a semisubmersible floating platform, for 15MW offshore wind turbines.

NTU Pioneering Offshore Wind Power in the Asia-Pacific Region



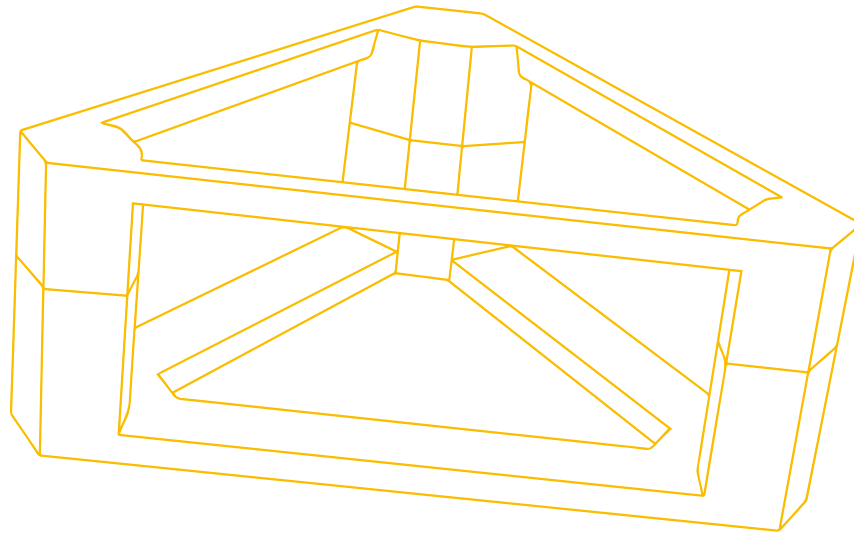
Amid the global consensus on the transition to net zero by 2050, renewable energy plays a pivotal role. Capitalizing on the Taiwan Strait's exceptional wind conditions, the Taiwanese government plans to reach 5.7 GW of cumulative offshore wind power capacity by 2025. This will generate approximately 21.52 billion kWh of clean electricity annually, thereby supplying power to 5.6 million households. The plan is expected to create over 20,000 jobs, advancing towards net-zero carbon emissions, energy self-sufficiency, and industrial upgrades. As a leading research institution in the Asia-Pacific region's offshore wind power industry, NTU has been at the forefront of this field for years.

Ministry of Education, NTU launched the "Offshore Wind Energy Industry Talent and Technology Training Program" in September 2023. This collaborative effort involves five universities (National Formosa University, Taipei City University of Science and Technology, Chienkuo Technology University, Southern Taiwan University of Science and Technology, and National Kaohsiung University of Science and Technology), as well as entities such as the Metal Industries Research & Development Centre and the Taiwan Construction Research Institute, to collectively promote offshore wind power talent cultivation.

To nurture talent, NTU initiated the Offshore Wind Power Credit Program in 2018 and partnered with the Netherlands in the Taiwan-Netherlands Offshore Wind Joint Talent Cultivation Cooperation in 2020. These efforts involve training local seed instructors and accelerating the talent development required for Taiwan's offshore wind power industry. With funding from the



Press conference for the NTU Yunlin Branch Offshore Wind Talent Training Center Opening Ceremony. (September 5, 2023)



Further, NTU has collaborated with CSBC Corporation Taiwan and the Ship and Ocean Industries R&D Center to develop the “TaidaFloat” – a 100% domestically-produced semi-submersible floating platform with a robust mooring system. The TaidaFloat can withstand a typhoon with a 50-year return period and remain stable during extreme weather conditions. Unlike traditional fixed-foundation wind turbines, this platform does not require seabed piles and can be deployed in waters at depths exceeding 60 meters, vastly expanding the potential for offshore wind power. Moreover, by eliminating the noise pollution associated with pile driving, this system is more environmentally friendly. In September 2023, TaidaFloat’s platform structure and mooring system received the Approval in Principle (AIP) certificate from the American Bureau of Shipping (ABS), marking a significant milestone for Taiwan in floating offshore wind turbine technology.

Taiwan’s unique advantages in offshore wind power development will play a pivotal role in the nation’s journey towards net zero. As a central hub for talent cultivation and technological innovation, NTU is committed to advancing the offshore wind power industry and contributing to Taiwan’s sustainable energy future.

The RSPRC Launches Press Conference on the Release of the 2023 Net Zero Transition Public Opinion Survey

In response to Taiwan’s announcement in 2022 of the Taiwan’s Pathway to Net-Zero Emissions in 2050 and the enactment of the Climate Change Response Act in 2023, which establishes a legal framework for achieving net zero emissions by 2050, the Risk Society and Policy Research Center (RSPRC), focusing on the United Nations’ SDG 7 for sustainable energy and social equality, conducted the “Public Opinion Survey on 2023 Net Zero Transition”. The survey results were unveiled at a press conference on July 19, providing valuable insights for various stakeholders.

The survey findings indicate Taiwan has entered a paradigmatic-changing phase of energy transition development with a considerable proportion of respondents supporting for renewable energy as a stable component of Taiwan’s electricity portfolio and willing to pay more for it. Nearly 60% of the respondents are willing to install or have already installed rooftop solar panels. Based on these findings, the RSPRC recommends actively promoting interdepartmental legislative amendments and cross-sector collaborations to achieve 2050 net zero emissions goals, emphasizing more intergenerational equity, homeland sustainability, and private sector engagement.

According to previous academic surveys, Taiwanese citizens are consistently willing to invest more and make greater efforts for future generations, particularly in addressing climate disasters and transitioning to net zero carbon emissions. This reflects a strong societal desire for intergenerational justice, which is crucial for driving economic and social transition. The RSPRC, serving as an essential research and social communication platform, conducts annually significant surveys on energy and net zero transition to advocate policies engage in social dialogue, fulfilling its University Social Responsibility.



Press conference for the “Public Opinion Survey on 2023 Net Zero Transition” held by the NTU RSPRC. (July 19, 2023)



8

DECENT WORK AND ECONOMIC GROWTH



The "International Talent & Impact Zone" at VISION 2023 NTU Campus Recruitment Fair.

NTU iNGO Academy Cultivates Sustainable Talent

4 8 17

Non-governmental organizations (NGOs) have become a vital pathway for Taiwan to connect with the international community and pursue sustainable development. Recognizing this, NTU officially launched the NTU iNGO Academy in 2023. Through collaboration between academia and civil society, the Academy aims to cultivate talents who can bridge Taiwan and the global community. The first program of the iNGO Academy partnered with Impact Hub Taipei, a social impact incubator, successfully matching 15 NTU students from 5 countries and 9 colleges with diverse international NGOs to do internship.

Following the conclusion of the first program in June 2023, participants shared positive feedback, expressing that their involvement with NGOs broadened their perspectives and allowed them to apply their learning and cultivate essential skills for the future. Partnering NGOs commended NTU students for their innovative ideas, which injected fresh energy into their organizations. Through, NTU hopes this initiative will connect more young students with international NGOs, fostering diverse partnerships and networks that contribute to a more sustainable future.

The iNGO Academy emphasizes project-based learning, providing students with practical opportunities beyond the classroom. Through internships, students gain firsthand understanding of how organizations address social issues and contribute to Sustainable Development Goals, while also exploring their future career paths. In addition, the iNGO Academy offers training courses combining lectures and workshops to equip students with relevant professional skills.



NTU iNGO Academy Signing Ceremony and Orientation. (March 3, 2023)

VISION 2023: NTU Campus Recruitment Fair

4 8

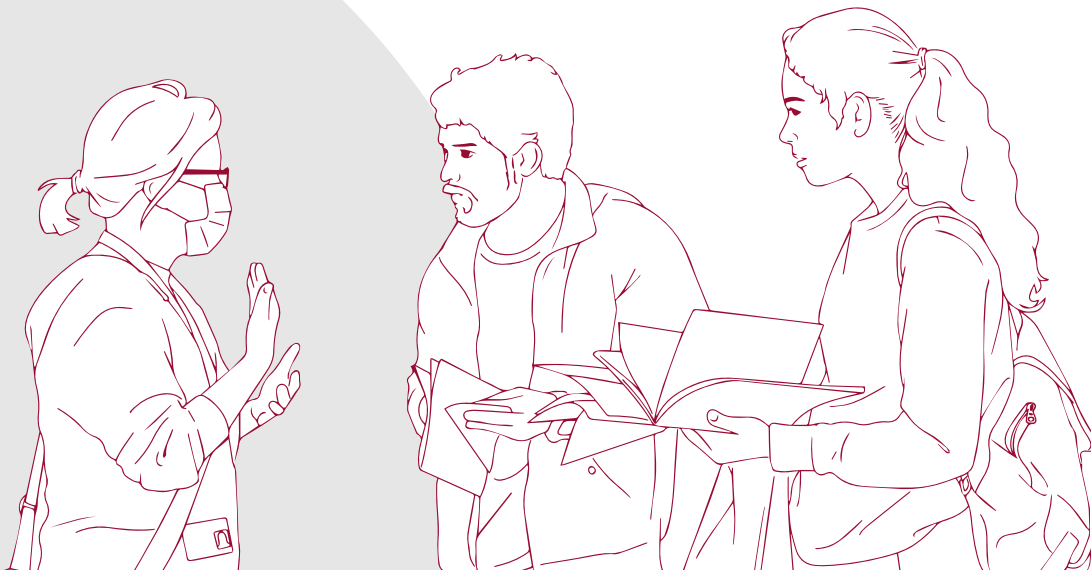
VISION 2023 NTU Campus Recruitment Fair kicked off on March 4, with around 310 companies participating. The physical exhibition featured 448 company booths, covering a variety of sectors: Information Technology, Finance, Corporate Groups, Human Resources, and Diversified Industries. Additionally, there were dedicated sections for “NTU Start-ups” and the “International Talent & Impact Zone,” offering both local and international students a wider range of global career options.

The NTU Campus Recruitment Fair has always attracted large crowds. To overcome the limitations of time and space for visits and interviews, the 2023 event further streamlined its integration of online and offline recruitment activities. For instance, students could use their smartphones to scan QR codes at company booths, giving them access to a virtual digital expo platform. This platform facilitated online communication with company HR representatives, business card exchanges, and participation in video recruitment activities. This hybrid approach effectively connected students and companies, increasing opportunities for talent matching.



VISION 2023 NTU Campus Recruitment Fair attracted large crowds.

The International Talent & Impact Zone specifically invited companies committed to SDGs. These companies presented their profiles in English and recruited international talent, attracting over a thousand students who sought consultation, with some submitting their resumes on the spot. NTU continues to support students with various learning opportunities and career counseling resources, help them become leaders in their respective fields while aligning with industry demand and enhancing corporate competitiveness.



