

# NTU HIGHLIGHTS



Special Report:

## Chinese Overseas Flagship Center

- Harry Shum Speaks at NTU
- Students Impressed by Finland's Education
- Animal-Friendly Campus

## NTU, NUS Strengthen Ties

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Joint Eco-Friendly Agriculture Exhibition Presents Examples of Human-Nature Coexistence

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# Message from Shih-Torng Ding, Vice President for Academic Affairs

As a leading university in Taiwan, NTU's top priority is to educate the next generation of elites. To achieve this goal, the Office of Academic Affairs (OAA) encourages the faculty to integrate frontier research results into their teaching, thereby involving undergraduates to learn from these cutting-edge studies.

Currently, the OAA has two focuses in its innovative strategies for talent development, namely, "areas of specialization" and "interdisciplinary expertise." To encourage further specialization in the students' chosen fields, the office plans to offer a bachelor's degree with honors for those who have completed a bachelor's thesis. Various interdisciplinary programs have also been planned, and the limit on program credits has been relaxed in hopes of giving the students the opportunity to integrate their majors with other disciplines.

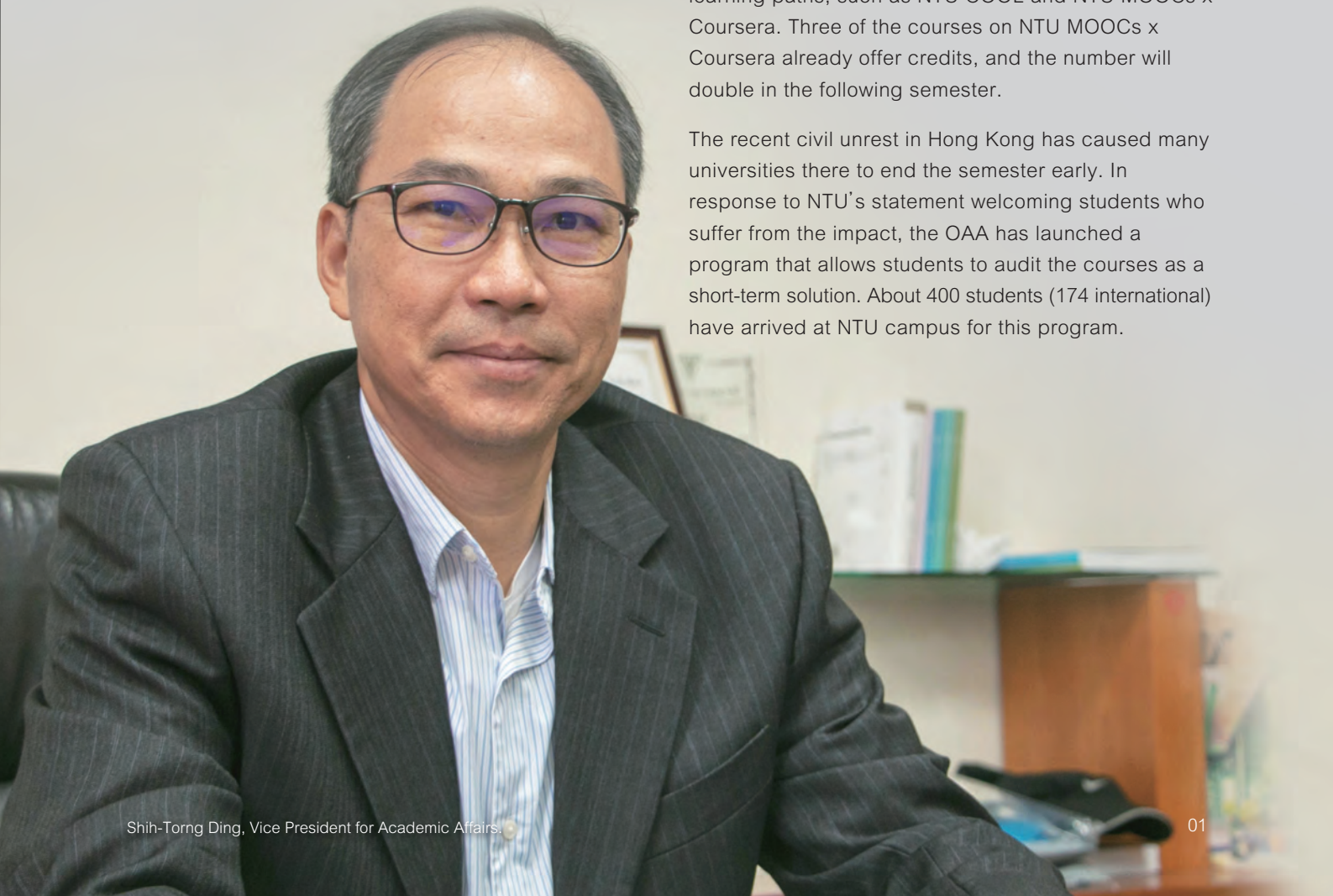
Internationalization is another major effort the OAA has been working on. The International College will be start to enroll new student next year, offering master's programs in Global Agriculture Technology and

