NATIONAL SUN YAT-SEN UNIVERSITY

2025 Annual Report of Higher Education Sprout Project

Interdisciplinary Collaborative Learning Programs

Interdisciplinary Collaborative Learning Programs connected with the SDGs of 2030 Agenda for Sustainable Development of UN

- NSYSU offered 13 different topic-oriented collaborative learning programs in an effort to promote interdisciplinary learning.
- The programs brought instructors from different fields of study together to provide students with 67 integrated courses, and 72 micro integrated courses.
- In 2025, a total of 12,052 students participated in these programs.

Adaptive Leadership and Entrepreneurship Responsive Training Program （ALERT）

Self-directed Learning in Interdisciplinary Design, Technological Art, and Social Curation: Creative Translation of Kaohsiung

Civil Society and Democratic Innovation Collaborative Learning and Practice

STAMD, Implementation of sustainability

Corporate Sustainability and Regional Revitalization

Educational Programs For Prevention Medicine And Food Safety In Campus

Exploration in the Culture of Indigenous Peoples and Sustainable Development

Marine Sustainability and Circular Economy

Socially-Engaged Arts: Anthropocene and Ecological Crisis

TechX Learning Explorers : Interdisciplinary Expertise and Career Development

Literature's Practical Path II: Strolling Through the Traditional Market

Local Development and Sustainable Agriculture

The Anthropocene: Ecological Crisis, Artificial Intelligence, and the Augmentation of Arts and Culture

https://artogo.co/zh-TW/exhibition/colearning-nsysu

Creating a Teaching Support System

Teaching Support System

- NSYSU developed a teaching support system to encourage instructors to adopt innovative teaching approaches.
- In addition to continuing to hold seminars and workshops and adopting microteaching and teaching incentives, NSYSU adopted an in-class peer review system, promoted teacher professional learning community, and provided subsidies for teaching materials, as part of its Higher Education SPROUT Project.
- In 2025, 697 teachers participated in the campus-wide innovative teaching.

Ministry of Education Teaching Practice Research Program

- NSYSU encourages instructors to apply for the Ministry of Education Teaching Practice Research Program and has created a webpage to provide them with new pedagogical knowledge.
- A total of 42 projects submitted by NSYSU faculty were approved in 2025 , an approval rate about 60%. Starting in 2020, NSYSU was chosen by the Ministry of Education as the southern base for the Teaching Practice Research Program. This demonstrates that with the university’s support, the NSYSU faculty is an exemplar in combining education with research.

Establishment of Faculty EMI Teaching Capacity Enhancement Mechanism

New faculty — **EMI teaching support pathway** — **Senior faculty**

Consultation system
- Orientation Program for new faculty

Piloting & Sharing

Faculty development
- EMI workshop
- Teaching community & classroom observation
- Faculty training & certification mechanism

Consultation & Guidance

EMI teaching support
- EMI TA support

Enhancement

Online training
- OPEN Program
- Certificate in EMI Skills
- OPEN MOOCs EMI

Teaching Evaluation
- Evaluation survey on EMI courses
- Bilingual course instant feedback system

Teaching enhancement
- Enhancement mechanism

Awards
- Subsidy for EMI courses
- EMI salary flexibility
- Overseas training grant

Promotion & Evaluation
- Bonus credits for Faculty offering EMI courses

- Newly-hired faculty must offer at least one EMI course per semester (contract starting from 2022)

Credit Flexibility to Help Students Develop Autonomous Learning Abilities

Micro-Credits Course

In order to encourage autonomous and flexible learning, the *NSYSU Guidelines on Micro Credits* offers students variety and flexibility in course choices. In 2024, 307 students have been recognized with 1-micro-credit. In 2025, 2,258 students participated in 83 different micro-courses in various fields of study, providing them with a range of learning options.

Digital Self-Paced Learning

In order to promote autonomous learning, NSYSU launched a digital self-paced learning program. Starting from 2020, NSYSU colleges provide a list of recommended online self-study courses offered by international online learning platforms (e.g., Coursera, edX, FutureLearn, Udacity, Udemy, etc.). As of 2025, a total of 1,428 students have earned recognized credits.

Innovative Degree Paths

NSYSU has adopted several innovative degree paths, including the Undeclared Major Bachelor's Program, Five-Year Bachelor's and Master's Program, Seven-Year Combined Degree Program, and NSYSU Dual Degree Program (available for both Master's and doctoral degrees). These innovative degree paths provide students with a range of learning options.

Establishment of EMI Programs, Investment of EMI Course Resources

2021-2024 AY English Program

College of Science

- Dept. of Biological Sciences
- Dept. of Chemistry
- Dept. of Physics
- Dept. of Applied Mathematics

College of Medicine

- Dept. of Biomedical Science and Technology

College of Engineering

- Dept. of Electrical Engineering
- Dept. of Mechanical and Electro-Mechanical Engineering
- Dept. of Computer Science and Engineering
- Dept. of Photonics
- Dept. of Materials and Optoelectronic Science

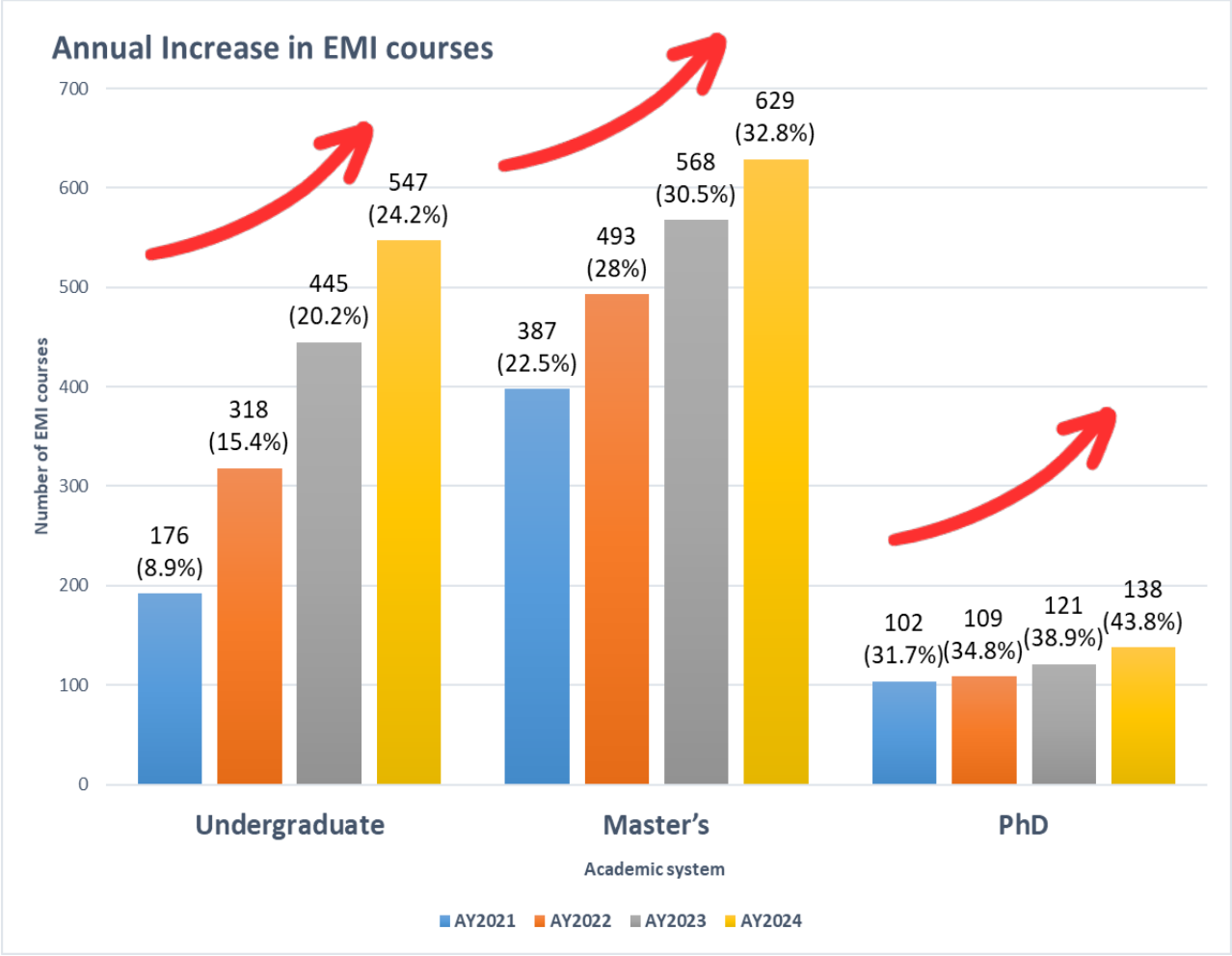
College of Management

- International Business Bachelor Program

College of Marine Science

- Dept. of Marine Biotechnology and Resources
- Dept. of Marine Environment and Engineering

In 2024 Academic Year, EMI Courses have reached 1,314 courses (29.25%)



Internationalization

World Connection

NSYSU has 330 partner universities and 7 university alliances from 46 countries. Among the partners, NSYSU signed 259 exchange programs with 233 universities and GHEA21, 47 dual-degree agreements with 36 universities.