Employer-Friendly Practices and Empowerment Models for Migrant Workers

In 2023, NTU students participated in a project titled Employer-Friendly Practices and Empowerment Models for Migrant Workers in collaboration with One-Forty, a non-profit organization dedicated to migrant worker education and cultural exchange. The project aimed to design service solutions that facilitate better interactions between employers and migrant workers, and assist migrant workers in adapting to the local working environment. The project included a six-month Mandarin learning journey for migrant workers, alongside with initiatives to cultivate employer empathy, promote cultural exchange between employers and workers, and develop “multicultural adaptation” teaching materials. Students, alongside One-Forty team members, conducted interviews with employers to understand their perspectives and analyzed case studies from domestic and abroad. Through small-scale testing and validation, they formulated practical solutions that address the needs of both employers and migrant workers. The project hopes to challenge existing stereotypes and prejudices that originated from employers’ unfamiliarity with migrant workers. Furthermore, by addressing language barriers, the initiative aims to reduce potential conflicts and risks for employers, migrant workers, and those under their care.



NTU students participated in the “Employer-Friendly Practices and Empowerment Models for Migrant Workers” project in collaboration with One-Forty.

9

INDUSTRY, INNOVATION AND INFRASTRUCTURE

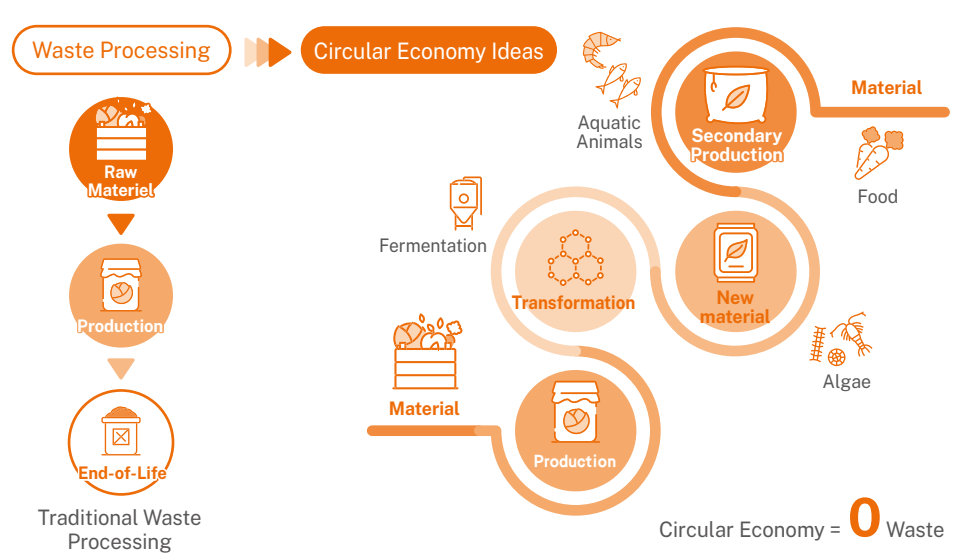
Net Zero Tech International Contest @ Taiwan Inspires the Young

In collaboration with the TECO Technology Foundation, NTU hosted the 2023 Net Zero Tech International Contest @ Taiwan. The competition aimed to encourage young students to engage in research related to net-zero emissions and to promote collaboration between academia and industry. The event attracted 146 teams from 10 countries/regions and involved approximately 500 students and faculty members, showcasing the youth's innovation in net-zero technologies from around the world.

A student team guided by Professor Nae-Lih Wu from the Department of Chemical Engineering secured the Third Place with their project titled "Rising Star of Battery: The Perfect Combination of High-Efficiency Halide All Solid State Lithium Ion Battery Technology Development and Circular Economy." This technology is expected to be directly applicable to existing battery production processes, enhancing both battery capacity and safety. In addition, a student team led by Professor Yu-San Han from the Institute of Fisheries Science received the Image Systems Technology Award for their project "Application of green materials in eco-friendly farming: waste-reducing and low-carbon clean production." The team's approach of "eco-friendly aquaculture" utilizes a circular model to achieve low-carbon, zero-waste aquaculture, addressing Taiwan's high-salinity fermentation waste issue while promoting circular economy.



A student team guided by Prof. Nae-Lih Wu secured the Third Place with their project, "Rising Star of Battery: The Perfect Combination of High-Efficiency Halide All Solid State Lithium Ion Battery Technology Development and Circular Economy."



NTU team addresses waste management issues with their project "Application of green materials in eco-friendly farming: waste-reducing and low-carbon clean production".

The competition's participants, aged between 20 and 30, represent the backbone of society. The then-president Tsai Ing-wen graced the final award ceremony, offering recognition and encouragement to the young students. The competition will continue in the future, with talent cultivation as its core objective. It aspires to not only elevate participants' technical skills and foster international collaboration during the event but also encourage them to dedicate themselves to the field of sustainability and contribute to the net-zero transition beyond the competition.



The then-president Tsai Ing-wen, distinguished guests, and winning teams pose for a group photo.

NTU and ITRI Collaborate in R&D, Patents, and Talent Development

Since 2002, NTU and the Industrial Technology Research Institute (ITRI) have collaborated extensively, notably through the Nanotechnology Research Center, producing over 50 significant research outcomes. Continuing this partnership, in April 2023, NTU and ITRI announced an expanded collaboration at a joint event, focusing on three areas: cross-disciplinary R&D, intellectual property strategy, and talent recruitment. Key research themes will include successful aging, the circular economy and net-zero emissions, and electronics and communication applications. This academia-industry collaboration aims to accelerate research and development, drive industrialization, and boost industry competitiveness.

Facing global competition for technology and talent, domestic academic and research institutions must coordinate their resources to strengthen their competitive edge. With this expanded collaboration, NTU is committed to talent cultivation, top-tier research, and enhanced industry-academia cooperation. Efforts will be directed towards promoting international and cross-disciplinary research collaborations. ITRI will closely partner with NTU in R&D, patents, and talent initiatives to expedite the application and commercialization of innovations. Together, NTU and ITRI will attract top international talent to enhance research quality and contribute to the development of cutting-edge technologies.



The cooperation exchange meeting between NTU and ITRI. (April 6, 2023)

Experts Gather at NTU Forum to Explore AI Innovation in Business and Finance

Since its advent in late 2022 and subsequent meteoric rise, ChatGPT has garnered widespread attention and interest, holding significant implications for both financial technology (fintech) and various business sectors while revolutionizing industries across the board. On June 14, NTU's FinTech Research Center and Industry Liaison Office jointly hosted a forum titled "Developments and Applications of ChatGPT in Finance and Business." Nearly 200 scholars, industry experts, and business leaders participated in the event to explore the potential and challenges of ChatGPT in the realms of business and finance.



The NTU Forum: "Developments and Applications of ChatGPT in Finance and Business." (June 14, 2023)

The forum featured presentations by five distinguished experts. Associate Professor Vivian Yun-Nung Chen from NTU's Department of Computer Science and Information Engineering discussed the differences between current generative AI models and their predecessors, as well as strategies for preventing data leaks and misinformation. Dr. Jyh-Shing Jang, Chief Technology Officer of E.SUN Financial Holding Company, explored the current applications and challenges of generative AI in the financial industry. Dr. Shou-De Lin, Chief Scientist at Appier Inc., addressed how organizations can determine the scope of AI application, establish AI implementation processes, and set up performance evaluation. The forum highlighted the vast potential of AI in the business and financial sectors, fostering cross-disciplinary collaboration and underscoring the importance of connecting technological research with industry applications.

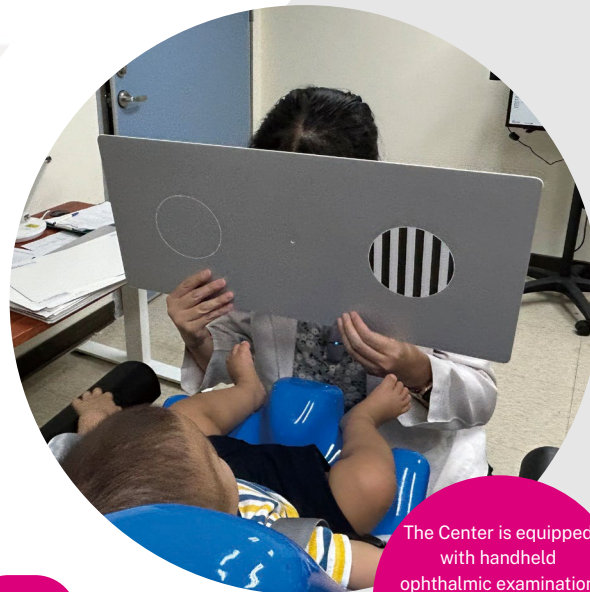
10 REDUCED INEQUALITIES



Promoting Visual Health Equity: Vision Center for Children with Special Needs 3 10

Clinical research indicates a higher prevalence of vision problems among children with disabilities compared with their typically developing peers. However, the unfamiliar and complex medical environments often intimidate these children, making them apprehensive about seeking medical attention and potentially missing critical windows for treatment and vision rehabilitation. Recognizing this challenge, NTU Hospital's Department of Ophthalmology, in alignment with the Ministry of Health and Welfare's "Vision Rehabilitation Program for Children with Special Needs," established the Vision Center for Children with Special Needs in 2023. The Center integrates a specialized medical team, utilizes vision assessment tools specifically designed for children with special needs, and provides dedicated examination rooms to ensure a comfortable and accessible environment. This initiative embodies the principles of the Convention on the Rights of Persons with Disabilities (CRPD) and the Convention on the Rights of the Child (CRC), safeguarding the medical rights and ensuring high-quality care for children with special needs.

The eyes are the windows to the soul and a crucial foundation for children's development. Since its inception, the Center has served over 300 children, including those with multiple disabilities, developmental delays, rare diseases, premature births, Autism Spectrum Disorder (ASD), and Attention Deficit Hyperactivity Disorder (ADHD), who cannot undergo standard vision examinations. Among these children, approximately 30% exhibit moderate to severe visual impairment, with over 50% previously undiagnosed before the program's intervention. To address the problem, the Center conducts comprehensive examinations to assess visual development and provides educational guidance to empower parents in supporting their children's progress in daily life.



The Center is equipped with handheld ophthalmic examination instruments and utilizes vision assessment tools suitable for children with special needs.



Established in 2023
Vision Center for Children with Special Needs

Served
300+ ppl.

Global Asia Research Center (GARC) Promotes Transnational Comparative Studies on New Immigrants and Laborers

The Global Asia Research Center (GARC) at NTU is dedicated to cross-social and cultural issues within the Asian context. By employing a comparative approach, examining Taiwan alongside other Asian countries with similar developmental trajectories, GARC aims to distinguish both the universal and unique aspects of Taiwanese society. In July 2023, GARC organized the international conference “Transnational Families and the Second Generation in Asia,” exploring the experiences of transnational families and second-generation immigrants. The conference touches on how immigrants navigate life in foreign lands amidst social constraints related to ethnic relations, geopolitics, and economic development. Scholars from six countries, including Japan, South Korea and the Philippines, shared case studies of new immigrants and their children seeking identity recognition within their respective host countries and reconstructing their identities under the influence of language, culture, policies, and values. The conference aimed to identify strategies for mitigating unequal treatment arising from identity labels and stereotypes.