Genomic Studies, Biodiversity, Global Climate Change, Disaster Mitigation, Smart Healthcare, and Smart IoT. To facilitate international exchanges and enhance the students' competitive advantages, relevant courses will be taught in English to create a bilingual academic environment.

Besides educating elites, the university fulfills its social responsibility by offering more enrollment for disadvantaged students. We will double the number of disadvantaged students funded by the "Hope Admission Program," as well as continuously offer scholarships so that they can concentrate on their studies. Moreover, the Center for Teaching and Learning Development also offers a range of counseling services to help the students overcome difficulties in study and life.

The office has invested in technologies that will further enhance students' learning experience, including a video recording system that records lectures to maximize their value. A number of online platforms have also been integrated to diversify the student learning paths, such as NTU COOL and NTU MOOCs x Coursera. Three of the courses on NTU MOOCs x Coursera already offer credits, and the number will double in the following semester.

The recent civil unrest in Hong Kong has caused many universities there to end the semester early. In response to NTU's statement welcoming students who suffer from the impact, the OAA has launched a program that allows students to audit the courses as a short-term solution. About 400 students (174 international) have arrived at NTU campus for this program.



# Chinese Overseas Flagship Center Opens at NTU

The Language Flagship is the United States' national effort to innovate the way Americans learn certain target foreign languages. After a considerable effort, the Chinese Overseas Flagship language center at NTU opened with a ceremony on October 28.

Distinguished guests at the ceremony included Director of American Institute in Taiwan (AIT) William Brent Christensen, Deputy Minister of Foreign Affairs Szu-Chien Hsu, Deputy Director General of the Ministry of Education's Department of International and Cross-Strait Education Jocelyn Chin-Shu Chang, the heads of the 12 Flagship universities in the US, industry collaborators, as well as experienced Chinese language educators. The first batch of 22 students were introduced to the advantages of learning Chinese in Taiwan. Besides experiencing Taiwanese culture, they were expected to visit the different NTU campuses. The project director of the Flagship program, Der-Lin Chao, encouraged the students to make the most of their time in Taiwan as well as foster bilateral ties.

Established in June 2019 by the US Defense Language and National Security Education Office (DLNSEO), the Chinese Overseas Flagship Center in Taiwan is a significant project that requires the sustained effort and dedication of people in government, academia, and private sector, with the goal to educate "global professionals." The selection process is rigorous. The 22 students who have completed three years of formal Chinese study were screened before passing an examination. The 10-month program, also known as the "Capstone Year," gives the students the opportunity to take intensive academic language classes while conducting specialized individual research. They will also do an internship at a partner enterprise as part of the immersive language program. The 12 participating Flagship universities include Arizona State University, Brigham Young University, Hunter College, Indiana University, San Francisco State University, the University of Hawaii at Manoa, the University of Minnesota, the University of Mississippi, the University of North Georgia, the University of Oregon, the University of Rhode Island, and Western Kentucky University.