In addition to the international collaboration resources, the Office of International Affairs also hosted various cultural activities and international conferences to build an international-friendly campus.

NSYSU forms exclusive partnership with SOAS, University of London

NSYSU x Kumamoto University launch Mandarin Language Center

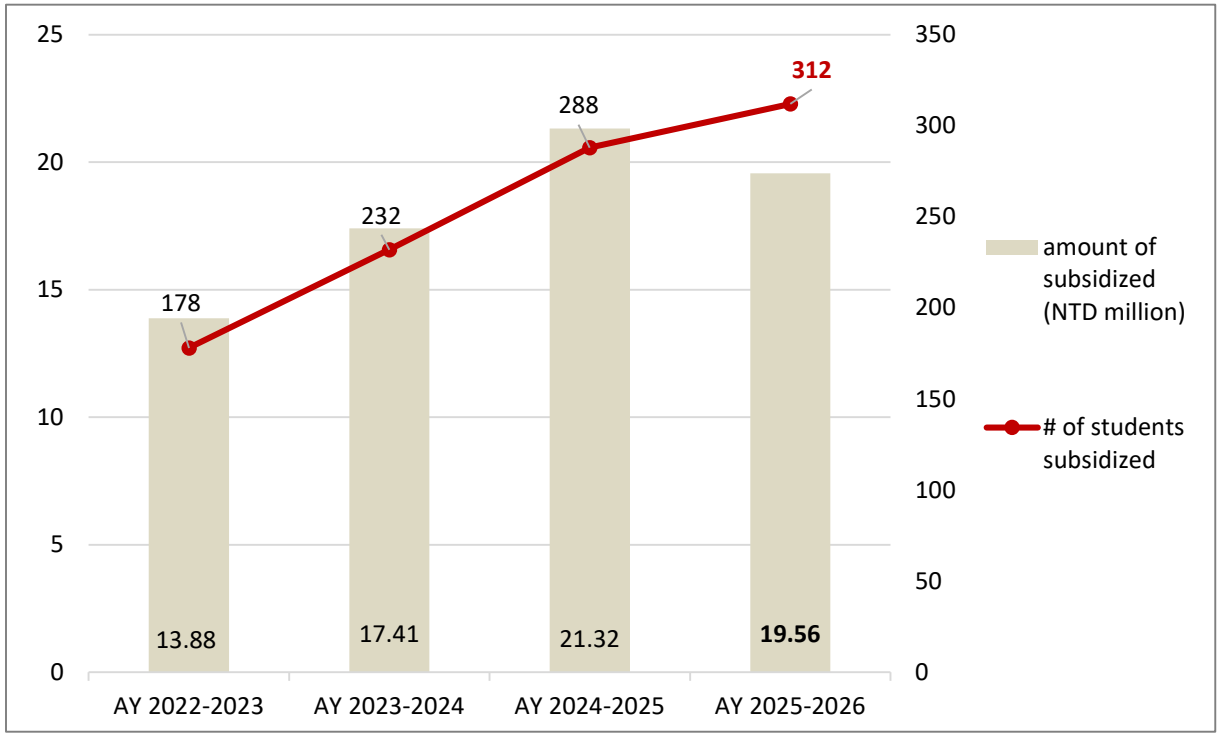
2025 NSYSU Delegation to the U.S. to Attract Global Talent and Strengthen Alumni Ties

NSYSU hosts 2025 Taiwan Studies Programme for European Officials

Internationalization

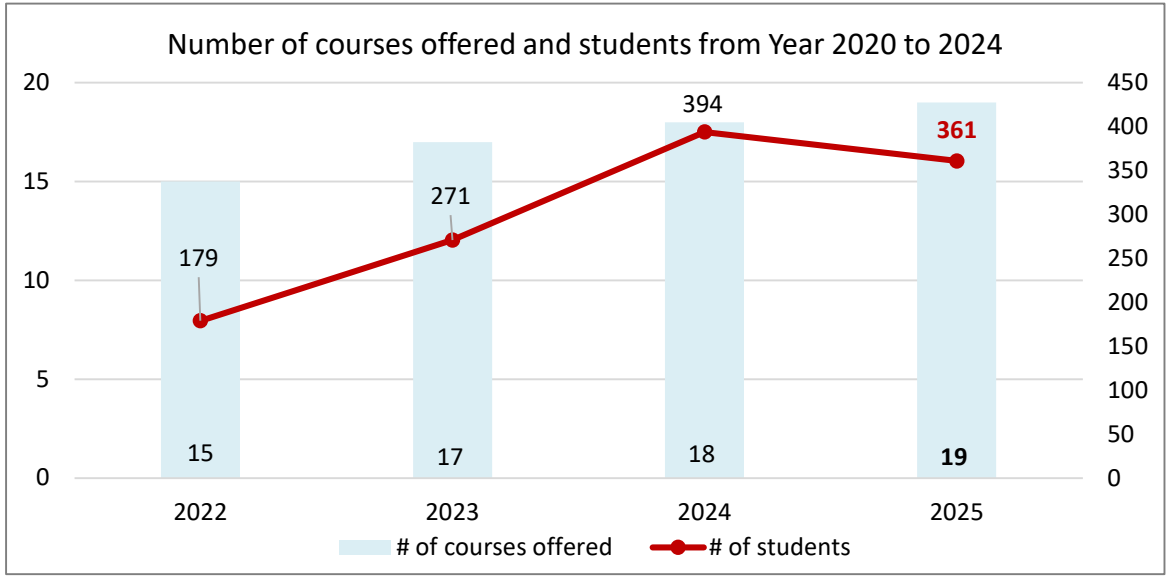
Study abroad scholarships

To encourage student participation in the exchange, dual-degree, and short-term study abroad programs, the OIA offers scholarships funded by the university and the Ministry of Education.



Free Multi-Language Program

Starting in 2020, NSYSU has provided free language courses in Japanese, French, German, Korean, Spanish, Thai, and Vietnamese to local students and staff to improve their foreign language skills. For 2025, **6 languages** were offered in **19 courses,** and **361 students and staff** benefited.



College of Science
International Double Degree Program

Achievements of the Double Doctoral Degree Program

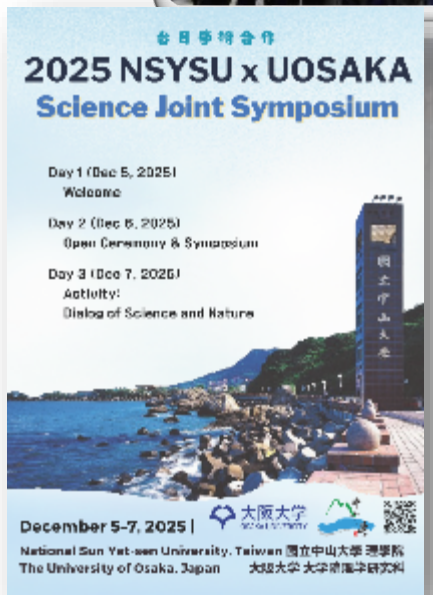
- 2 domestic PhD students were selected for the Double Degree Program with Osaka University.

Overseas Training Program for Master's Students

- Several master's students participated in a short-term research training program at Osaka University.
- Sharing sessions are held for students to exchange their research experiences.

Hosting of Joint International Symposium

- 2025 NSYSU × Osaka University Science Joint Symposium
- Opportunities for faculty and graduate students to engage in cross-institutional and interdisciplinary exchange.