“Transnational Families and the Second Generation in Asia” international conference.



“Labor Movements in East Asia: Mobilizing Against Inequality Amid Political Change.” international conference.

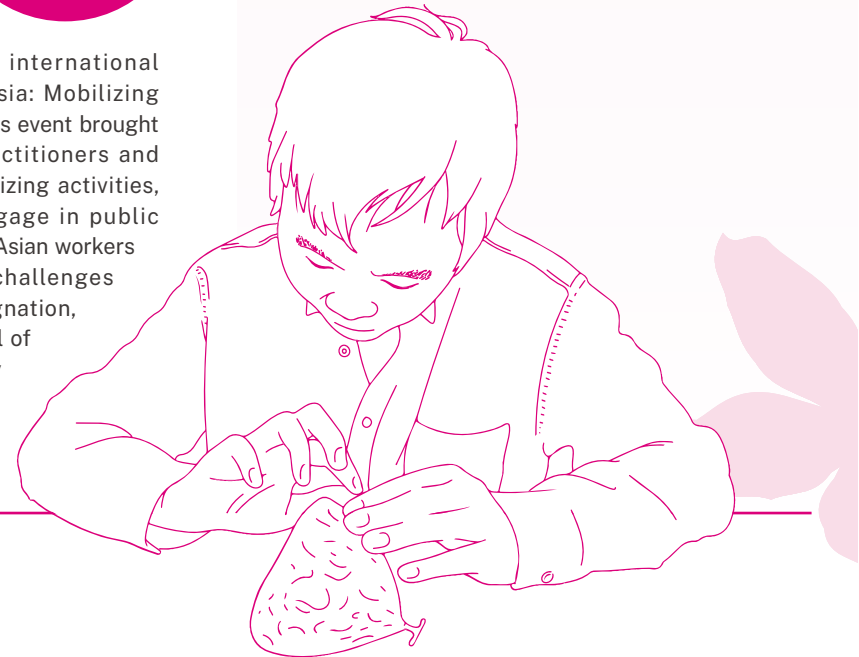
In September, GARC convened the international conference “Labor Movements in East Asia: Mobilizing Against Inequality Amid Political Change.” This event brought together East Asian labor movement practitioners and political strategists with expertise in organizing activities, collective bargaining, and strikes to engage in public discourse. Discussions centered on how East Asian workers advocate for their rights in the face of challenges such as government repression, wage stagnation, discrimination, and exploitation, with the goal of reducing unequal treatment experienced by transnational workers in the workplace.

8 10

NTU Museums Welcomes Visually Impaired Visitors with Diverse Experiences, Promoting a Culturally Inclusive and Equitable Environment

Committed to creating an inclusive and equitable environment where cultural rights are accessible to all, NTU History Gallery, Herbarium, and Insect Museum actively participate in Ministry of Culture projects and collaborate with the Eden Social Welfare Foundation’s Visual Impairment Service Center. Through thoughtfully designed multisensory experiences incorporating auditory, tactile, and olfactory elements, the museums enable visually impaired individuals to engage with exhibits in diverse and meaningful ways.

Furthering their commitment to inclusivity, NTU Museums actively solicit feedback from visually impaired individuals through focus group interviews and provide professional skills workshop on equity for staff members. These initiatives enhance tour guiding skills and improve exhibition quality, ensuring equal learning opportunities for all visitors and fostering a welcoming environment.



11

SUSTAINABLE CITIES AND COMMUNITIES



Weaving workshop held in the Seediq community, with instruction provided by a master weaver.

Weaving It Together: Textile Traditions in the Seediq Community



In contemporary times, Indigenous peoples face significant challenges in preserving their cultural heritage. Against this backdrop, weaving has emerged as a vital avenue for cultural practice and inheritance among Taiwan's Indigenous peoples. Weaving not only embodies material culture but also serves as a means to connect various networks. For the Seediq people in Nantou County, weaving is a core aspect of their culture and an important tradition.

To preserve the tradition, the Indigenous Research Center at NTU partnered with the Seediq community in Nantou to launch the "Weaving It Together: Textile Traditions in the Seediq Community." Through weaving workshops and the reproduction of museum collections, cultural artifacts were showcased within the community. The workshops also deepened participants' understanding and appreciation of weaving techniques. Concurrently, efforts were made on the NTU campus to cultivate weaving materials like ramie and other ethnic plants to foster cross-ethnic interaction.

Indigenous instructors were invited to conduct courses on weaving with inkle looms. Additionally, the Center compiled years of knowledge into instructional manuals and videos, making them publicly available. This effort brings Indigenous culture closer to a wider audience, promoting interethnic exchange and cultural sustainability.



Participants collaborate in cultivating culturally significant plants on the NTU campus.

Unearthing Cultural Treasures of Former Indigenous Settlements

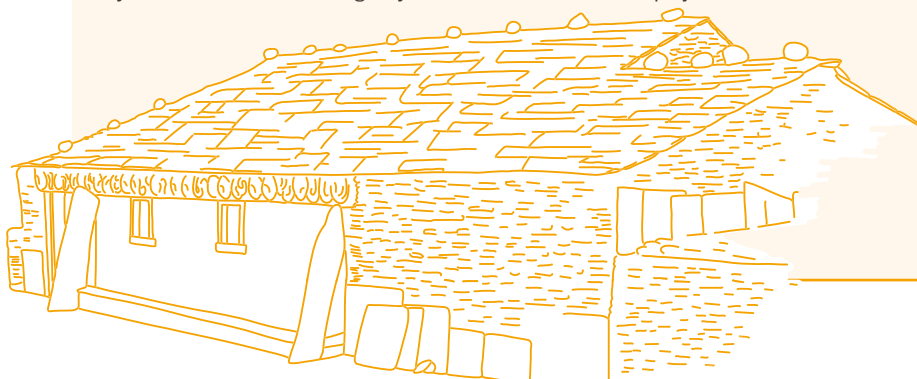
In recent years, NTU's Department of Anthropology has collaborated with local communities to promote the "Indigenous/Local Community Past Settlement Research" project. This initiative leverages expertise in cultural anthropology, archaeology, material culture studies, and museology to help preserve local cultural and historical heritage.

"Former Indigenous settlements" refer to the historical dwelling places of Indigenous peoples or other local communities. Though now reduced to remnants and scattered artifacts, these sites harbor invaluable insights into the traditional culture, social structures, worldviews, and religious beliefs of our forebears. Much of this cultural knowledge, however, has faded over time, necessitating research, interpretation, and translation by scholars in fields such as archaeology. Moreover, the fragmented nature of material remnants in former requires the involvement of cultural anthropology and cultural heritage management to reconstruct oral histories, investigate existing cultural and social phenomena, and engage in continuous dialogue and critical analysis with community members. This approach facilitates a deeper and more comprehensive understanding of former settlements, their history, culture, and social significance.



NTU students and young members of the indigenous community conducting surveying work at the former indigenous settlement.

Through collaborative projects with the Department of Anthropology, community members have the opportunity to acquire pertinent knowledge and undertake investigations, documentation, and basic research on their own traditional culture and history, including interpretation and written documentation. This initiative seeks to lay the groundwork for sustainable community development and empower community members to assert their agency over relevant infrastructure projects and activities.



Interdisciplinary Exploration: Dancing Through the Lives of Miners

Professor Chia-Fen Tsai from NTU's College of Design and Innovation offers the course "Music Design and Innovative Applications." In the fall semester of 2023, her course collaborated with Professor Wen-Chi Wu's "Body Language and Environmental Exploration" course at Tamkang University (TKU). With the lives of miners and mining culture in Houtong, Ruifang District, New Taipei City, as their focus, the courses transformed the real-life experiences of miners into stories interpreted through music and dance. This creative project also partnered with the Houtong Miners' Culture & History Museum, taking students on field trips to the community where former miners shared their multifaceted experiences of joy and sorrow. This allowed students to gain a deeper understanding of the community and its social issues.



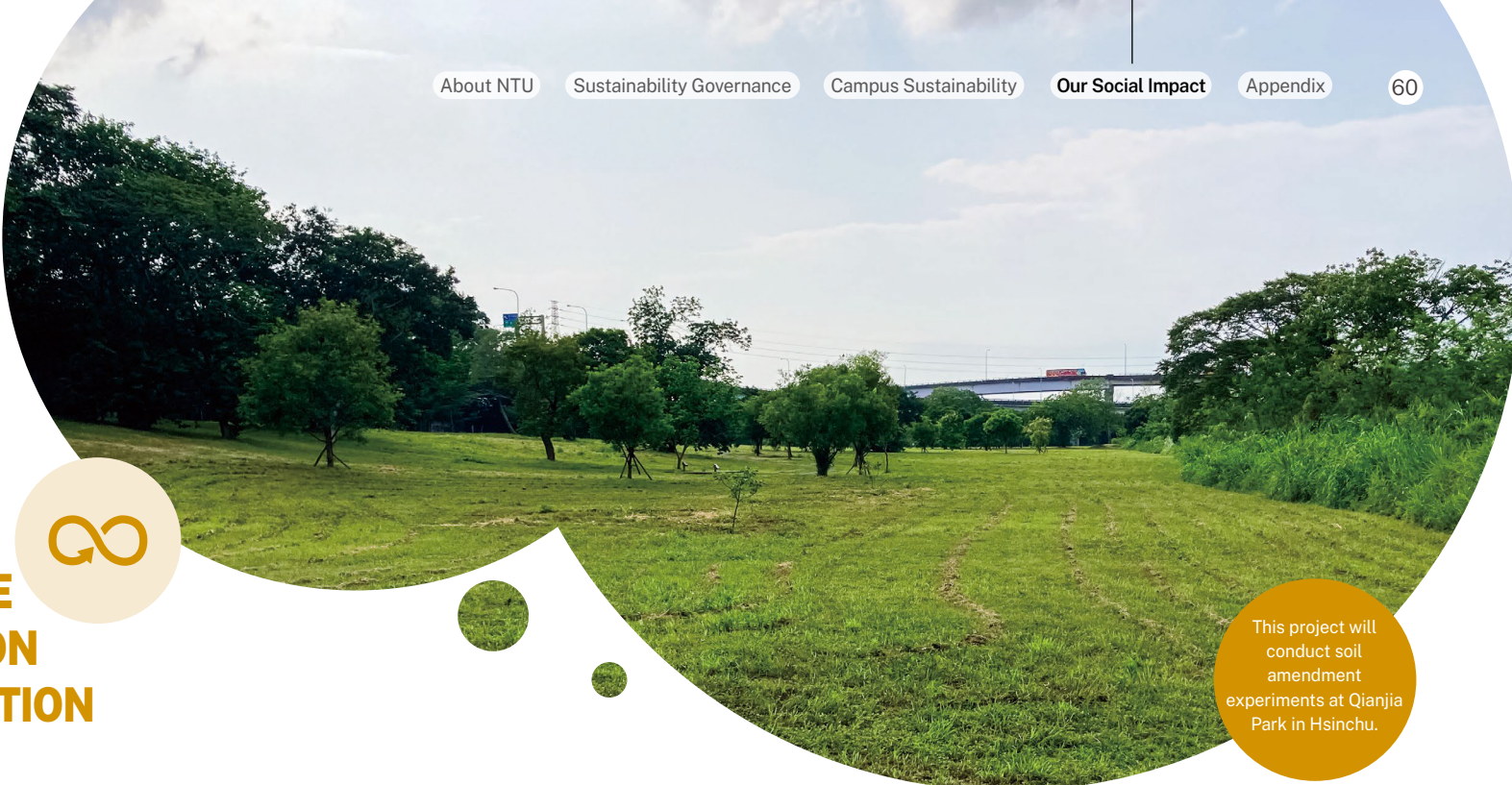
A local guide leads students through the remains of a mine in Houtong and shares stories of his past experiences working as a miner.