During a meeting between the Flagship Program Director Der-Lin Chao and Mu-Hsuan Huang, Dean of NTU's College of Liberal Arts last year, Chao said that he had proposed that the Flagship headquarters launch a center in Taiwan several times, but to no avail.



Despite the setbacks, he hoped the College of Liberal Arts would be willing to make another attempt. At the end of 2018, the College worked closely with Chao to pass several strict reviews. Finally in March 2019, the US Flagship headquarters approved the proposal to set up a center in Taiwan. The college collaborated closely with the International Chinese Language Program (ICLP) and other departments at NTU to make the center a reality. The fourth floor of the Mathematics Research Center Building was selected as the home to the center, and the renovation was completed before September to welcome the teaching staff as well as the students.

The complicated preparation process relied on the strong support of various administrative and teaching units of NTU. The Office of General Affairs generously rented out the fourth floor of the Mathematical Research Center Building, allowing the students to take classes at a quiet central location on campus next to beautiful Drunken Moon Lake. The Office of International Affairs and the Office of Student Affairs also worked together to assist in making all the necessary arrangements. With the help and effort of all the parties involved, the first batch of elite students completed registration on September 1. After the opening ceremony, the 12 directors from the Flagship universities sat down together the next day to discuss the future development of the program. The Flagship

center will accommodate 100 students in the future and thereby host exchanges among the elite students from the US and Taiwan, so that they may learn from each other as well as enhance the international reputation and influence of NTU.

During the ceremony, AIT Director William Brent Christensen praised Taiwan for being a reliable partner in democracy, a positive force in the world, and a good place to study Chinese. When he was first stationed in Taiwan at the beginning of his career, he benefited greatly from the safe and culturally diverse environment here that left a mark on his career. He strongly encouraged the Flagship students to make the most of their time here. Besides remarks from executives and company representatives, the students all introduced themselves in Chinese during the ceremony; some even performed stand-up comedy to demonstrate their excellent language skills and good sense of humor. To end the ceremony on a high note, the Golden Melody Award winner Octangle Male Choir led the students in singing a popular song in Chinese. As a world-class university in Taiwan and a proactive member of the international academic community, NTU has reached a significant milestone with the establishment of the Overseas Flagship Center on campus, thereby demonstrating what it has to offer for the advancement of global higher education.



Opening ceremony of the Chinese Overseas Flagship Center in Taiwan.



Speech by President Chung-Ming Kuan at the 91st anniversary celebration.

## NTU Celebrates 91st Anniversary with Festivities and Joy

NTU celebrated its 91st anniversary in the Sports Center at 9:00 on November 15, 2019. The ceremony, presided over by President Chung-Ming Kuan, was attended by several former presidents, alumni from around the world, faculty, students, as well as guests from various sectors. On this special occasion, honor was paid to distinguished alumni of the year, students who made special contributions to society, and recipients of the Fu Bell Scholarship.

As an expression of our sincere appreciation for outstanding alumni who have made substantial contributions to the university as well as society, eight NTU Distinguished Alumni were selected and named by the committee this year. The full list is as follows:

\*Academics: Academician Bede Liu (electrical engineering), Academician Yuen-Ron Shen (electrical engineering), Academician Ho-Kwang Mao (geosciences), and Academician Michael M.C. Lai (medicine)

\*Public Service: Mr. Mau-Nan Chu (pharmacy) and Mr. Yu-Hsin Lin (EMBA)

\*Miscellaneous: Dr. Fang-Yu Lin (clinical medicine) and Dr. Laung-Terng Wang (electrical engineering)

Among the distinguished alumni receiving public recognition, Academician Ho-Kwang Mao and Mr. Mau-Nan Chu enlightened the participants with their speeches. In the near future, the distinguished alumni will be invited as keynote speakers in the NTU Lectures on the Intellectual and Spiritual Pilgrimage series to share their expertise with the new generation of elite students who hopefully will follow in their footsteps and become pillars of society.

