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INDUSTRY, INNOVATION AND INFRASTRUCTURE

📖	2020-2024 Publications	**629**
🍃	2020-2024 Percentage of all Taiwan Publications	**6.2%**
🏫	Course Units	**1,528**
👤	Student Engagement with Units on SDG 9	**30,652**

Research

Breakthroughs Laying the Groundwork for Taiwan's Aerospace Development

At 6:06 a.m. on July 21, 2024, NYCU's Aerospace Systems & Aerodynamics Research (ASARe) Lab successfully completed the maiden test flight (Launch-1) of the Asfaloth sounding rocket at the Xuhai Scientific Rocket Range, Pingtung, a major milestone on the University's path toward space exploration. The mission debuted the "Viper–Eagle" hybrid rocket engine, showcasing innovative propulsion capabilities and establishing a critical foundation for upcoming tests of higher-performance two-stage rockets. Beyond the flight itself, the result marks a significant leap in systems integration, aeronautical engineering, and propulsion technology across collaborating laboratories, and opens up new opportunities for Taiwan's space initiatives and indigenous aerospace R&D.

Innovation and Applications in Anti-Counterfeiting Technology

Assistant Professor Yao-Wei Huang (Department of Photonics) and his team have developed a narrowband high-Q metasurface platform that dramatically enhances the color purity and security of anti-counterfeit labels. Using topology-optimized inverse design, the group realized a metasurface with a quality factor (Q) of 1,362, delivering up to a 15× efficiency improvement over conventional approaches and achieving an experimental efficiency of 59%, which is a notable breakthrough in the field of nonlocal metasurfaces. The work was published in Nano Letters and was featured as a cover article, drawing significant attention from both academia and industry sectors.
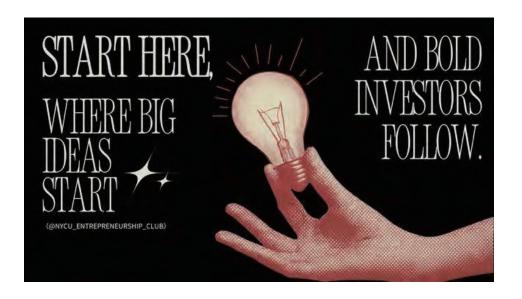
Social Impact

Accelerating the Internationalization of Taiwan's Startups

NYCU's Industry Accelerator & Patent Strategy Center (IAPS) signed an MoU with DEKRA, a global leader in testing and certification, to provide startups with a one-stop pathway from product testing and inspection to international certification. Having already supported over 1,000 startups and R&D teams, the IAPS will leverage DEKRA's capabilities to lower market-entry barriers, shorten time-to-market, and boost global competitiveness.

Open-Source 5G Core Powering Global Innovation

Developed by Professor Jyh-Cheng Chen, Dean of the College of Computer Science, free5GC is the world's first fully standards-compliant open-source 5G core network software. On September 16, 2024, at the Open Source Summit Europe, free5GC was officially onboarded to the Linux Foundation open-source ecosystem—an international milestone that strengthens open development in core networks and lays the groundwork for future 6G technologies.

Education & Cultivation

Cross-Disciplinary Learning that Ignites Innovation

NYCU's ICT Co-Working Space pairs hands-on, cross-disciplinary courses with university-wide maker spaces to provide students with a platform for experimentation and co-creation. The 2024 ICT Open LABs Showcase, themed "Intelligence Leading the Trend," presented outcomes from seven focus areas—digital manufacturing, AR/VR, IoT, drones, robotics, biomed/health, and new media creation—with over 100 projects on display. The exhibition also featured interactive experiences, including laser engraving, 3D printing, and VR explorations. By integrating coursework, exhibitions, and try-it-yourself activities, the program cultivates students' cross-domain creativity alongside practical making and problem-solving skills, advancing a vibrant campus culture of innovation.

Building a Campus Entrepreneurship Value Chain

The NYCU Innovation & Entrepreneurship Club is a student academic organization dedicated to creating an on-campus startup community and serving as a bridge between students and the industry. Centered on strengthening entrepreneurial capability, the club encourages participation in creativity and start-up competitions, and helps its members expand their professional networks and resources. Its hallmark is a full "from 0→1" execution chain, from pain-point discovery, user interviews, and product validation to business plan writing and pitch demo training. The club also organizes company visits and internships to reinforce a sustainable campus startup ecosystem.

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Education & Cultivation

Co-Creating an Innovation Ecosystem across Industry, Government, and Academia

At InnoVEX 2024, NYCU curated the NYCU Pavilion to showcase the university's growing portfolio of startup technologies by integrating multiple in-house incubation resources. The pavilion, curated by several accelerators, includes the ESG Accelerator, a collaboration with the Ennoconn Group, the International Sports Technology Startup Accelerator, a partnership with the Ministry of Education's Sports Administration, and the university's Innovation and Entrepreneurship Center, which focuses on cultivating spin-off companies. The pavilion showcases a model of innovation and incubation fostered through a trilateral partnership between industry, government, and academia. The exhibits spanned areas such as information and communications technology, artificial intelligence (AIoT), green technology, and sports technology, demonstrating the university's strength in cross-disciplinary R&D and startup incubation.

Building a One-Stop Startup Support Platform

NYCU's Innovation and Entrepreneurship Center drives a campus-wide startup ecosystem through structured support, competitions, and purpose-built incubation spaces, accelerating technology translation and new-venture growth. The Center offers a full suite of resources for faculty and student founders: training courses, events, and talks; hands-on support for business plan development covering market discovery, technology valuation, technology transfer, go-to-market strategy, fundraising, and product/service validation. Regular innovation and entrepreneurship competitions cultivate creative thinking and technology commercialization skills, unlocking campus ventures. With dedicated incubation sites, the Center actively recruits high-quality teams, connects them to NYCU's industry–academia resources, and supports their market expansion and internationalization.

Transforming the Boai Campus into a BioICT Powerhouse

NYCU is reimagining its Hsinchu Boai Campus as a national BioICT hub, centered on biomedicine, AI, and semiconductors. In 2024, the University established the College of Engineering Biosciences (one department, two institutes, and three programs). Building on the campus's legacy as the cradle of Taiwan's semiconductor industry, the site is being repositioned as a base for engineering biology and smart healthcare, integrating molecular biology, ICT, and biomedical engineering to advance precision medicine, translational engineering, and sustainable technology. Current investments include intelligent diagnostic chips that combine generative AI with semiconductor design to speed up screening for sepsis and stroke, along with R&D on decarbonization and net-zero solutions. The College is linking the Center for Engineering Medicine with Chuming Hospital to create industry–academia–clinical collaborations and real-world clinical testbeds. By strengthening critical infrastructure and innovation capacity, the Boai Campus is positioned as a national nexus for BioICT development.