Students perform at the Ruisan Coal Preparation Plant in Houtong. (December 10, 2023)

In December 2023, students from NTU and TKU presented their final projects at the Ruisan Coal Preparation Plant in Houtong. Through their musical and dance creations, they conveyed the bittersweet experiences of the miners to the audience. After watching the performance, Ms. Pao-Yin Wu, a legendary figure in Houtong's mining history, expressed that seeing the students wholeheartedly portray the life stories of old miners brought back many memories of her time as a miner, moving her to tears. This intergenerational and interdisciplinary collaboration not only broadened the students' life experiences but also offered a glimmer of hope for preserving the fading stories of miners.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



This project will conduct soil amendment experiments at Qianjia Park in Hsinchu.

NTU Partners with Vanguard International Semiconductor Corporation to Develop Domestic Negative Emissions Technology

NTU, through its College of Engineering’s Water Technology and Low-Carbon Sustainability Innovation Research Center (WInnER), entered into a collaborative research agreement with Vanguard International Semiconductor Corporation (VIS). The joint project, titled “Enhancing Soil Carbon Sinks through the Application of Resource Recycling Concepts,” aims to develop a novel approach to carbon sequestration. The research focuses on combining agricultural and livestock waste products, such as biochar and compost, with organic fertilizers and innovative carbon dioxide nanobubbles. This combination promotes microbial growth in the soil through biostimulation, leading to the accumulation of microbial residues and enhanced soil carbon sequestration capabilities. Over a three-year period, the research team will conduct soil amendment experiments, taking into account local climate and soil characteristics. The project will assess the potential application benefits of

this technology within Taiwan and other subtropical regions. Additionally, field tests will be conducted at Qianjia Park, a site with long-term involvement from VIS as an adopter, allowing for the evaluation of research findings in a real-world setting.

NTU is committed to fulfilling its environmental and social responsibilities by leveraging its research expertise and practical approach to address real-world challenges. The university actively promotes the concept of resource circulation in biological carbon sequestration, bridging the gap between theoretical research and practical implementation. The project’s objectives extend beyond scientific advancement, aiming to achieve tangible societal and environmental

benefits. By enhancing soil organic carbon sequestration capacity and improving soil quality, the project strives to contribute to ecological and environmental protection while promoting the well-being of all people.



On-site soil quality sampling and analysis at Qianjia Park.

NTU and Delta Electronics Joins Forces on Developing Environmentally Friendly and Sustainable Product Technologies 9 12

NTU's College of Electrical Engineering and Computer Science (EECS) and Delta Electronics, Inc. entered into a partnership to establish the Delta-NTU Joint Research & Development Center in 2021. As of 2023, this collaboration has involved 30 professors and nearly 100 students on 45 research projects. The Center operates on two core principles, "Autonomous" and "Sustainable", focusing on three themes: Artificial Intelligence of Things, Electric Vehicles, and Sustainability. Through industry-academia collaboration, the Center aims to leverage NTU's top-notch research capabilities, develop cutting-edge technologies, and jointly cultivate world-class talent capable of collaborating with international research communities.



Facing the ever-expanding packaging market for fast-moving consumer goods on a global scale, especially single-use plastic packaging, a significant amount of plastic material still ends up in the ocean every year despite being recyclable. Effectively utilizing plastic waste recovered from the ocean is crucial for environmental protection. To this end, the Center is dedicated to research on this type of plastics, establishing a dedicated management mechanism for green plastics in order to improve the strength and reliability of ocean-bound plastic (OBP). At the same time, we are researching methods for stabilizing high mixing ratios of 50% OBP to expand the range of applicable products. The goal is to significantly reduce the carbon footprint of products and move towards sustainable development for our planet.



The Delta-NTU Joint Research & Development Center is dedicated to research on reusing ocean-bound plastic.

2023 ESG and Management Innovation International Conference

In recent years, ESG has become a major focal point in the field of business management. To enhance the breadth and depth of international case studies, NTU's College of Management, in collaboration with Macquarie University in Australia, organized the 2023 ESG and Management Innovation International Conference in April 2023. The conference featured research paper presentations centered around the three major themes of ESG: Environmental Protection, Social Responsibility, and Corporate Governance, including research submissions from countries such as China, Australia, Malaysia, France, the United States, India, and Vietnam. Guest speakers also shared and exchanged views on the importance and potential of integrating ESG principles into accounting practices. By gleaned useful ideas from international case studies, the conference aimed to foster the development of more sustainable and innovative business models, creating an economic ecosystem that balances social and environmental benefits.

This international collaboration between NTU and Macquarie University has paved the way for more possibilities for future research cooperation and established a diverse and extensive partnership between the two institutions. NTU is also expected to collaborate with Pusan National University in South Korea and Chulalongkorn University in Thailand for subsequent iterations of the conference in 2024 and 2025, respectively, which will provide a long-lasting platform for exchanging ideas and perspectives among scholars from around the globe.



ESG and Management Innovation International Conference. (April 4, 2023)

13 CLIMATE ACTION



Integrated Operation of Meteorological and Hydrological Information for Building Disaster-Resilient Communities

9 13 17

To enhance disaster response capabilities among local governments and citizens for mitigating the impact of disasters, the NTU Center for Weather and Climate Disaster Research (WCDR) has been actively involved in coordinating how to respond to major typhoons and earthquakes in Taiwan in recent years. The Center has assisted the government in implementing 542 self-resilient communities in flood-prone areas and has helped to recruit 1,621 civilian volunteers to support local authorities in flood prevention and control efforts. Volunteers worked on river and coastal embankment inspection and disaster monitoring for the integrity of relevant facilities. Furthermore, the Center utilizes AI and deep learning algorithms to improve the professionalism, accuracy, and speed of meteorological and hydrological forecasting, which provides community residents with easily understandable disaster warning indicators to further enhance the community's disaster response capabilities.

As one of the Core Group Members of the Association of



Pacific Rim Universities (APRU) in the Multi-Hazards Program, the WCDR has established partnerships with renowned universities and institutions across the world, including the Disaster Prevention Research Institute at Kyoto University, the International Research Institute of Disaster Science at Tohoku University, and Kansai Electric Power Company in Japan. By sharing its expertise in the development of meteorological and hydrological research and applications in disaster prevention, the WCDR has strengthened industry-government-academia collaboration, implemented specialized technologies in disaster prevention and responses, and enhanced its presence on the world stage.



WCDR has developed a platform that integrates meteorological and hydrological information to deliver real-time operational services (pictured: meteorological instrument).



WCDR utilizes an AI deep learning algorithm for accurate short-term quantitative precipitation forecasting.

NTU Co-leads International Team, Publishing New Findings on Global Climate Change Three Million Years Ago

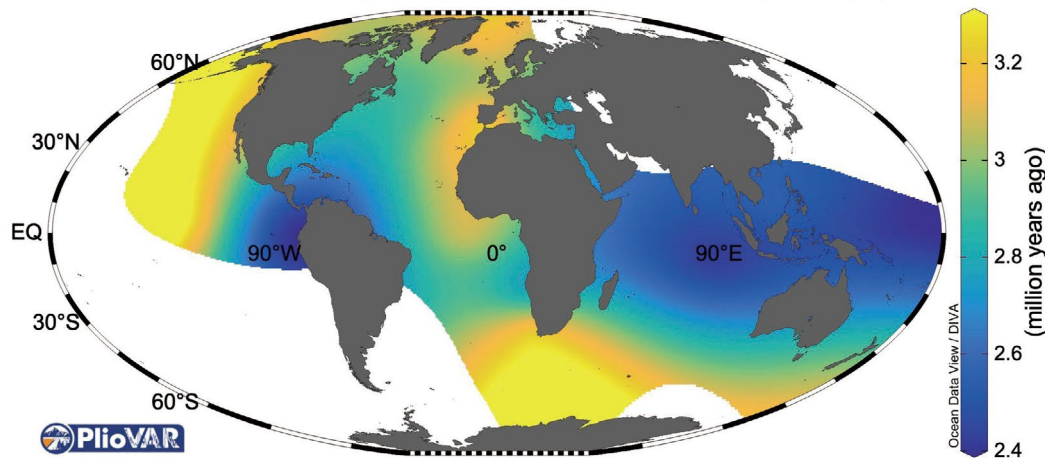
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With global warming becoming increasingly severe, understanding future trends in Earth's climate is imperative. Studying periods in Earth's past when similar warm conditions existed can help predict future climate change. According to the Intergovernmental Panel on Climate Change (IPCC) report, the late Pliocene, approximately three million years ago, had atmospheric CO2 concentrations comparable to what we are facing in the near future. Associate Professor Sze Ling Ho of NTU's Institute of Oceanography, along with Professor Erin McClymont of Durham University in the UK, have been co-leading the international working group known as PlioVAR. They coordinated effort involving over 30 experts from numerous research institutions across Europe, the Americas, Asia, and Oceania to collaboratively study paleoclimate records spanning 3.3 to 2.4 million years ago.

The PlioVAR team retrieved marine sediment core samples from the deep-sea bed using a drilling research vessel and

reconstruct Earth's climate history by analyzing the core sample that preserved thousands to millions of years data within them. The team focused on analyzing global paleoclimate data, investigating changes in polar ice shelves, ocean, and atmospheric circulation during the late Pliocene. Their findings revealed that during this climate transition, change in seawater temperatures in some regions occurred earlier (even before ice sheets undergoing changes), while other regions remained completely unaffected by the growing ice sheets in the Northern Hemisphere. Additionally, the mean and the range of climate variability differs by region globally, highlighting the complexity and regionally heterogeneous nature of climate change across a globally-significant climate transition. This research was published in the highly influential journal *Reviews of Geophysics* of the American Geophysical Union (AGU) in 2023 and was selected as an *Editors' Highlights* article in *Eos*, AGU's science news magazine.

Timing of climate transition through the onset and intensification of Northern Hemisphere glaciation (3.3 – 2.4 million years ago)



Timing of climate transition through the onset and intensification of Northern Hemisphere glaciation (3.3–2.4 million years ago).