NTU has always placed equal emphasis on academic excellence, moral integrity, and giving back to society. Among the various student awards presented this year were the Social Devotion Special Award, Outstanding Youths, Outstanding Student Scholarship, and Fu Bell Scholarship. The Social Devotion Special Award went to the Social Service Division of the Student Association of the NTU Department of Social Work, NTU World Volunteer Society, as well as Yu-Hsiang Yang of the NTU Department of Geography. Moreover, the Fu Bell Scholarship was launched this year to attract elite high school students to attend NTU.

Besides the ceremony, a wide range of festivities and events have been planned throughout the month to mark this special occasion. These include international exchange sessions, alumni reunions, student events, art performances, guided campus tours, and academic forums. Please join us in wishing NTU a happy 91st birthday!



NTU delegation at NUS.

## NTU Furthers Collaboration with NUS in EECS, Management, and Chinese

To promote in-depth academic exchanges and collaborations in specific fields between NTU and the National University of Singapore (NUS), President Chung-Ming Kuan visited the partner university on October 25 together with the Executive Vice President Chiapei Chou, Dean Yao-Wen Chang of the College of Electrical Engineering and Computer Science, Dean Shing-Yang Hu of the College of Management, Chair Chia-Ling Mei of the Department of Chinese Literature, and CEO Simon Liou of the Office of Financial Affairs.

For starters, the two sides held in-depth discussions on the possibility of further collaborations in the targeted fields, including electrical engineering and computer science (EECS), management, and Chinese literature. Representatives from NUS's Faculty of Engineering, Business School, Department of Chinese Studies, and External Relations were present. Afterwards, President Tan Eng Chye and Senior Deputy President and

Provost Ho Teck Hua held a forum with the NTU team to sum up all previous discussions.

This visit led to substantial discussions and fruitful results. As to EECS, the two sides agreed to promote faculty and student exchanges, collaborate on academic research, and share resources from industry and academia. Moreover, selected doctoral students will participate in research exchange programs to be co-instructed by faculty members from the two universities. Summer programs and co-taught EMBA elective courses were discussed in the field of management. As to Chinese literature, an exchange agreement for faculty and students will be signed this year. A summer program will also be organized next year along with literature and journalism courses offered by NTU. The possibility of NUS students attending a one-year exchange program at NTU was also discussed, and it will be highlighted during NUS admission.

NUS, like NTU, is a world-class comprehensive research university. The two universities began their collaborations in 2001 and have had frequent faculty exchanges. Several student exchange programs have also been launched for the College of Management, the School of Nursing, and the Institute of Industrial Engineering. During the past five years, over 100 students have participated in these programs in pursuit of academic excellence.

# NTU Research Team Receives Best Paper Award at Top International Conference on Embedded Systems

During the Embedded Systems Week (ESWEEK) held in New York this year, the research conducted by the industry-academia team led by NTU Professor Tei-Wei Kuo was selected for the Best Paper of the Year award by the program committee of ACM/IEEE International Conference on Hardware/Software Codesign and System Synthesis (CODES+ISSS), a conference co-organized by ACM (Association for Computing Machinery) and IEEE (Institute of Electrical and Electronics Engineers). This marked the first time a Taiwanese research team received such a great honor.