SOAS-NSYSU
Global Citizenship Joint Master Degree Program

NSYSU Forms Exclusive Partnership with SOAS, University of London

- NSYSU has entered into a groundbreaking partnership with SOAS University of London (SOAS), marking the first and only exclusive collaboration of its kind in Taiwan.
- The NSYSU College of Social Sciences will collaborate with SOAS's Department of Anthropology and Sociology to launch the SOAS-NSYSU joint master degree program in sociology and global citizenship, set to begin student admissions in 2026. This innovative program is poised to set a new benchmark in Taiwan's higher education landscape.
- The MoU was officially signed by NSYSU President Chih-Peng Li and SOAS Vice-Chancellor Adam Habib on April 10th,2025. With key witnesses including NSYSU Senior Vice President Chih-Wen Kuo, Vice President for International Affairs Ming-Hsuan Lee, and Dean of the College of Social Sciences Mei-Hua Chen.

Global AI Think Tank Project

AI research projects spanning different disciplines

- **AI and National Security:**This subproject focuses on the strategic role of AI in great-power competition and its implications for Taiwan's national security decision-making. Since the project began, the research team has interviewed nearly ten experts from government, industry, and academia, collecting in-depth views on the dynamics of US–China AI competition and Taiwan's role within it.
- **AI and Education/Learning:**The team focuses on developing curricula and teaching materials for "integrating AI into clinical simulation teaching." A needs assessment for the courses has been completed.
- **AI and Mental:**This subproject is developing AI literacy assessment tools tailored to local needs. Work is already underway on item writing, test administration, reliability and validity analysis, and fairness evaluation.
- **AI and the Society:**In this subproject, the first-phase qualitative interviews are proceeding according to schedule. Interviews with students from all colleges at NSYSU have been completed.
- **AI and industrial economy:**This research group aims to explore the impact of AI on industrial economy and labor market. We have been continuously collecting reports on AI industry and labor policies from Europe and the United States as an important reference for Taiwan's development.

Institutionalization & Local Engagement

- In 2025, NSYSU advanced social responsibility with the themes of “Local Revitalization and Sustainable Transformation” and “Interdisciplinary Collaboration.”
- Institutionalized social practice system:
  - Formal implementation of USR-based (University Social Responsibility) curriculum.
  - Launch of a selection mechanism for outstanding teachers in social practice.
  - Continuous training for assistants and teams through SIG (Social Innovation Group) empowerment series.
- Deepening local engagement in Port City (Cijin & Kaohsiung), community revitalization, and sustainable innovation.
- Unique NSYSU model: Integration of curricular learning, practical fieldwork, community involvement, and international collaboration.

Internal Development & Curriculum Institutionalization

- SIG Empowerment Series (April 30, 2025):
  Theme: “Behind the Scene to Implementation: The Unsung Heroes of University Social Responsibility.”
  Focus on building the capacity of USR assistants and project teams in administration, site management, resource linkage, and team support.
  Enhanced project execution resilience and cross-unit cooperation within campus.
- Institutionalizing USR Curriculum in Spring Semester:
  Core courses adopting CBL/PBL (Case-Based/Learning & Project-Based Learning).
  Courses span across four major USR projects, with students engaging in Cijin, Kaohsiung Port, and even Japan.
  Activities include field research, local partnerships, international exchange, and localized research aligned with SDGs.
- Teacher Award and Selection for Social Practice:
  Selection Period: March 1, 2024 – February 28, 2025.
  Evaluation focused on innovation, social impact, sustainable contribution, and interdisciplinary cooperation.
  Incentivizing long-term engagement and quality integration of teaching and fieldwork.

Local Engagement Spotlights – Cijin Technical House & Creative Exchange

- Cijin Technical House – Cijin Social Innovation Base
  Long-term development led by the Department of Sociology USR program.
  Integration of culture, community, senior care, arts, and social innovation functions.
  2025 Highlight: Opening of the independent bookstore “thàk冊 2.0.”
  Serves as a model for port city social practice, connecting locals, students, artists, and innovation teams.
- 2025 Local Revitalization Forum (May 29):
  Theme: “Resonating with Technology, Creating the Future | Green Innovation from Land to Heart.”
  Exchange with Tainan’s local revitalization teams.
  Focus on sustainable tourism, smart technology adoption, and ecological/agricultural rejuvenation.
  Enabled cross-city resource linkage and network expansion of innovative practices.
- Deep-dive Urban & Port Area Curriculum:
  “Urban Collaboration Center” program strengthens port area partnership.
  Explores urban sustainability, coastal change, and circular innovation topics.
  Develops students’ interdisciplinary capabilities in urban governance and sustainable transformation.

NSYSU Social Responsibility – Key Impacts & Future Directions

- Established solid institutional foundation for ongoing social responsibility initiatives.
- Fostered synergy among curriculum, research, community, and industry, reinforcing local and regional engagement.
- Recognized as a benchmark for:
  - Sustainable and resilient urban practice.
  - Interdisciplinary solutions to local challenges.
  - Cultivating future leaders with commitment to SDGs and impact on society.
- Future Focus:
  - Expand collaboration across greater Asia-Pacific.
  - Continue strengthening both local roots and global perspectives for sustainable social innovation.

Cutting-Edge Research Achievements Successfully Transferred to Industries

Upper Urinary Tract Stone Risk Assessment and Prediction Model

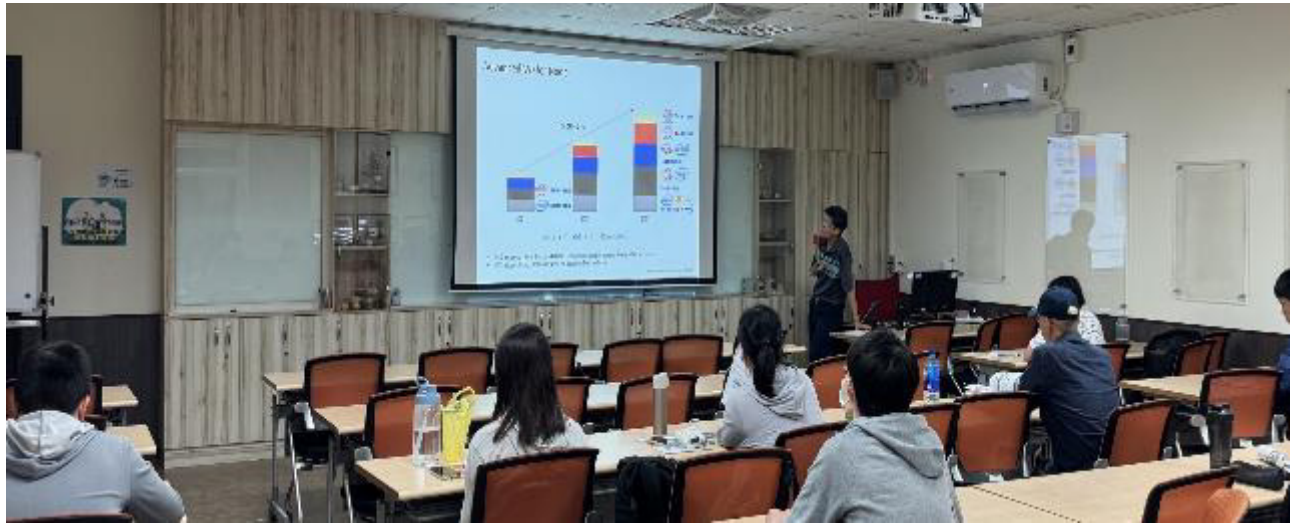
Professor Gao Chong Yao's team from the Department of Electrical Engineering, in collaboration with Kaohsiung Medical University, has completed the valuation and equity contribution of their “Upper Urinary Tract Stone Risk Assessment and Prediction Model” technology this year, demonstrating cross-disciplinary innovation in medical engineering.

The patented “Upper Urinary Tract Stone Risk Assessment and Prediction Model,” jointly developed by Professor Gao Chong Yao and Kaohsiung Medical University, integrates clinical data with artificial intelligence analysis to enhance the accuracy of early diagnosis and clinical decision-making for urinary tract diseases. This technology has been adopted by Kaohsiung Medical University's incubator enterprise, “United Kaohsiung AI Medical,” which is advancing its industrialization through equity valuation. Following rights allocation between the two institutions, our university secured shares valued at NT$5 million, demonstrating the high technical value and market potential of our interdisciplinary medical-electrical research in smart healthcare applications. This achievement not only elevates AI-driven biomedical innovation capabilities but also injects new momentum into southern Taiwan's precision medicine industry.