Net-Zero Youth Academy: Empowering Youth to Make an Impact

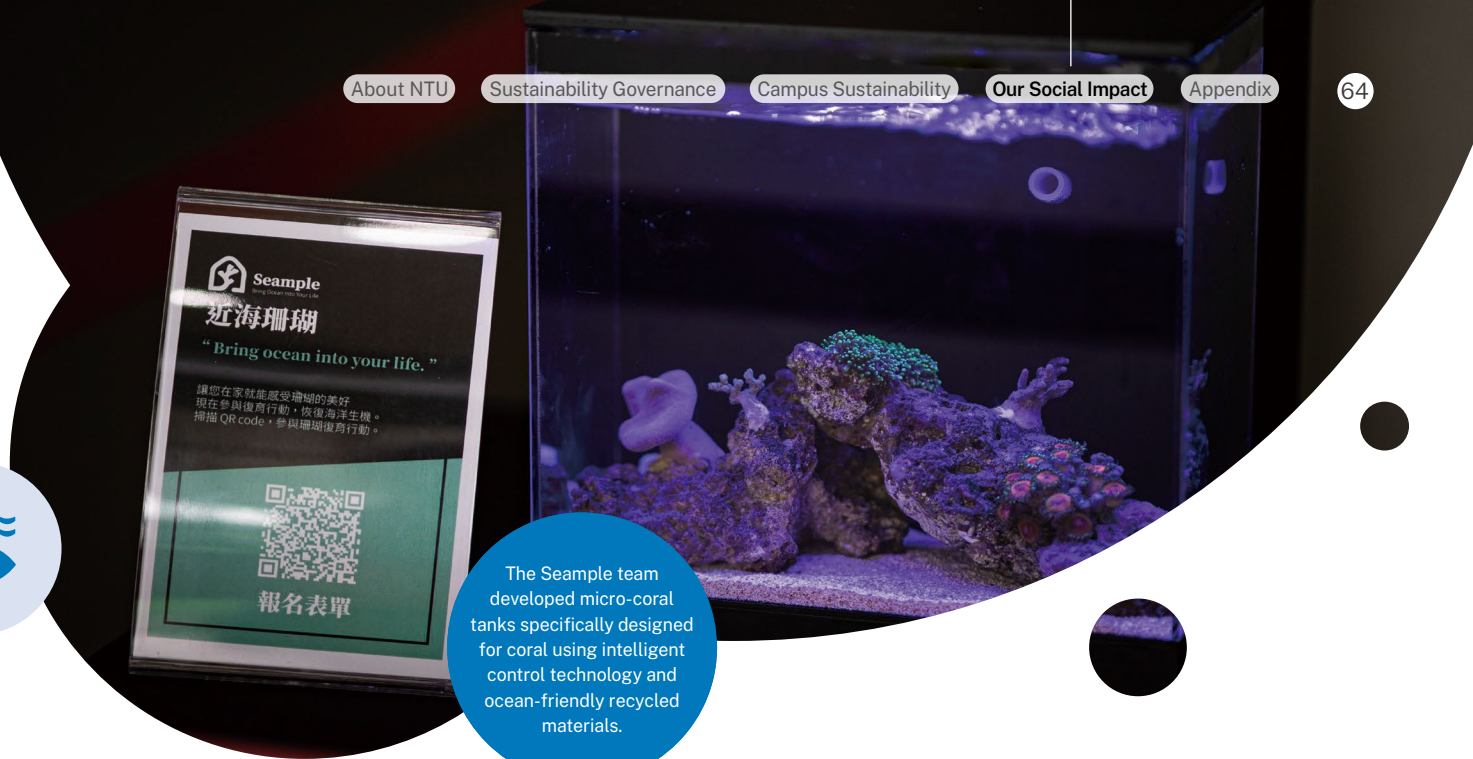
NTU's Risk Society and Policy Research Center (RSPRC) is dedicated to promoting the "Youth Net-Zero Empowerment Platform" project, aiming to build a co-learning network for Taiwanese youth in net-zero knowledge and sustainability advocacy based on policy, legal frameworks, and corporate governance. Through training programs such as salons, lectures, and courses, RSPRC works with young people who aspire to engage in sustainability advocacy, careers, or related academic research to shape and implement Taiwan's net-zero transformation goals.

In 2023, RSPRC held four youth training salons and, with the sponsorship and support of the Fubon Cultural & Educational Foundation, launched the inaugural "Net-Zero Youth Academy." The Academy provides a three-week course for students and young professionals for free. RSPRC hopes that through this systematic curriculum, participants will obtain the net-zero vision with a social science perspective, cultivate knowledge of net-zero transformation in both global and local contexts, and exert substantial influence on the advocacy of net-zero legislation and policies.



Participants of the inaugural Net-Zero Youth Academy.

14 LIFE BELOW WATER



The Seample team developed micro-coral tanks specifically designed for coral using intelligent control technology and ocean-friendly recycled materials.

Seample: A Citizen-Participatory Coral Reef Restoration Project

4 14

Coral reef ecosystems are among the most important and diverse marine ecosystems on Earth. However, the strict requirements for coral survival, including specific temperature ranges, light levels, and water quality, pose significant challenges to their restoration. The Seample team, composed of students from NTU’s Creativity and Entrepreneurship Program, is dedicated to addressing these challenges and restoring damaged coral reef ecosystems. Utilizing intelligent control technology and ocean-friendly recycled materials, the team has successfully developed a “micro-coral tank” specifically designed to meet the needs of corals. This innovation allows individuals to participate in coral restoration from their homes, engaging more citizens in marine conservation efforts.

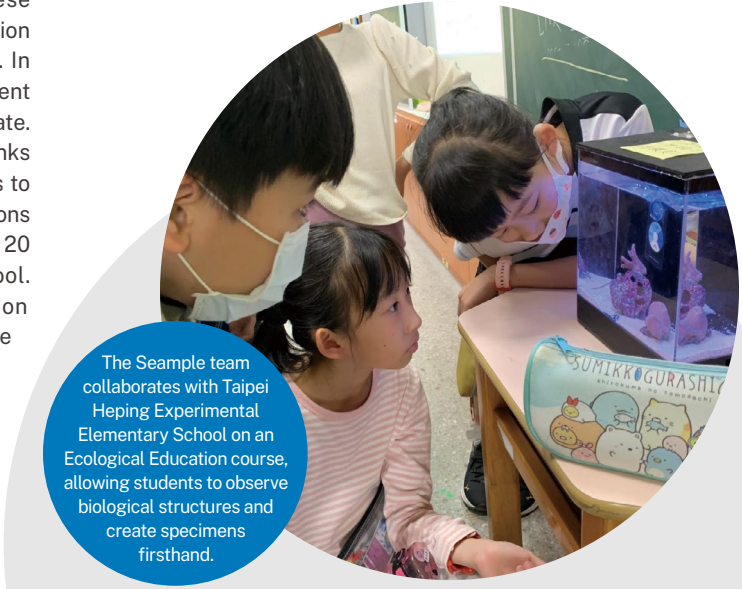
The Seample team’s explorational spirit led to their selection for the TSMC Udreamer Project Fund and received the “Innovative Service Award” under the U-start Plan for Innovation and Entrepreneurship program by the Ministry

of Education’s Youth Development Administration. These recognitions demonstrated the team’s successful integration and implementation of the diverse learning approaches. In February 2023, the team held an “NTU Fostering Corals” event on campus, with over 200 individuals signing up to participate. The team selected 15 participants to foster micro-coral tanks for one and a half months and entrusted another five tanks to professionals, collecting valuable experiences and suggestions from all involved. Ultimately, they successfully retrieved 20 grown coral polyps and placed them in a restoration pool. Furthermore, the Seample team brings marine education into elementary and junior high schools through interactive ecological education courses and summer camps. These programs teach students about marine sustainability and allow them to observe biological structures firsthand. This collaborative effort integrates marine education into children’s lives, cultivating their awareness and concern for the ocean and advocating coral conservation actions among the general public.

NTU Fostering Corals



Successfully retrieved **20** grown coral polyps



The Seample team collaborates with Taipei Heping Experimental Elementary School on an Ecological Education course, allowing students to observe biological structures and create specimens firsthand.



Traditional elver-fishing-practice demonstration along the coast to raise awareness for eel resource management.

NTU Institute of Fisheries Science Team Dedicated to Conserving Eel Resources

Eel aquaculture and elver fishing are important components of Taiwan’s fisheries industry. However, in recent years, eel resources have declined dramatically due to overfishing, habitat degradation, global climate change, and other factors. In response to this critical challenge, a research team formed by NTU’s Committee on Fisheries Extension and the Institute of Fisheries Science, led by Professor Yu-San Han, has been dedicated to conserving eel ecology and promoting the sustainability of the eel aquaculture industry. The team have been documenting changes in eel habitats and fishing practices for many years. The team discovered that over 70% of Taiwan’s river habitats suitable for eels have disappeared, and the elver resources of the most common Japanese eel (*Anguilla japonica*) species in Taiwan are gradually depleting, estimated to be disappearing at an average rate of 5% per year. This alarming trend suggests that within 10 to 20 years, there may be no eels left in Taiwan.

Therefore, the team actively conducts outreach activities related to eel and elver resources, fishing operation safety, and seafood education. In 2023, they held four seminars, inviting fishermen and local residents to participate and learn about eel ecology and resource management, raising public awareness about the importance of marine resource conservation. They also promoted safety precautions for elver fishing operations, working together to maintain the sustainability of traditional eel fisheries and cherish the limited eel resources.

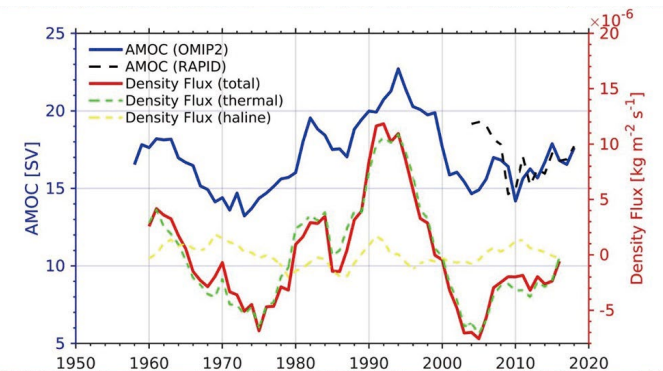
8 14

Taiwan Multi-Scale Community Ocean Model Participated First Time in International Climate Modelling Project¹ Phases Six

14

The Atlantic Meridional Overturning Circulation (AMOC) is caused by differences in seawater temperature and salinity that drives global ocean currents circulation. It plays a crucial role in Earth’s climate system by transporting warm equatorial waters to high-latitude regions and influencing the circulation patterns of all major oceans through deep ocean circulation. Understanding the AMOC is vital for predicting extreme weather events.