The award-winning paper, "Achieving Lossless Accuracy with Lossy Programming for Efficient Neural-Network Training on NVM-Based Systems," was the brainchild of the team comprised of members from NTU, Academia Sinica, and Macronix International. Besides receiving this recognition, this paper was accepted by ACM TECS (ACM Transactions on Embedded Computing Systems), the world's leading academic journal in the field of embedded systems. This year marked the 28th edition of ACM/IEEE CODES+ISSS. Since 2005, it has been joined by ACM EMSOFT (International Conference on Embedded Software) and CASES (International Conference on Compilers, Architecture, and Synthesis for Embedded Systems) to form ESWEEK. This grand event in the world of embedded systems attracts a lot of attention from both academia and industry, which makes the win highly commendable!

This study indicated that the training of neural networks involves a high demand for RAM capacity, which causes significant energy consumption and cost. To overcome this obstacle, the NTU team proposed the use of non-volatile memory, more precisely, phase change

memory. To improve training efficiency without reducing the accuracy of the neural network, a number of detailed and in-depth observations were made on the "data stream" and "data content" of the neural network. This effectively writes data in the memory while extending memory life, solving the problems faced by today's neural network training without changing the existing architecture and technology. Besides inspiring innovative research of large neural network architecture, it can also be applied to the inference phase of neural networks.

Winning the best paper award at a prestigious international conference is an example of successful collaboration among academia, government, and industry. The R&D capacity of the team reached its full potential thanks to the long-term support from NTU, the Ministry of Science and Technology, and Macronix. Not only did winning this award enhance the international visibility of Taiwan, it will certainly inspire greater future research and breakthroughs.



At the award ceremony.



# Prof. Suming Chen Receives International Award from JSAM

Prof. Suming Chen of NTU's Department of Biomechatronics Engineering received the International Award at the general meeting of the Japanese Society of Agricultural Machinery and Food Engineers (JSAM) held at Hokkaido University, Sapporo, on September 3, 2019. The award was presented in recognition of Prof. Chen's many contributions to international education, academic research, and JSAM over the years.

Prof. Chen is an indispensable member of academia both at home and abroad. Besides his long-term dedication to the field of agricultural machinery engineering in Taiwan, Prof. Chen also actively collaborates with numerous universities and research institutions around the world to promote research and education. His research results have been well-received by the international academic community. Over the past decade, he has been invited to speak at 21 international conferences, delivering 3 keynote speeches, 2 plenary speeches, and 16 invited speeches. He has also been awarded 31 patents and 6 technology transfers.

At present, Prof. Chen serves as the editor-in-chief and deputy editor-in-chief of three international academic journals, including *Engineering in Agriculture, Environment and Food*; *Agricultural Mechanization in Asia, Africa, and Latin America*; and *Smart Sensing and Intelligent Systems*. In particular, Prof. Chen is devoted to the launch of *Engineering in Agriculture, Environment and Food (EAEF)*, an academic journal jointly published by the agricultural machinery associations of Taiwan, Japan, and Korea. He also supported the founding of the Asian Agricultural and Biological Engineering Association (AABEA). Moreover, he has worked tirelessly for the creation of the International Symposium on Machinery and Mechatronics for Agriculture and Bio-systems Engineering (ISMAB) founded by Taiwan, Japan, and Korea. The three countries have been taking turns

hosting the bi-annual symposium since 2002, with the 10th symposium scheduled to be held in Kaohsiung next year.

As to international education cooperation, Prof. Chen has been a faculty member of the distance learning program of Kyoto University since 2013. Due to the program's enormous success, Tsukuba University joined this all-English program in 2017. During his tenure as Deputy Dean of NTU's College of Bioresources and Agriculture, Prof. Chen actively facilitated and promoted a Double Degree Program in MS and PhD between NTU and Kyoto University, as well as another between NTU and Tsukuba University. Moreover, he set up the GIP-TRIAD Program (Global Joint Degree Program in Agro-Biomedical Sciences on Food Security and Healthcare) co-organized by NTU, Tsukuba University, and the University of Bordeaux.



Prof. Suming Chen (right) is awarded JSAM International Award.