Social Responsibility

Developing Continuing Education Programs Aligned with Industry and Government Needs to Fulfill University Social Responsibility

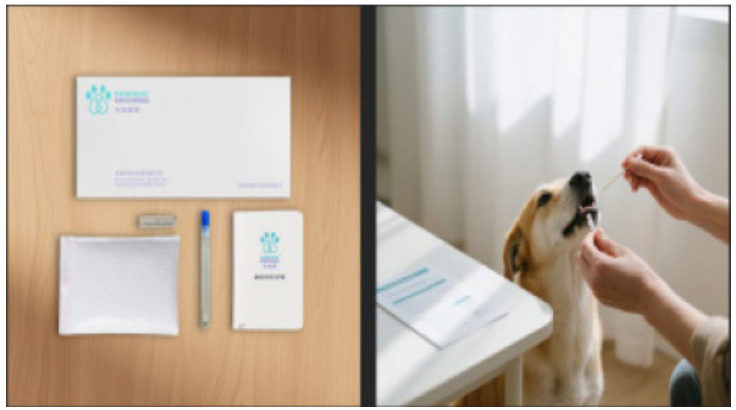
In the 2025 academic year, the university continued to offer 13 commissioned training programs for organizations such as the Ministry of Education, Ministry of Environment, Taiwan Power Company, Taiwan External Trade Development Council, Kaohsiung National Taxation Bureau, and various private enterprises. These programs covered topics including environmental certification, bilingual teaching competencies for primary and secondary schools, English speaking and writing, as well as management and leadership training, generating total revenue exceeding NT$6.53 million.



Additionally, the university offers a variety of diverse courses to meet the learning needs of the general public, providing high-quality instructors and an excellent learning environment to support the mission of continuing education and lifelong learning.

Campus Innovation and Entrepreneurship Achievements (1)

NSYSU U-start Teams



The entrepreneurial team from NSYSU's startup
The Paw Print Decoding Team was awarded the MOE's 2024 U-Start Plan for developing a localized, fast, and cost-effective canine genetic testing kit that provides accurate, rapid testing for common canine genetic diseases in Taiwan, thereby lowering the testing threshold and increasing market acceptance.

Campus Innovation and Entrepreneurship Achievements (2)

The “Let’s Sell! Let’s Play Entrepreneurship!” Market Event

The market enabled 20 student teams and vendors (including KMU and NCKU) to validate ideas in real-market settings. Activities included expert one-on-one coaching, pricing tests, and hands-on workshops. Attracting around 500 participants, it strengthened students’ marketing, user-feedback skills, and entrepreneurial readiness, and effectively promoted cross-campus collaboration.

Counseling and Health Service Division

Mental health activities in each college

Considering the distinct characteristics of each college, college-level mental health activities were piloted in 111-2 semester and expanded in 112 semester with programs tailored to each college's needs.

In 2025, a total of 24 college-level mental health activities were conducted with 344 participants, along with two College Mentor knowledge and skills training sessions involving 25 participants. The activities included film discussions, lectures, craft workshops, experiential sessions, and suicide prevention training.

Advancing Indigenous Leadership in Higher Education

Cultivating Indigenous Students' Capacity for Community and Global Engagement

We pursue this mission through three integrated strategies:

(1) Advancing collaborative teaching with systematic academic support,

(2) Providing administrative support and coordinating institutional resources, and

(3) Empowering Indigenous students' subjectivity and agency.

Together, these efforts strengthen Indigenous students' ability to engage with their communities, participate in broader networks, and contribute meaningfully to Indigenous societies through sustained and cooperative forms of leadership.

Taiwan 2050 Net-Zero & NSYSU 2048 carbon neutrality

Replace air conditioner

A total of 169 air conditioners over 9 years old were replaced in the teaching administrative area.
Effectively improve building performance and improve electricity efficiency.

Strive for government energy conservation subsidy programs

Received a subsidy of NT$2.28 million to replace the central air-conditioning system of the Electrical Engineering building to improve building energy efficiency and reduce carbon emissions.

ISO 50001 Energy Management System

For buildings with a high increase in electricity consumption, we have implemented and certified the ISO 50001 energy management system to continuously improve energy efficiency.
Conduct greenhouse gas inventory training courses to improve greenhouse gas inventory capabilities.

Digital Humanities and AI Arts

The Digital Renaissance: Harmonizing Classics and Human Spirit Beyond the Algorithm

In 2025, the Digital Humanities and AI Arts International Research Group explored the multifaceted dynamics of human–machine collaboration. In terms of educational practice, the group organized a series of interdisciplinary workshops. Highlights included a March workshop on interpreting classical literature through podcast production, followed by April sessions led by Chang Chieh-hsin on adapting scripts with ChatGPT and by Associate Professor Hsieh Tsung-han on AI-based vocal synthesis. At the same time, writers Chang Yi-hsuan and Egoyan Zheng held dialogues on women's writing and AI-generated narratives.

In September, a collaboration with the Taiwan Dance Research Society further examined AI's role in the performing arts through motion-detection technologies and improvisational experimentation.

Regarding academic and artistic outputs, the group hosted the International Conference on Digital Humanities and AI Arts in late October, featuring discussions that ranged from translation and music to ethics. Running concurrently, the Aura of Presence exhibition used AI technologies to reinterpret the poetry of Yu Kwang-chung.

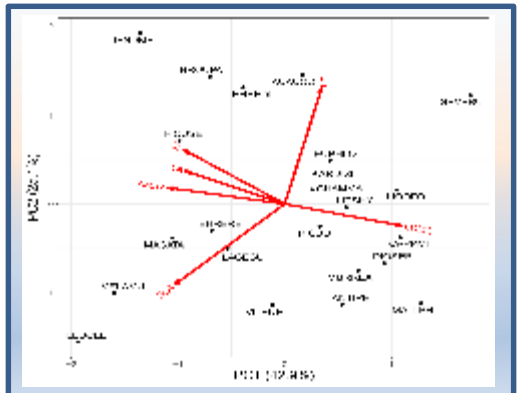
The year concluded in November with a lecture on digital humanities theory by Professor Kwok Chun-yi and a keynote address by Academician C.-C. Jay Kuo on the enduring value of the humanities in the age of AI. Together, these initiatives significantly enriched interdisciplinary dialogue across literature, music, performance, and digital technology.

Biomimetic Research Group

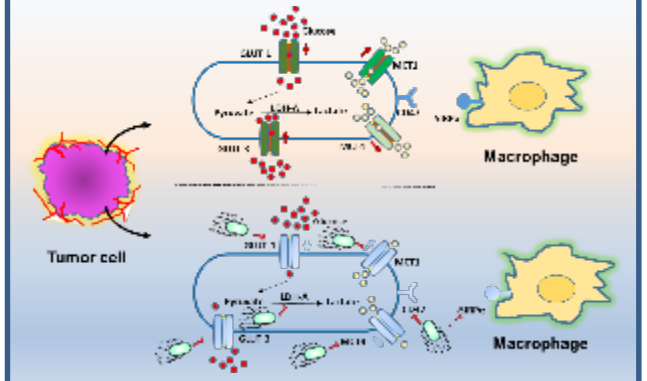
Goals and Achievements

The seven-member team from the College of Science and Engineering has shown strong performance in research, applied science, and industry–academia collaboration.