A domestic research team led by Professor Yu-Heng Tseng, Director of NTU’s Ocean Center, has successfully developed the high-precision “Taiwan Multi-scale Community Ocean Model” (TWMCOM). This advanced model is capable of simulating not only small-scale circulation changes in the waters surrounding Taiwan but also changes in the global ocean and sea ice systems. Representing Taiwan for the country’s first-time participation, the team joined the Ocean Model Intercomparison Project (OMIP) under Phase Six of the Coupled Model Intercomparison Project (CMIP6). They successfully simulated the changes in the AMOC over the past 50 years and discovered that the salinity mixing process in the North Atlantic at latitude 45°N is a key factor affecting the changes of the AMOC. Additionally, the research investigated the impact of changes in sea ice on seawater density and its subsequent effects on the AMOC and the Antarctic Circumpolar Current over the past decade.



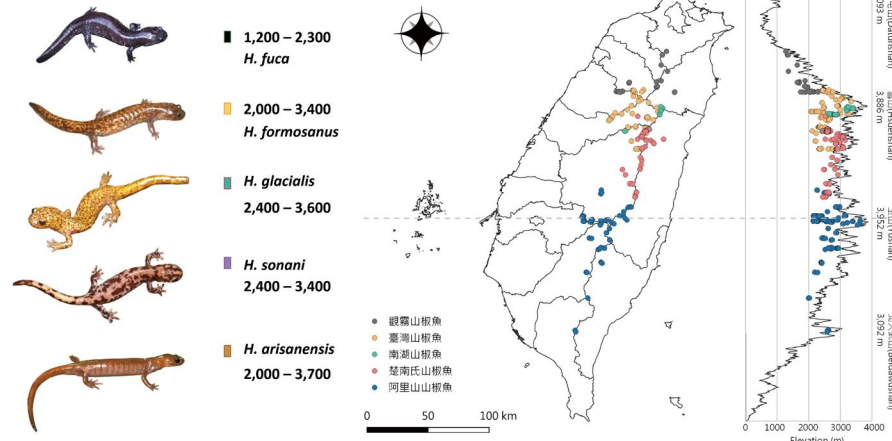
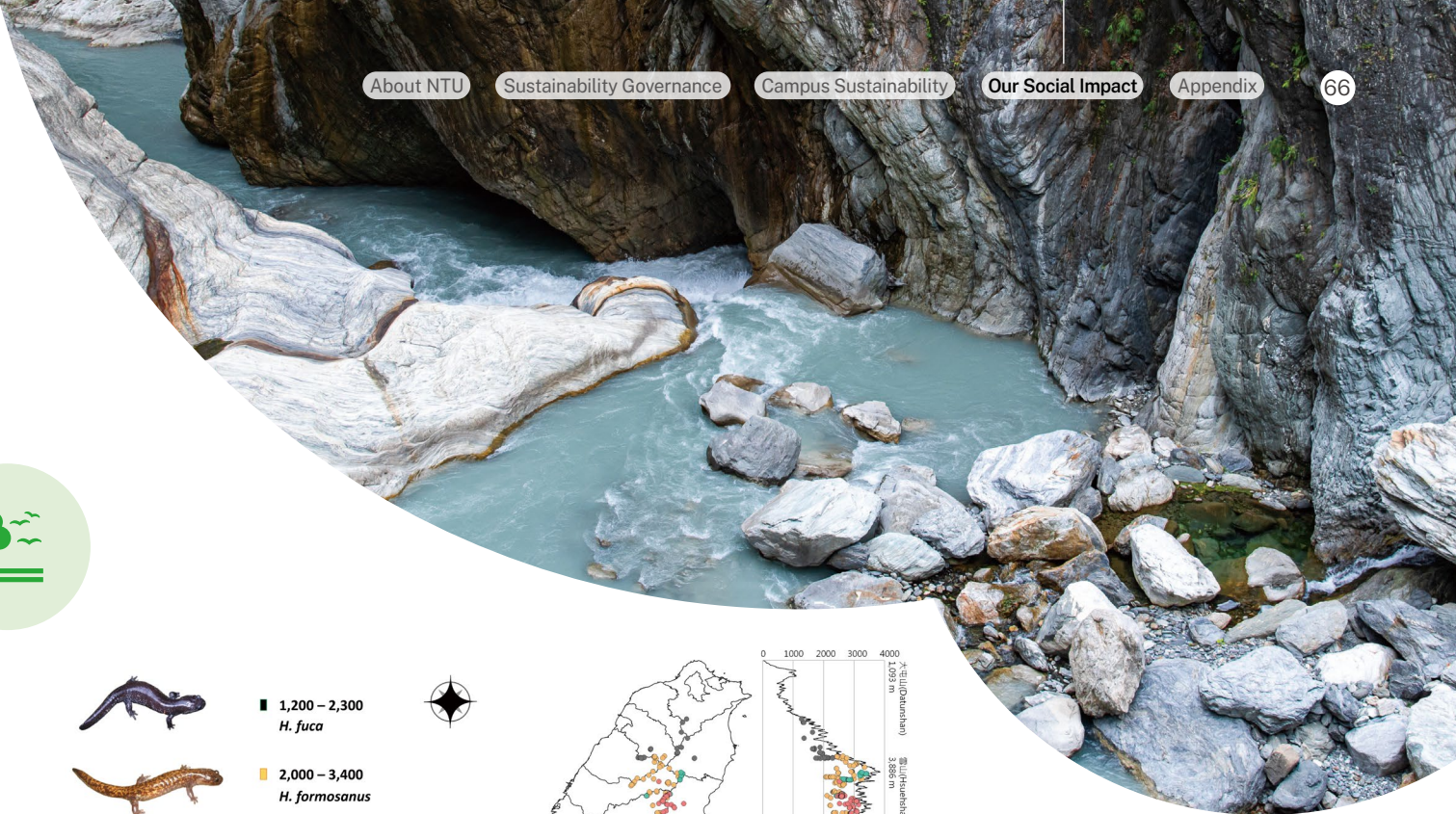
AMOC transport at 26.5°N in the last cycle of the OMIP2 experiment (blue) and RAPID observations (black) (units: Sv). The 5 year running mean of the annual mean density flux over the North Atlantic (45–65 °N) is superimposed (red). The total density flux is separated into thermal (green) and haline (yellow) components.

Note 1 The CMIP is part of the World Climate Research Programme (WCRP), focusing on integrating historical climate simulations and future projections from renowned international climate research centers to understand past, present, and future climate change. CMIP is crucial for the climate assessments of the Intergovernmental Panel on Climate Change (IPCC).

15 LIFE ON LAND

Mapping the Distribution of Taiwan Hynobius Salamanders: A Journey into the Headwaters of High Mountain Streams

In 1919, Japanese scholars discovered the Hynobius salamander (Hynobiidae) for the first time in Taiwan. Continuing their research, Taiwanese scholars Kuang-Yang Lue and June-Shiang Lai published their findings on the “Guanwu” salamander (*Hynobius fuca*; or Taiwan lesser salamander) and “Nanhu” salamander (*Hynobius glacialis*) in 2008. It took nearly 90 years to discover five additional endemic Hynobiidae in different parts of Taiwan. However, in order to unravel the evolutionary history of these five species, it was crucial to first determine their geographical distribution across Taiwan. This involved constructing a distribution map and overlaying information on mountains, altitude, slope direction, rivers, and vegetation with the salamanders’ genetic information. Since most Hynobiidae habitats in Taiwan are located in the headwaters of high mountain streams, investigating their distribution proved extremely challenging.

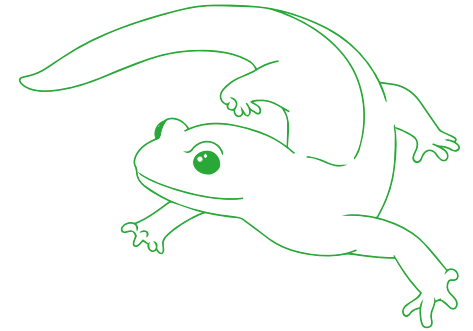


Geographical and altitude distribution of five Hynobius species in Taiwan.

To unlock the evolutionary relationships of Hynobius species in Taiwan, Professor Yu-Ten Ju’s team at NTU’s Department of Animal Science and Technology collaborated with Dr. June-Shiang Lai’s team from the Department of Life Science at National Taiwan Normal University (NTNU) in 2016. Regrettably, Dr. Lai died in a fall while conducting research in the mountains in June that year. To fulfill his legacy, the team once again shouldered their equipment two months later, in August, and completed a survey of Hynobius species along the east ridge

of Mount Qilai, in the Taroko National Park, hoping to decipher the evolutionary history of Taiwanese salamanders.

Between 2020 and 2022, Prof. Ju led a cross-domain integration project titled “Habitat, Genetic Structure, and Biology of Taiwan Salamander (*Hynobiidae*) Distribution in Alpine National Parks.” The research aimed to extend the survey area to regions surrounding national parks, map the geographical distribution of Hynobiidae in Taiwan, collect life history data,



and infer their habitat requirements through dietary analysis. Building upon the research of Prof. Kuang-Yang Lue and Dr. Lai from NTNU, the NTU team finally completed a comprehensive Hynobius distribution map in 2022, 101 years after the first specimen of the genus was discovered in Taiwan. This knowledge is not only crucial for the theoretical scientific research on the genus but also important to the management of the national parks.

Prof. Ju and Dr. Lai’s dedication and sacrifice in Hynobiidae research, as well as their spirit of camaraderie, were captured in the film Good Morni MIT, directed by Chueh-Ming Mai and filmed over a period of 17 years. The film touched many viewers who love hiking and support ecological conservation, offering the general public a glimpse into the real lives of these “smiling spirits of the high mountains.”



The film Good Morni MIT, released in 2023.

Preserving the Critically Endangered “Bird of Myth and Legend”: The Chinese Crested Tern

15

Since 2003, Professor Hsiao-Wei Yuan of the School of Forestry and Resource Conservation at NTU has spearheaded an international collaborative effort to monitor and conserve the Chinese Crested Tern This species, with a global population once fewer than 100 individuals, has earned the moniker “bird of myth and legend” due to its extreme rarity. Through dedicated conservation efforts, the population has since doubled.

The Chinese Crested Tern was once thought to be extinct until it was rediscovered in 2000 by director Chieh-Te Liang while filming the ecological documentary Tern Conservation Areas in the Matsu Islands, and the nickname was born. Prof. Yuan first conducted basic data collection in Taiwan and then collaborated with Chen Shui-Hua, Director of the Zhejiang Provincial Museum in China, and Simba Chan, Director of the Wild Bird Society of Japan, in 2006 to draft the International Action Plan for the Conservation of the Chinese Crested Tern for BirdLife International, outlining conservation goals and short, medium, and long-term strategies.