# 1st NTU Family Meeting Strengthens Collaboration with Partner Institutions

As a world-class university, NTU takes pride in being a leading member of the global academic community. On November 7, NTU held the first NTU Family Meeting of representatives from its partner universities. The opening of the grand occasion was presided over by Executive Vice Presidents Chiapei Chou, Ching-Hua Lo, Ming-Syan Chen, and Shan-Chwen Chang. The in-depth exchanges that lasted for 6 days was attended by 27 representatives from 22 universities in 10 different countries, including Heidelberg University, the Free University of Berlin, the University of Hamburg, the University of Leuven, the University of Bordeaux, the University of Warsaw, the University of California at Davis, the University of Washington at St. Louis, the University of Sydney, Kyoto University, the University of Tokyo, the University of Tsukuba, the National University of Singapore, Seoul National University, Chulalongkorn University, just to name a few. Moreover, representatives from National Taiwan Normal University, the National Taiwan University of Science and Technology, and the Foundation for International Cooperation in Higher Education of Taiwan (FICHET), as well as NTU staff responsible for international affairs were also invited. Nearly one hundred people attended the opening ceremony of this grand event, and the ambiance was warm and lively.

Executive Vice President Chou gave welcome remarks at the opening ceremony. Besides welcoming the guests, she expressed hopes that academic cooperation between NTU and its partner universities would be deepened and strengthened through the discussions and exchanges in the days to follow. Prof. Hsiao-Wei Yuan, Director of the Center for Global Affairs and Science Engagement (GASE) of the Ministry of Science and Technology (MOST), also a professor at NTU's School of Forestry and Resource Conservation, gave a keynote speech on "Envisioning Internationalization." With her rich experience in international higher education, Prof. Yuan discussed how to build an ecosystem by drawing on the momentum from government and industry, as well as the role of universities in bringing innovation to higher

education. Such topics as global student mobility and the trends of industry, government, and academia cooperation spurred fruitful discussions among the representatives. Notably, they shared the status of industry-government-academia cooperation in their respective countries and the vision of how universities could play a more active role in the future.

In the panel on "Strategy, Innovation, and SDG," Ms. Eva Leptien of the University of Hamburg, Dr. Fernando Palacio of Kyoto University, and Xiaohui Fu of the University of Sydney shared their views on the relationship between the 17 UN Sustainable Development Goals (SDGs) and university curricula. They discussed how to incorporate the SDGs into teaching, research, and administration missions in directing the development of universities, and explored the positive significance that goes beyond SDGs. At noon, the representatives visited the "Green House" on campus to enjoy NTU's greenery and experience its diverse natural landscapes.

On November 8, the representatives engaged in a series of workshops on international higher education. The topics included "Reinventing the Rules of Global Engagement," "Innovations in Study Abroad for Transformative Learning," and "Engaging Local and



International Students: Practices and Issues.” The workshops were moderated by international affairs executives to encourage the representatives to exchange their ideas and experiences about higher education practices around the world. The representatives also had the opportunity to share the concrete measures, strategies, and implementations taken for campus internationalization at their universities in group discussions. They also expressed hopes that their home universities would organize similar events in the future, showing that the Family Meeting was a productive initiative that could lead to a series of future events to enhance the cross-cultural knowledge of international higher education administrators. After the workshops, the representatives visited the NTU Cancer Center to learn about its history and facilities with the help of the Center’s Director, Prof. Ann-Lii Cheng. The NTU Cancer Center is an excellent example of a world-class medical care facility based on innovative measures, artificial intelligence, as well as the cross-disciplinary vision that includes both science and the humanities.

The representatives also took the opportunity to participate in the NTU Study Abroad Fair. Besides engaging in lively exchanges with President Chung-Ming Kuan, Executive Vice President

Ching-Hua Lo, and Deputy Vice Presidents Bi-Fong Lin and Chris Lin, the representatives also explained their different programs to NTU students, including their exchange programs and summer programs. The opportunity to have face-to-face consultations with these high-level representatives was a major highlight of the fair. The Office of International Affairs also planned cultural and historical tours of Taipei so that the representatives could experience the city’s rich history and diverse cultural heritage.