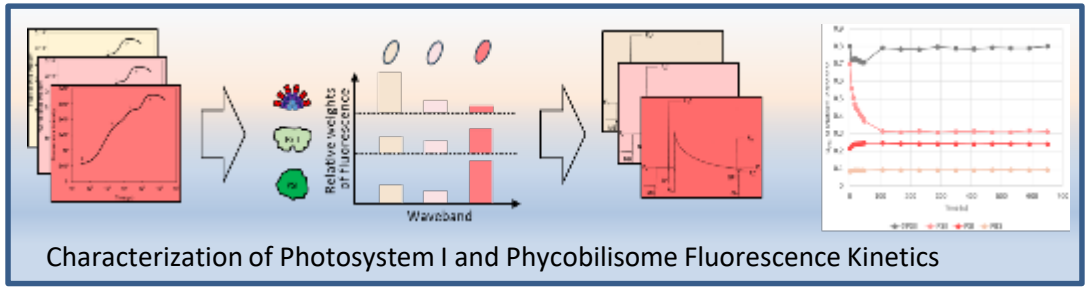
- ❖ 25 journal articles
- ❖ 14 industry projects
- ❖ 3 patents



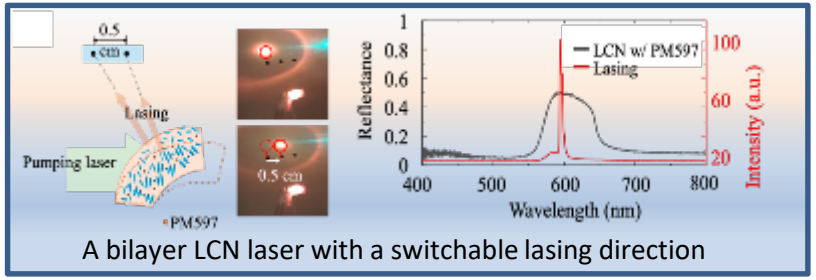
Leaf PCA of major tree species in Kaohsiung urban forests



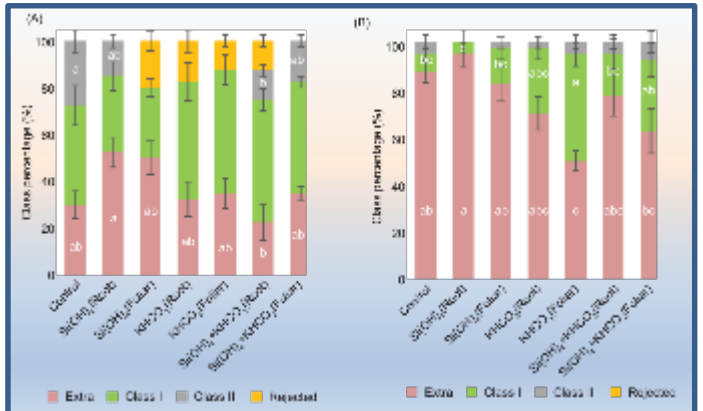
Tumor-targeting bacteria curb tumor growth by altering glucose metabolism



Characterization of Photosystem I and Phycobilisome Fluorescence Kinetics



A bilayer LCN laser with a switchable lasing direction

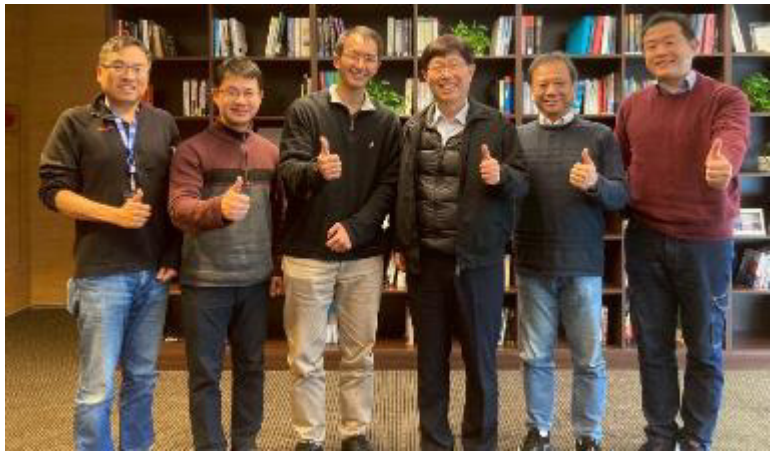


Penggunaan asam silikat untuk meningkatkan sifat fisikokimia buah stroberi di dataran rendah tropis

Awards at the 2025 Taiwan Innotech Expo
Platinum Award-Multi-Axis Log Handling Machine

Discover anti-inflammatory cembranoids from cultured soft corals

Material-based Quantum computing research group



Building up networking and cooperation with HonHai Foxconn Technology Group

Community Networking through the Quantum Forum at the 『2025 Kaohsiung Smart City Summit』

Research highlights achieved through fruitful collaboration with the National Quantum Teams

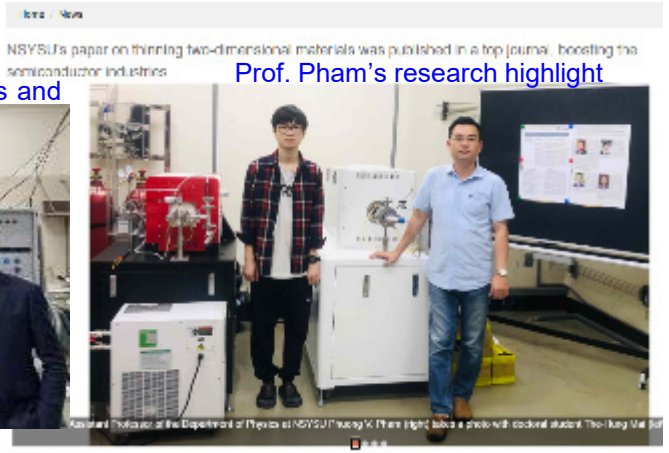
Material-based Quantum computing research group

Key highlights:

- Published **30** SCI papers (more than double last year), with **16** in **Q1** journals and **15** achieved through **international collaboration**
- Research on quantum computing (**Prof. Chiu**) with the National Quantum Teams, as well as work in materials science (**Prof. Pham**), has been highlighted by the University and featured in science media
- Hosted the first ever **Quantum Forum** at the **Kaohsiung Smart City Summit & Expo**, which received an enthusiastic response and extensive media coverage
- Building up cooperation with **HonHai research institute**, **Cavendish Lab at University of Cambridge** and **Imperial College London**
- Hosted industry meeting in **2025 Annual Meeting of the Physical Society of Taiwan** and established cooperation with the Israel QC company **Quantum Machines**

Cooperation with Quantum Machines and the National Quantum Team

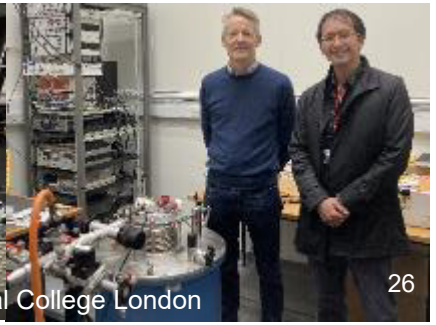
Prof. Pham's research highlight



Industry meeting in 2025 Taiwan Physical Society Annual Meeting

Quantum Forum at the Kaohsiung Smart City Summit & Expo

Visited the chairman of HonHai - Young Liu

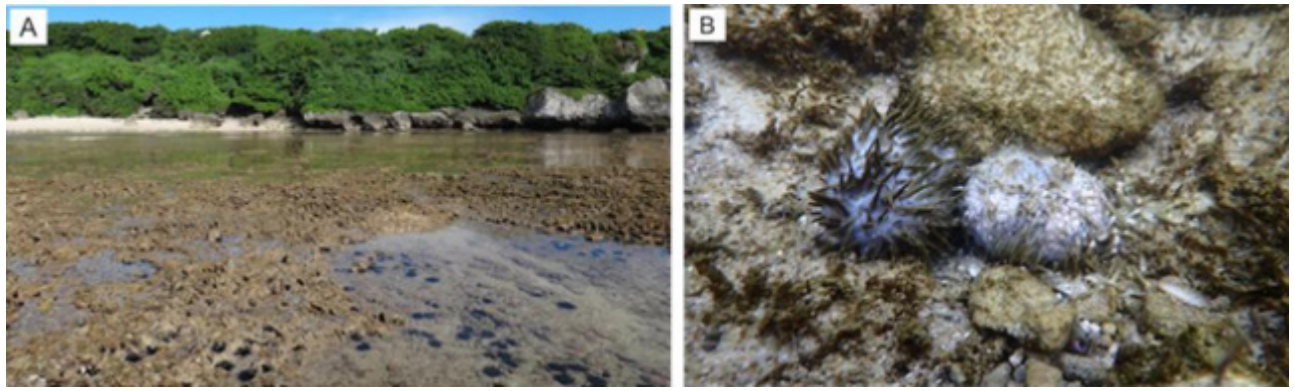


Visited Cavendish Lab and Imperial College London

Silicon Photonics Technology

- Our SiPh gyroscope technology was awarded the Gold Medal at the 2025 Ministry of Economic Affairs National Invention and Creation Award.
- International industry-academia collaboration with TOKYO OHKA KOGYO Co., Ltd for developing silicon photonics packaging technology.
- Industrial recognition – invited to speak at major industry events, including IEEE IITC 2025, IMPACT 2025, ASE CRD, USI Tech Forum, and TSMC OIP Ecosystem Forum.