Prof. Yuan and her students have actively sought and secured funding for conservation research and have partnered with the Wild Bird Society of Taipei to restore the habitat of the terns’ breeding islands in the Matsu archipelago. These efforts included vegetation and rodent removal, as well as playback of tern colony sounds with decoys to attract breeding pairs nesting in specific islands for enhanced protection and monitoring. By translating fundamental scientific research into practical conservation strategies, the team has successfully bolstered the survival of this critically endangered species. Prof. Yuan also actively raises awareness among international and local government through lectures and presentations. In recognition of her contributions, she received the PSG Special Achievement Award at the 2023 Pacific Seabird Group annual meeting, highlighting Taiwan’s commitment to biodiversity preservation on the global stage.



The Chinese Crested Tern parent and chicks.

NTU Experimental Forest and Forestry Agency Collaborate on “Taiwan Wood & Bamboo” Exhibition at Taipei Building Show

9 13 15

Aligned with Taiwan’s objective of achieving net-zero emissions by 2050, the Experimental Forest within NTU’s College of Bioresources and Agriculture actively champions the added value of utilizing domestic timber and bamboo as construction and engineering materials. The Experimental Forest focuses on developing innovative technologies and marketing strategies for these materials, aiming to protect forest ecosystem diversity while enhancing the long-term application of wood products and increasing natural carbon sequestration to achieve net-zero emissions.

In 2023, the Experimental Forest, in partnership with the Forestry and Nature Conservation Agency (FANCA) of the Council of Agriculture, various timber and bamboo material suppliers, the Association of Humanitarian Architecture, and the Taiwan Bamboo Society, participated in the Taipei Building Show for the seventh consecutive year under the “Taiwan Wood & Bamboo” banner. The collaborative exhibit received the “Excellent Exhibitor Image Award” for the seventh year in a row. This year’s showcase featured a domestically sourced, hybrid bamboo-wood log cabin equipped with a solar power system, demonstrating a model green residence that effectively integrates carbon storage, carbon substitution, and net-zero emissions principles. In addition, the exhibit utilized 45.85 cubic meters of wood and bamboo, equivalent to 12 tons of carbon sequestered within the construction materials. Notably, these negative-carbon materials will be repurposed following the exhibition, enabling long-term carbon storage. This underscores the environmental benefits and versatility of wood and bamboo materials in the construction and interior design sectors.



Hybrid bamboo-wood log cabin on display.

16 PEACE, JUSTICE AND STRONG INSTITUTIONS



Taiwan-Germany Joint Research Project Launched to Explore Relational Schemas in State-Citizen Interactions

Professor Helen K. Liu of NTU's Department of Political Science and Graduate Institute of Public Affairs, in collaboration with Professor Rick Vogel, Chair of Public Management at the University of Hamburg, launched the National Science and Technology Council's (NSTC) Taiwan-Germany joint research project "TAIGER"¹ in April 2023. The project investigates relational schemas in state-citizen interactions, aiming to understand on how relationship between the public sector and citizens was affected by emerging technologies, such as AI, and major policies, such as energy transition. Prof. Vogel have witnessed increased citizen collaboration in the design, implementation, and evaluation of public services in recent years. Additionally, interactions and reactions between civil servants and citizens are often based on past experiences. Therefore, focusing on relational schemas in state-citizen interactions is crucial for promoting citizen collaboration and enhancing the quality of public services.

The three-year TAIGER project will explore the relational schemas in state-citizen interactions and their antecedents and consequences. It will clarify the mutual impressions and expectations between civil servants and citizens and analyze how these relational schemas influence collaboration. The research will be conducted by first establishing a theoretical research framework for cross-country comparison, followed by data collection and surveys in Germany and Taiwan, and finally, a comparison of the differences between the two countries. In addition to conducting cross-national research and academic publications, the team also hopes to strengthen democratic institutions in both Taiwan and Germany through bilateral cooperation mechanisms, with the goal of enhancing citizen participation and citizen's influence in public affairs.

Note 1 With a terrific sense of humor, Prof. Vogel christened the project "TAIGER" by combining the first three letters of "Taiwan" and those of "Germany".

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Prof. Vogel from the University of Hamburg delivered a guest lecture. (April 6, 2023)

Exploring Digital Transformation and Access to Justice: A Multi-Year Research Initiative at NTU College of Law 10 16

Distinguished Professor Kuan-Ling Shen of NTU's College of Law is currently leading a multi-year research project entitled "Digital Court, Legal Tech, and Access to Justice." The project investigates the digitalization of court systems across various domains, including civil court, family court, commercial court, constitutional court, and criminal court. This includes analysis of due process within digitalized judicial procedures and the handling of digital evidence. Prof. Shen also guides graduate students in conducting legal data analytics and statistical analysis on a substantial corpus of judicial decisions (containing about a thousand cases), aiming to optimize judicial procedures, enhance the predictability of judgments, and prevent inconsistencies in rulings.

As an example, the project highlights the significant digitalization of litigation procedures in civil courts globally since 2020, accelerated by the pandemic. Prof. Shen explores the rationale behind online courts and analyzes the challenges faced by traditional litigation processes during digitalization. Additionally, her research focuses on the role and status of children in judicial proceedings, advocating for children's right to be heard and right to participate in family court. Notably, in 2022, Prof. Shen's expert opinions were incorporated into a landmark constitutional litigation case involving an international child abduction case. This judgment upholds the principles of the UN Convention on the Rights of the Child and has significant implications for judicial practice.



Distinguished Prof. Kuan-Ling Shen of NTU's College of Law, along with Prof. Sieh-Chuen Huang and Alex Yueh-Ping Yang, and Associate Professors Hui-Chieh Su and Kai-Ping Su collaboratively lead a multi-year research project dedicated to promoting digital transformation and enhancing access to justice within the court system.

"Culture-Health" University Social Responsibility Project

Project Objectives

The College of Public Health (CPH) at NTU has launched the "Culture-Health" University Social Responsibility (USR) Project, supported by the Ministry of Education. This initiative focuses on contemporary social and health injustices experienced by indigenous communities. The team employed a bottom-up approach to foster collaboration between partner communities and researchers in culture and history. The project aims to build community sustainability and cultivate resilience among indigenous populations. Through the collection of community perspectives on health promotion and cultural safety, the project critically examines the shortcomings of existing policies and institutions. This participatory approach facilitates the co-development of "health promotion cultural safety indicators." Additionally, CPH offers a specialized mini-program on indigenous health to enhance cultural competency among medical and health care professionals. The program seeks to establish and implement safe, responsible, and culturally sensitive health promotion initiatives that embody the core principles of the Indigenous Peoples Health Act.

Action Plans

1.

Discuss strategies for utilizing the Indigenous Peoples Health Act with advocacy groups and contribute to platforms such as journals, conferences, and media outlets.

2.

Collaborate with local partner communities to develop community-based health promotion programs.

3.

Organize cultural safety courses, workshops, and lecture series to cultivate cultural sensitivity and competency among medical and health care personnel.

4.

Support students in completing research and outreach projects on topics related to indigenous health, culture, human rights, and critical policy analysis.



Participants listen to tribal elders share Amis myths and stories in the Tafalong traditional ancestral house (Kakita'an) and learn about the damage inflicted on local culture by past colonization and the subsequent cultural revitalization process.



Holding an "Indigenous Peoples Health Act Symposium" to bring together domestic advocacy groups and discuss the current status and future prospects of the Act's implementation.



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PARTNERSHIPS FOR THE GOALS

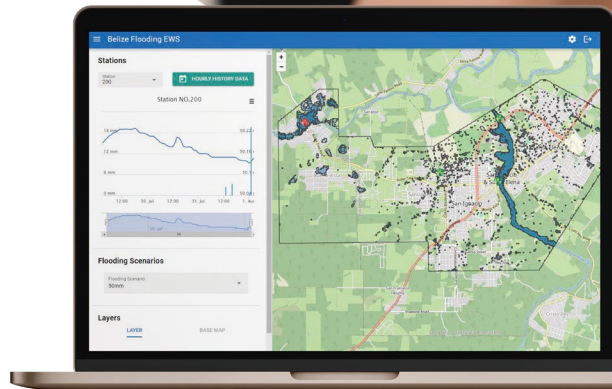


NTU's WCDR Assists Belize in Building Disaster Prevention and Response Capabilities

11 13 17

Located in Central America, Belize boasts the largest coral reef in the Northern Hemisphere and is rich in biodiversity. However, its location in an active hurricane zone, coupled with the low-lying nature of its densely populated coastal areas, makes it vulnerable to floods and heavy rainfall, causing great hardship for its citizens. To enhance Belize's resilience to extreme weather events, NTU's Center for Weather and Climate Disaster Research (WCDR), in collaboration with the International Cooperation and Development Fund (ICDF) and the Belize Ministry of Sustainable Development, Climate Change and Disaster Risk Management, launched the Belize Urban Resilience and Disaster Prevention (BURDP) project in 2019. The project aims to leverage Taiwan's extensive experience in flood control and disaster prevention technology to bolster Belize's disaster response capabilities.

The BURDP project, led by Associate Professor Hao-Che Howard Ho from the Department of Civil Engineering, initially



Belize flood prevention platform.

focused on governance planning for the city of San Ignacio, a major tourist destination in Belize. Through the integration and updating of hydrological data, disaster prevention infrastructure maps, terrain models, and satellite imagery, the project identified flood-prone areas within the city. Using rainfall and river water level monitoring data, the project provides proactive early warnings on the timing and potential scope of flood events. Prof. Ho and his team have also conducted personnel training in Belize. Notably, during Hurricane Eta in 2020, the flood warning platform established by the team enabled the successful evacuation of local residents three hours in advance, significantly mitigating disaster losses.



Drone operation training.

In 2022, the team adopted a holistic “river basin disaster prevention and management” approach to develop a flood early warning mechanism for the Belize River¹, the country’s most vital waterway. The project included updating foundational geographic information, strengthening disaster preparedness capabilities, and implementing technology-based monitoring techniques. Since 2023, and continuing through 2024, the team has been actively implementing various measures in Belize, including the installation of water level monitoring stations, drone operation training, and fostering disaster-resilient communities. Through technology transfer from NTU, the project aims to empower local authorities and frontline personnel in Belize, work alongside with this diplomatic ally of Taiwan to create a smart and safe homeland, and achieve SDGs related to pre-disaster warning, disaster response, and post-disaster recovery.



Hold disaster prevention lectures in elementary school.

Note 1 The Belize River, traversing regions that encompass 45% of the nation’s population, plays a crucial role in the country’s agricultural and economic activities. All major Belizean cities are situated along its banks.

NTU and NCREE Collaborate on New Earthquake-Resistant Technologies 9 11 17

In 1990, the National Science Council (NSC), a predecessor of the current National Science and Technology Council (NSTC), established the National Center for Research on Earthquake Engineering (NCREE) on the campus of NTU to foster research and development in earthquake disaster mitigation technologies. For over three decades, NTU and NCREE have maintained a close collaborative partnership, leveraging NTU’s world-class faculty and exceptional students alongside NCREE’s state-of-the-art experimental facilities and research expertise. This collaboration has yielded significant advancements in joint research and development, talent cultivation, and experimental capabilities.