All in all, the NTU Family Meeting successfully promoted international cooperation and exchanges with leading universities all over the world. Moreover, it created more possibilities for future cooperation, including dual degree programs and online courses, to enhance NTU’s reputation and influence in the global higher education community. Overall, the goal of organizing the meeting was to collectively promote innovation through the network of the international higher education community. This initiative received positive feedback from social media, powering higher education to move forward to the next level.

Please follow this link for the highlight video:  
<http://ntufm2019.mystrikingly.com/>.

Group photo at NTU Family Meeting.





Over 1,500 people visit the NTU Study Abroad Fair to consult partner university booths.

## A Glimpse of Higher Education Abroad: Over 100 Universities Join NTU Study Abroad Fair

The 2020/2021 NTU Study Abroad Fair was held on November 9 at the Main Library and Shih-Liang Chien Lecture Hall. The opening ceremony was presided over by President Chung-Ming Kuan. In his remarks, he encouraged the students to explore the world and promised the university would do its best to facilitate their studies abroad, with one of the concrete measures being to offer student exchange scholarships.

The NTU Office of International Affairs organizes the Study Abroad Fair each year, and this year's 12th edition was the most impressive in scale. The fair was joined by representatives and incoming exchange students from 104 partner universities in 26 countries, as well as outgoing exchange students of NTU, with booths set up by NTU's 6 strategic partners and many other renowned universities. According to the statistics, over 1,200 NTU students participate in exchange programs, dual degree programs, and short-term programs every academic year, making NTU the university with the most exchange students in Taiwan.

A great success, the fair drew over 1,500 visitors. Students who had studied abroad were invited to share their experiences with respect to the fair's theme: "Where there is a will, there is a way." Representative offices of the UK, France, Germany, Japan, Australia,

and so on offered the latest information about studying in those countries. This year, a Best Booth Campaign was held to encourage visitor engagement and feedback. Also, over 30 people won prizes from a lucky draw for submitting satisfaction surveys. The prizes ranged from an Apple Watch S5 to subsidies for study abroad programs, which will hopefully encourage the winners to set off on their academic journeys abroad!

The Study Abroad Fair not only allowed the students to gain a better understanding of NTU's partner universities, it also gave them the opportunity to find out more about the various overseas educational programs offered by NTU. The students were encouraged to accept the challenges of improving their foreign language skills, furthering their studies, and familiarizing themselves with different cultures by studying abroad. This kind of mobility and cross-cultural knowledge would in turn help them excel on the international stage. The Study Abroad Fair received positive feedback in the media, which also created a special niche for attracting outstanding high school students to study at NTU in the future.

The next NTU Study Abroad Fair is scheduled to be held on Saturday, November 7, 2020. Those who are interested in participating in overseas educational programs and alumni who would like to share their experiences are all cordially welcome.

For more information, please visit the website of the Office of International Affairs: <https://oia.ntu.edu.tw/>.



Executive Vice President Chou and the trainees from Kyushu University.

## Kyushu University Attends University Staff Training Program at NTU

Staff members of Kyushu University visited NTU to attend the International University Staff Training Program hosted by NTU's Office of International Affairs, Office of Student Affairs, Office of Academic Affairs, Office of Research and Development, Secretariat, and Personnel Department. The training program ran for 12 days, from October 21 until November 1. The opening ceremony was held at Conference Room 2 of the Second Administration Building, and representatives from both schools attended the auspicious event. Senior Vice President of Kyushu University Kazuo Ogata led a delegation of six staff members who were warmly received by NTU Executive Vice President Chiapei Chou, Deputy Vice President for Student Affairs Shih-Pe Wang, Senior Executive Officer Li-Ju Chen, Senior Executive Officer Meng-Tze Shu, and 22 staff members.