Adaptive Strategies for Marine Ecosystems under Climate Impacts and the Application of Smart Technologies



Research on intertidal echinoderm communities in Xiao Liuqiu revealed ecosystem vulnerability under extreme rainfall, contributing important insights for coral reef management. Findings published in **Zoological Studies**.

Interdisciplinary team developed an AI-based early warning system for Taiwan's hard clam aquaculture, detecting abnormal siphon an burrowing behaviors. Results published in **Aquacultural Engineering**.

Seagrass Restoration and ESG-Oriented Collaboration among Government, Industry, and Academia

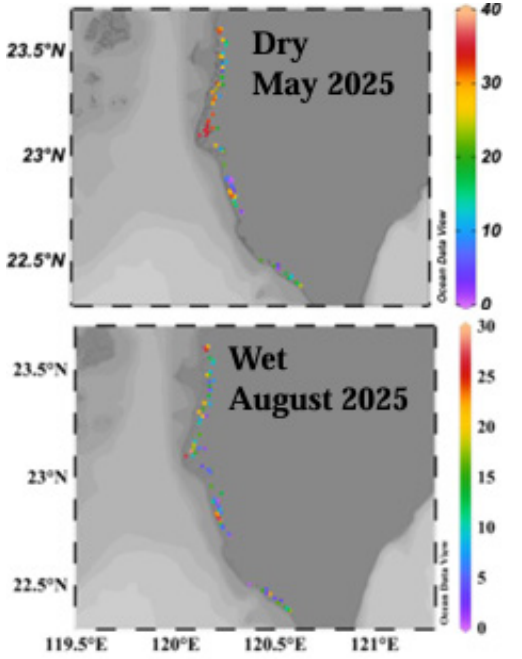
Nanshan Life agreed to fund our seagrass restoration project at Qigu (Shang Yin Vanson Liu's lab) from 2025 July to 2026 June for 1500000 NTD.

Parents and kids from Tainan Municipal Qigu District Guangfu Experimental Elementary School of Ecology joined us to transplant seagrass from the donor site to the nursery.

High-Resolution Greenhouse Gas Dynamics in Southwestern Taiwan's Nearshore Waters

Seasonal (Dry and Wet) CO_2 Investigations in Nearshore Waters of Southwestern Taiwan

Nearshore waters in southwestern Taiwan exhibit strong and seasonally driven CO_2 variability due to river input, monsoonal forcing, and human activities, yet systematic observations remain limited. By collecting nearly eighty samples in both dry and wet seasons, this study fills a key regional data gap, clarifies the main controls on CO_2 dynamics, and improves coastal carbon-flux assessments.



High-Temporal-Resolution Observations of CH_4, CO_2, and N_2O Fluxes in Nearshore Channels

To enable systematic observations, the Huang Lab developed an independent CO_2 monitoring system (including a water–gas equilibrator patented in Taiwan by Prof. Wei-Jen Huang) and integrated it with SGS Taiwan's greenhouse gas sensors. This setup provides a more comprehensive view of temporal variations in carbon and nitrogen cycling in nearshore water.

Improving the efficiency of fuel cell components

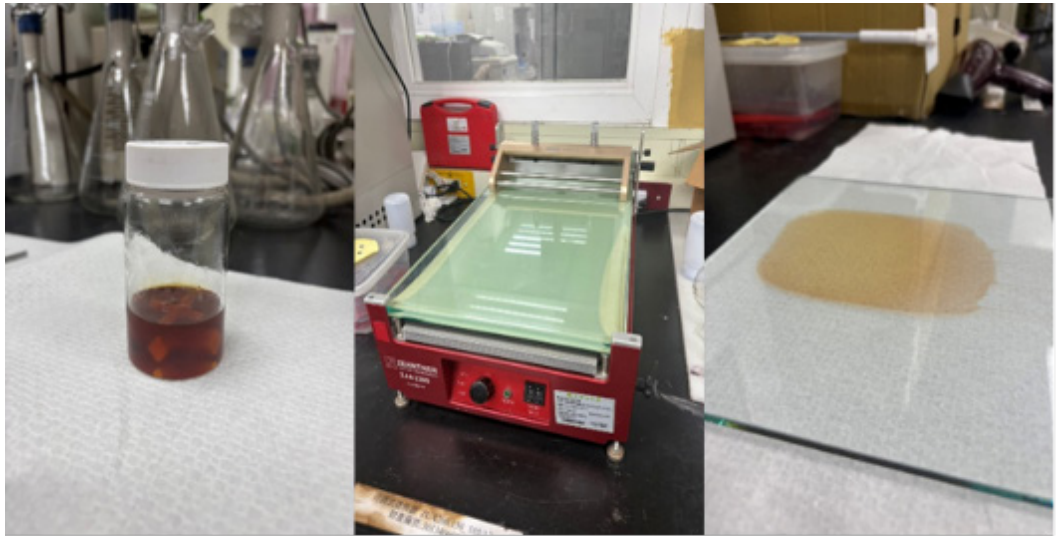
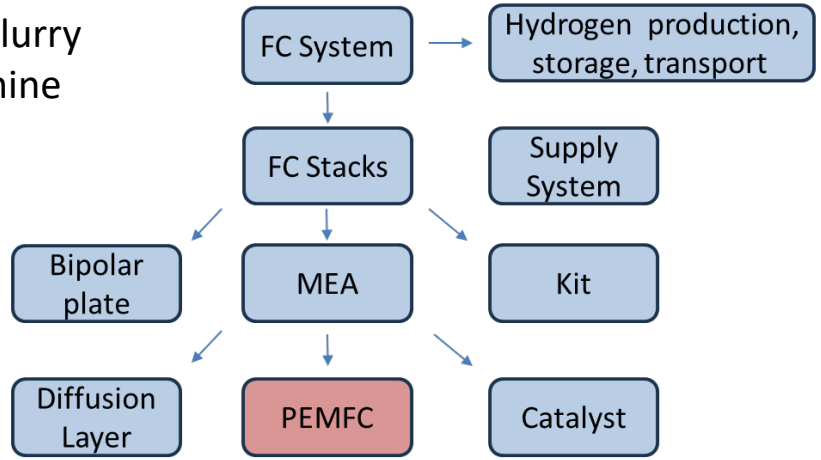


Fig.1 Fig.2 Fig.3

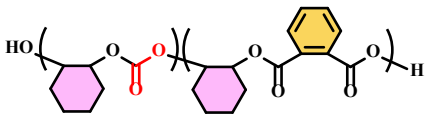
Fig.1 Membrane slurry
Fig.2 Coating machine
Fig.2 Membrane



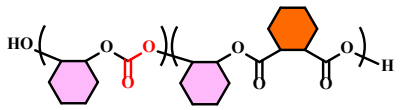
We successfully synthesized 40 grams of the monomer. NMR (nuclear magnetic resonance) analysis confirmed the chemical structure, and high-performance liquid chromatography (HPLC) indicated a purity of 98%. After polymerizing the monomer into the polymer, gel permeation chromatography (GPC) measured a weight-average molecular weight (Mw) of 166,347 g/mol. Through sulfonation, 30 g of the sulfonated polymer was obtained. The resulting membrane had a thickness of approximately 26 µm, and its ion exchange capacity (IEC) was measured to be 2.73 mmol/g. Proton conductivity, measured using an AC impedance analyzer at 80 °C and 95% relative humidity, reached 265.3 mS/cm. At 80 °C in water, the dimensional stability and water uptake of the membrane were 29.73% and 106.8%, respectively. The thermal stability (Td_5%) was determined to be 262.84 °C.