Many earthquake-resistant and disaster prevention technologies developed by NCREE have been implemented in practical applications, with some achieving global recognition. For instance, buckling-restrained braces (BRBs) have been employed in over 200 projects within Taiwan and exported to countries such as New Zealand, earning recognition through the Executive Yuan’s Award for Outstanding Contribution in Science and Technology. The Composite Earthquake Early Warning Platform is utilized in Taiwan’s elementary and secondary schools, high-tech factories, and the Taiwan High Speed Rail, with additional implementations in Southeast Asian countries. Furthermore, the 5D Intelligent Disaster Prevention and Rescue Platform assists developing nations in mitigating the impacts of earthquakes and other natural disasters. NTU remains committed to fostering international collaborative research projects with NCREE, striving towards the shared objective of “creating local value and achieving global excellence.”



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

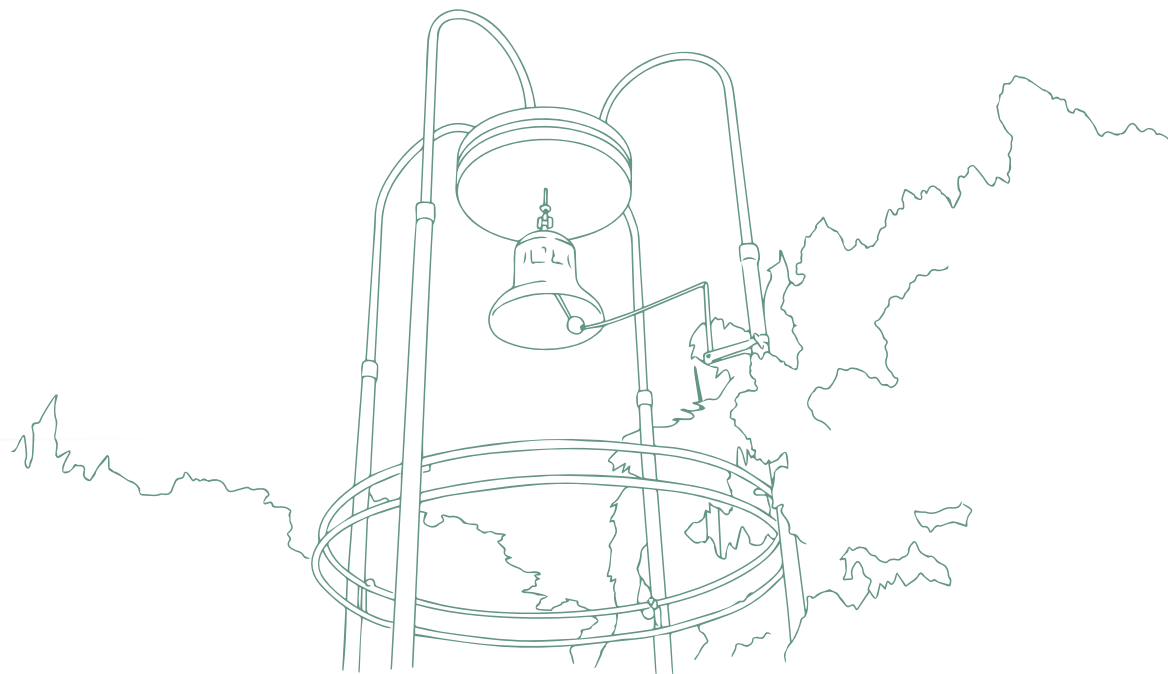
Promoting “Biocredit Taiwan” to Address the Ecological Crisis

The annual Conference of the Parties (COP) of United Nations Framework Convention on Climate Change, is the highest-level summit where governments from around the world gather to discuss and agree on solutions to climate issues. The NTU Experimental Forest was invited by the World Climate Foundation (WCF) to attend COP28 in 2023 and proposed the “Biodiversity Credit” initiative in a keynote speech. This initiative, which balances ecological conservation with economic development, can deepen collaboration between the financial sector and various industries on biodiversity issues. The proposal garnered significant acclaim at the conference, recognized as a valuable contribution to COP28 discussions.

In the forum, Director Ming-Jer Tsai of the NTU Experimental Forest Management Office advocated for a new planning model that integrates green economy principles with biodiversity protection. He also shared the Experimental Forest’s case study of the restoration of shallow mountain areas as an example of a nature-based solution, showcasing the long-term monitoring results of biodiversity enhancement using negative-carbon technologies. Subsequently, Prof. Tzung-Su Ding, Chair of NTU’s School of Forestry and Resource Conservation, and Prof. Shu-Yuan Pan from the Department of Bioenvironmental Systems Engineering, conducted two thematic forums to delve into the technical details of implementation, further enhancing global experts and scholars’ understanding and support for the Biodiversity Credit Initiative.

Prof. Ming-Jer Tsai, Director of NTU Experimental Forest, proposed “Biocredit Taiwan” at the COP28 forum.

05 Appendix



STARS (Sustainability Tracking Assessment & Rating System) Content Index

Corresponding Chapters		Sustainability Tracking Assessment & Rating System index	
<u>A Word from the President</u>		PRE 1 Executive Letter	
<u>Chapter 1 About NTU</u>		PRE 2 Points of Distinction PRE 3 Institutional Boundary PRE 4 Operational Characteristics PRE 5 Academics and Demographics	
<u>Chapter 2 NTU Sustainability Governance</u>	<u>2.1 Governance Structure & Governance Diversity</u>	<u>I. Governance Structure</u>	PA 3 Inclusive and Participatory Governance
		<u>II. NTU Sustainability Governance Framework</u>	PA 1 Sustainability Coordination
		<u>III. NTU Sustainable Development Initiatives</u>	PA 2 Sustainability Planning
		<u>IV. Stakeholder Communication</u>	PA 3 Inclusive and Participatory Governance
	<u>2.2 Endowment Management and Sustainable Investment</u>	PA 9 Committee on Investor Responsibility PA 10 Sustainable Investment PA 11 Investment Disclosure	

Corresponding Chapters		Sustainability Tracking Assessment & Rating System index	
<p>Chapter 3 Campus Sustainability</p>	<p>3.1 Our Academic and Research Influence and Sustainable Action</p>	<p><u>I. Cultivating Transdisciplinary Leaders in a Learner-Centered Environment</u></p>	<p>AC 1 Academic Courses AC 2 Learning Outcomes AC 3 Undergraduate Program AC 4 Graduate Program AC 5 Immersive Experience EN 2 Student Orientation EN 4 Outreach Materials and Publications EN 5 Outreach Campaign EN 8 Employee Orientation EN 9 Staff Professional Development and Training EN 11 Inter-Campus Collaboration</p>
		<p><u>II. Supporting Social Development with Academic Research</u></p>	<p>AC 9 Research and Scholarship AC 10 Support for Sustainability Research AC 11 Open Access to Research EN 10 Community Partnerships EN 14 Participation in Public Policy</p>
		<p><u>III. Social Care and Sustainability Promotion Led by Students</u></p>	<p>AC 8 Campus as a Living Laboratory EN 1 Student Educators Program EN 3 Student Life EN 5 Outreach Campaign EN 13 Community Service</p>
<p>Chapter 3 Campus Sustainability</p>	<p>3.2 Environmental Sustainability Governance at NTU</p>	<p><u>I. Low-carbon Campus</u></p>	<p>OP 1 Emissions Inventory and Disclosure OP 2 Greenhouse Gas Emissions OP 3 Building Design and Construction OP 4 Building Operations and Maintenance OP 5 Building Energy Efficiency OP 6 Clean and Renewable Energy</p>
		<p><u>II. Convenient Smart Transportation</u></p>	<p>OP 15 Campus Fleet OP 17 Support for Sustainable Transportation</p>
		<p><u>III. Water Management & Recycling</u></p>	<p>OP 21 Water Use OP 22 Rainwater Management</p>
		<p><u>IV. Sustainable Dining</u></p>	<p>OP 7 Food and Beverage Purchasing OP 8 Sustainable Dining</p>

Corresponding Chapters		Sustainability Tracking Assessment & Rating System index
Chapter 3 Campus Sustainability	3.2 Environmental Sustainability Governance at NTU	V. Sustainable Procurement OP 11 Sustainable Procurement OP 12 Electronics Purchasing
		VI. Waste Reduction & Recycling OP 18 Waste Minimization and Diversion OP 19 Construction and Demolition Waste Diversion OP 20 Hazardous Waste Management
		VII. Biodiversity OP 9 Landscape Management OP 10 Biodiversity
	3.3 Diverse, Supportive and Healthy Campus Culture	I. Diverse and Inclusive Campus PA 5 Diversity and Equity Coordination PA 6 Assessing Diversity and Equity PA 7 Support for Underrepresented Groups PA 8 Affordability and Access
		II. Campus Health and Well-being PA 12 Employee Compensation PA 14 Wellness Programs PA 15 Workplace Health and Safety
Chapter 4 Our Social Impact	SDG 1 AC 9 Research and Scholarship EN 10 Community Partnerships EN 13 Community Service	
	SDG 2 AC 9 Research and Scholarship EN 5 Outreach Campaign EN 10 Community Partnerships	
	SDG 3 AC 9 Research and Scholarship EN 10 Community Partnerships EN 13 Community Service	
	SDG 4 AC 5 Immersive Experience EN 3 Student Life EN 13 Community Service	
	SDG 5 AC 1 Academic Courses EN 4 Outreach Materials and Publications EN 5 Outreach Campaign	
	SDG 6 AC 9 Research and Scholarship EN 10 Community Partnerships	
	SDG 7 AC 1 Academic Courses AC 9 Research and Scholarship	

Corresponding Chapters		Sustainability Tracking Assessment & Rating System index
Chapter 4 Our Social Impact	SDG 8	AC 5 Immersive Experience EN 3 Student Life EN 10 Community Partnerships EN 13 Community Service
	SDG 9	AC 9 Research and Scholarship AC 10 Support for Sustainability Research
	SDG 10	EN 4 Outreach Materials and Publications EN 5 Outreach Campaign EN 10 Community Partnerships
	SDG 11	AC 5 Immersive Experience AC 9 Research and Scholarship EN 3 Student Life EN 10 Community Partnerships
	SDG 12	AC 9 Research and Scholarship EN 10 Community Partnerships
	SDG 13	AC 9 Research and Scholarship EN 5 Outreach Campaign EN 10 Community Partnerships
	SDG 14	AC 9 Research and Scholarship EN 5 Outreach Campaign EN 10 Community Partnerships EN 13 Community Service
	SDG 15	AC 9 Research and Scholarship EN 4 Outreach Materials and Publications EN 10 Community Partnerships OP 10 Biodiversity
	SDG 16	AC 1 Academic Courses AC 9 Research and Scholarship EN 10 Community PartnershipsFW
	SDG 17	AC 9 Research and Scholarship EN 4 Outreach Materials and Publications EN 10 Community Partnerships