CO_2-Based Copolymers: Emerging Sustainable Materials for Multifunctional Applications

CO_2-Based Copolymers by anhydride

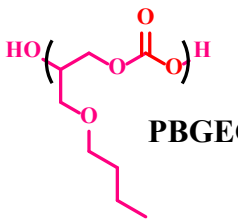


PCHC-PA

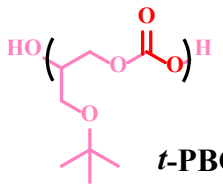


PCHC-CHA

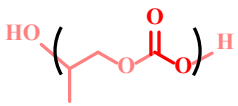
CO_2-Based Copolymers by different epoxide



PBGEC

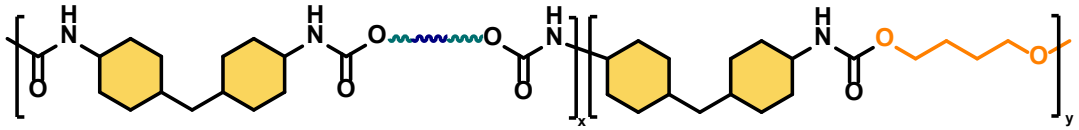


t-PBGEC



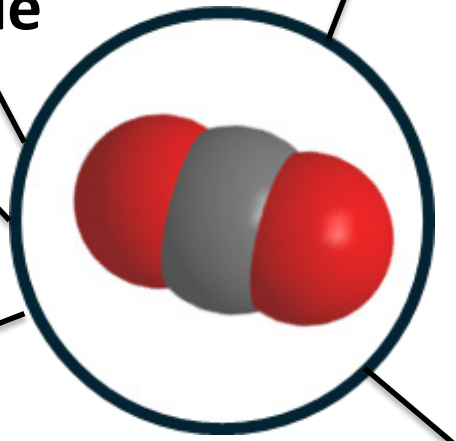
PPC

CO_2-Based Polyurethanes



PCHC-PUs

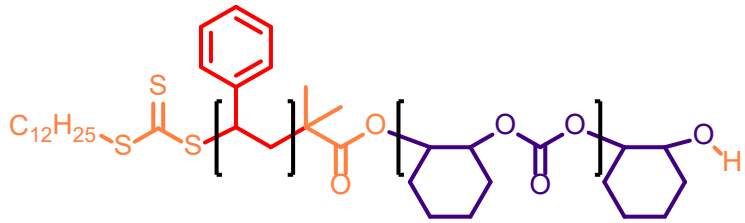
PCHC-PCL-PCHC =



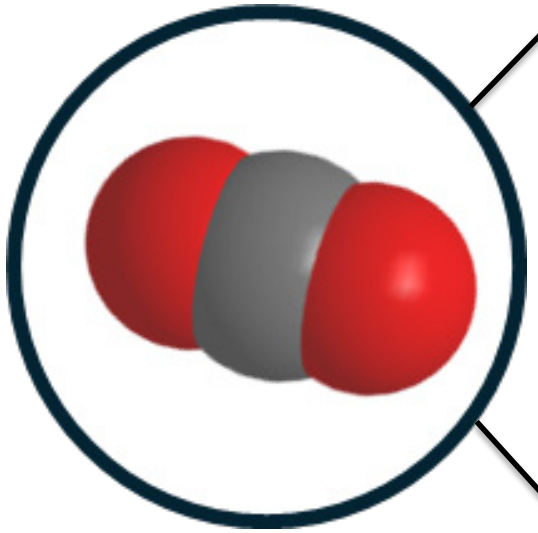
Hydrogen Bonding Interaction Study

CO_2-based polymers possess a unique molecular structure design and tunability owing to their capacity for hydrogen bonding interactions, which have a critical impact on their physical properties, blend compatibility, and multifunctional applications.

CO_2-Based Block Copolymers by RAFT



CO_2-Based Copolymers: Emerging Sustainable Materials for Multifunctional Applications



Porous Material Template

PEO-*b*-PCHC, synthesized using CO_2 as a monomer, was blended with phenolic resin as a template. After high-temperature calcination, a porous material with a high surface area (>500 $m^2\ g^{-1}$) was obtained, exhibiting a CO_2 adsorption capacity of 4.5 mmol g^{-1} at 273 K.

PU Elastomer Formation

Polycarbonate-type polyols synthesized from CO_2 can partially replace conventional petroleum-based polyols, and subsequently react to produce PU elastomers, foams, etc. These polyols impart strength, elasticity, shape-memory, and corrosion resistance, while also contributing to the environmental sustainability of polyurethane materials.

The Research Group for the Application of Intelligent Technology in Elderly Life

1. Age Friendly Transportation

- Finished older driver handbook
- Planning for senior driver workshops (2026)
- Transportation Bureau review committee
- Smart Transport Center visit

2. Smart Aging Conference

- UHIMA 2025
- 250 participants
- 83 oral / 76 posters

3. Research Output

- 24 papers
- 15 Q1, 4 Q2, 3 Q3, 1 Q4,
- 1 TSSCI

4. Student Competition Awards

- Travel Fun – Excellence Award
- Visitour – Second Place
- VR Memory Park – Second Place

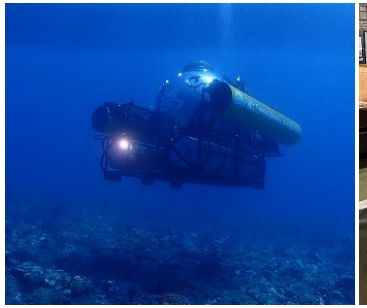
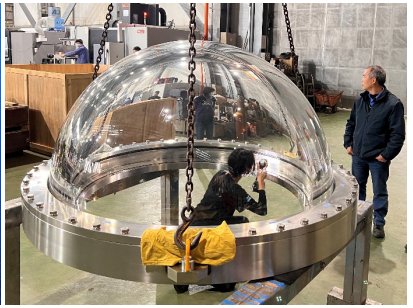
5. Elderly Healthcare Tech

- VR Dementia Care System
- 2025 Taipei Tech Expo showcase
- AI Kidney Health System (LLM based)

Marine-Science-Oriented Ocean Technology Implementation Center

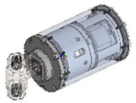
■ Scientific Focus Areas:

- Climate and pollution impacts on reefs
- Multimethod ecosystem monitoring
- Coastal–ocean carbon/nutrient tracking
- 3D CO_2 & chlorophyll tracking

Manual Winding Device
TW Pattern No. I890581 (Approved)
US Pattern Application No. 19/013023 (Under Review)

Mechanical Series-Parallel Switching Mechanism with Modular Expandability, Battery Module, and Multi-Module Battery System
TW Pattern Application No. 114133608 (Under Review)



Non-Coaxial Reduction Mechanism and Reduction System
TW Pattern Application No. 114141995 (Under Review)

■ 2025 Highlights:

- **Phase II Submersible for 50-m Depth Rating**:
  Acrylic dome seat completed; metallic hull designed; lithium battery system finished; 1 patent approved, 3 patents under review.
- **National Seafloor Imaging Database**:
  Supported government surveys; 546 hours of imagery archived.
- **Deep-Diving Tech R&D Facility**:
  4500 m & 8000 m pressure chambers commissioned; 130 research test services delivered.
- **International Academic Exchange**:
  Hosted invited talk by Prof. Muk Chen Ong, University of Stavanger.

Just Transition Research Team

Impact Assessment × Social Dialogue × Educational

- The research team focuses on studying “just transition“. It promotes integrated implementation through local field surveys, social dialogue, and educational empowerment.

- Academic Output
  - 23 journal papers (8 Q1, 8 Q2)
  - NT$16.45M external grants

Just Transition Research Team

Accumulating Evidence Through Tribal Field Survey

Professor Wang's team conducted six millet ritual and traditional farming practices research in the Dongrukai tribe, covering cultural and ecological knowledge related to slash-and-burn land preparation, sowing, thinning, and harvesting. These surveys provide crucial local data for cultural revitalization, land management, and net-zero transition, forming an important foundation for conducting an impact assessment of fair transition.

The team will continue to explore the connection between slash-and-burn agriculture and sustainability, hoping to make traditional wisdom a driving force for social dialogue and action in the face of the challenges of climate change.

Impact Assessment of Just Transition

Just Transition Research Team

Social Dialogue as a Method

Responding to deliberations on policies promoting democracy

- The “Gender-Friendly Green Transportation Workshop” involved female citizens of different generations from Kaohsiung. It engaged them in citizen-government dialogue with the Kaohsiung City Government Transportation Bureau.
- Workshop's findings were subsequently cited by the Kaohsiung City Council, demonstrating the policy impact of social dialogue and reflecting a shared commitment to a more just urban transition

Just Transition Research Team

Just Transition Education and Empowerment

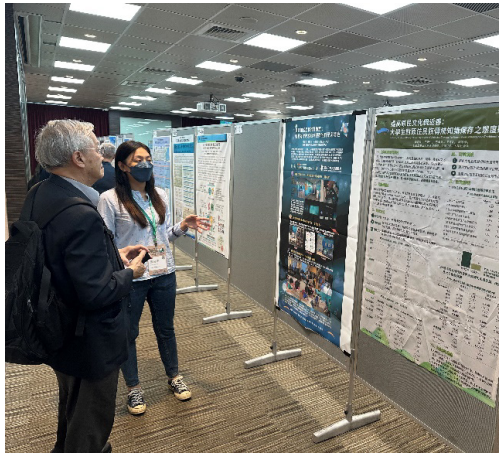
Knowledge diffusion through inter-institutional collaboration and academic communities

- Drawing on personal experience, this initiative aims to deepen students' understanding of just transition and disadvantaged situations.
- Empower youth deliberation and civic dialogue, and promote high school students' participation in just transition issues.

Just Transition Research Team

Just Transition Education and Empowerment

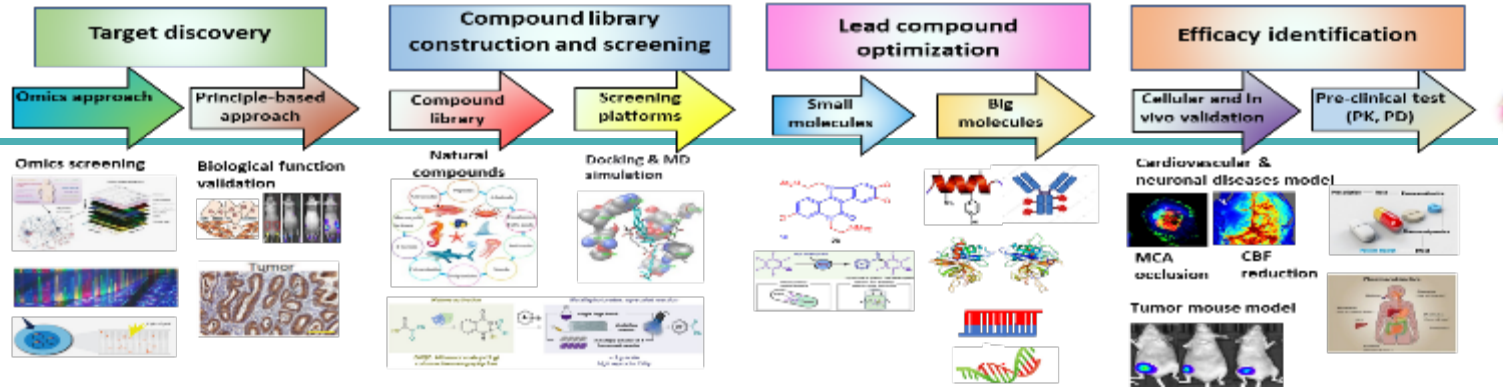
Knowledge diffusion through inter-institutional collaboration and academic communities



Just Transition Research Team

Established an inter-institutional collaborative knowledge network covering multiple countries, including Taiwan, the UK, Europe, the US, Australia, and Japan, comprehensively enhancing the internationalization and depth of justice transition education and research in NSYSU.

Innovation Center for Drug Development and Optimization

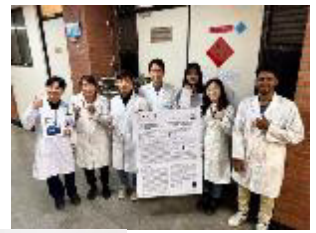


The team's key highlights and achievements

1. **Published 59 papers in international journals with >44 papers in Q1 ranking. Breakthrough research findings published in leading international journals.**

- Photocatalytic drug applications for Alzheimer's disease. J. Am. Chem. Soc. 2025, 147, 9, 7452–7460**. (Prof. H.-H. Liao)**
- Non-invasive imaging using [^{18}F]FEDV for early diagnosis of stroke and neurodegenerative diseases. *Nat. Biomed. Eng* 9, 716–729 (2025). **(Prof. Y.-Y. Sun)**
- A DNA Methylation Analysis using Infinium MethylationEPIC BeadChip. This paper has been selected as the cover article. Environ Epigenet. 2025 Jun 18;11(1):dvaf020. **(prof. S.-H. Yu)**

2. 2025 Ta-You Wu Memorial Award (Prof. H.-H. Liao)
3. 2024-2028 Emerging Young Scholar for the NSTC 2030 Cross (Prof. H.-H. Liao)
4. 2024-2029 Ministry of Education Yushan Young Scholar(Prof. H.-H. Liao)
5. NSYSU Industry–Academia Incentive Award (Prof. P.-C. Shih)
6. Patented by ROC and USA (Prof. Y.-S. Chen)
7. Received additional industry-university research joint projects (18 million at Sep. 2025)



Geriatric Medicine Translational Research Group

Summary

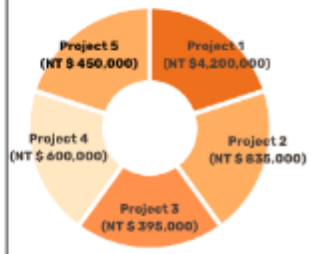
Annual Report

Until 2025.11
We've finished

Research Publications	Collaboration Projects	Collaborative Research	International Link
22 papers	NT$6.48 million	6 parts	3 parts

Research

Industry-Academia Collaboration Projects



Project 1: National Science and Technology Council-DNS
Project 2: National Science and Technology Council
Project 3: Ministry of Education Project
Project 4: NSYSU and KCGMH Project
Project 5: Zuoying Armed Forces General Hospital

Cross-Disciplinary and Multi-Institutional Collaborative Research

Partners in Geriatric Sleep and Cognitive Care:
-> KSVGH, NCKU

Partners in Oral Care for Elderly Indigenous People:
-> NSYSU, STUST, NKUST

Partners in Technology-Assisted Health Prevention for Elderly Communities
-> NSYSU, NKUST

International Link

2025.08.10-13
UMP, Vietnam
Design Thinking Workshop & MOU signing

2025.09.04-06
WSS 2025, SG
ASSM speaker

2024.10.06-10
TUKUC,UK
Academic exchange

Geriatric Medicine Translational Research Group

Research Publications (2025.1-11)

- **Publication: 22 papers in international journals**
- **Research: 5 proposals approved .**
- **Conferences： Co-organized 3 international conferences.**

Industry-Academia Collaboration Projects

- **A total of three collaborative projects have secured funding amounting to NT$6.48 million.**

1) National Science and Technology Council-Department of Natural Sciences and Sustainable Development(DNS): **NT$4,200,000**
2) National Science and Technology Council: **NT$835,000**
3) Ministry of Education : **NT$395,000**
4) Ministry of Education Project: **NT$600,000**
5) Zuoying Armed Forces General Hospital: **NT$450,000**

Geriatric Medicine Translational Research Group

Multi-disciplinary and Multi-Institutional Collaborative Research

Geriatric Sleep and Cognitive Care

- Center for Geriatrics and Gerontology, Kaohsiung Veterans General Hospital.
- National Cheng Kung University Hospital

Oral Care for Elderly Indigenous People

To explore the relationship between indigenous diets and oral health while developing an AI-driven interactive oral care game.

Collaborating Units：

- National Sun Yat-sen University (NSYSU)
- Southern Taiwan University of Science and Technology (STUST)
- National Kaohsiung University of Science and Technology (NKUST)

Technology-Assisted Health Prevention for Elderly Communities

Integrating the concept of service design into health technology to rejuvenate aging societies and develop a smart community co-living plan.

Collaborator: Professor Chia-Lun Lee, and Associate Professor Shih-Hsiang Sung, NSYSU.

Geriatric Medicine Translational Research Group

International Link

From August 10–13, 2025, Associate Professor Yen-Chin Chen led a design **thinking workshop** at UMP in Vietnam, and both parties reached a consensus to **sign an MOU** for future exchanges and collaboration.

Associate Professor Yen-Chin Chen attended World Sleep 2025 (Sep 4–6) in Singapore, presenting on CPAP effects in OSA patients and joining discussions on **sleep technology** and cognitive aging, gaining insights for **sleep medicine** and **long-term care** in Taiwan.

From October 6–15, 2025, Associate Professor Yen-Chin Chen joined the Taiwan–UK University Alliance faculty exchange, gaining key insights into the UK's approaches to healthy aging, **sleep medicine**, **VR teaching**, and institutionalized PPIE, providing valuable references for **future collaboration** and **educational innovation**.