NTU and Kyushu University have enjoyed close academic and administrative exchange relations in recent years, and Kyushu University regards NTU as a benchmark university in school development. The two institutions became partner universities in 2001 and currently have five active cooperation agreements, including one university-level agreement, one university-wide student exchange program, one student exchange program with the College of Social Science, and a dual degree program and student exchange program with the College of Law.

Kyushu University has set up 11 international affairs offices abroad, and its Taipei office is located at NTU's

College of Law. Kyushu University is determined to enter the ranks of the world's top 100 universities and enjoys the full support of "Top Global University," a project launched by Japan's Ministry of Education, Culture, Sports, Science and Technology. To achieve this goal, the school has stressed the importance of staff training in international affairs.

The international staff training program testified to the strong ties between Kyushu University and NTU, two prestigious universities from Japan and Taiwan. In her opening remarks, NTU Executive Vice President Chiapei Chou expressed her hopes that staff members would learn from each other and exchange knowledge on administrative work to strengthen collaboration between the two universities and to enhance their performance.

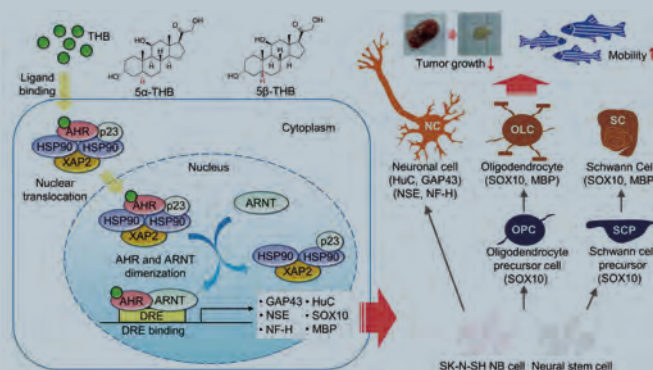
The program included lectures and department visits. Staff members from Kyushu University visited the Office of International Affairs, Office of Student Affairs, Office of Academic Affairs, Office of Research and Development, Secretariat, and Personnel Department. During the lectures, the trainees discussed the commonalities and differences between the two schools and gained insight on university administrative work.

The program ended on November 1 and a closing ceremony was held at Conference Room 1 of the Administration Building. At the ceremony, Executive Vice President Chou expressed her affirmation and encouragement to all of the participating trainees and staff. In particular, she expressed hopes that NTU staff would visit Kyushu University to promote further collaboration in the near future. The trainees also shared their feedback and expressed admiration for the efficient and professional administration at NTU. The program offered profound insights and experiences to the participants and will lead to improvements of the administrative systems of both universities.

# NTU and Academia Sinica Cast New Light on Neuroblastoma Treatment

Neuroblastoma (NB) is the most common extracranial solid tumor in infants. Around 30 diagnosed cases occur in Taiwan annually. After 15 years of endeavor, NTU and Academia Sinica discovered a new and safe way to treat the disease. The research finding was published in *Cancer Research* and *ACS Chemical Neuroscience*, and an international patent has been filed. In general, 85% of the NB cases occur before the age of four. NB usually arises from the adrenal gland, leading to unfavorable prognoses, thus over half of the patients already suffer multiple tumors or metastasis when diagnosed with the disease. This makes NB a highly aggressive cancer with a low survival rate.

The cause of NB is unknown yet it is generally believed to be caused by the mutation of neural crest cells. To reveal the mechanism behind the disease, Prof. Hsin-Yu Lee of NTU's Department of Life Science, Chief Wen-Ming Hsu of NTU Hospital's Pediatric Surgery Division, and Associate Research Fellow Yung-Feng Liao and Dr. Pei-Yi Wu of Academia Sinica's Institute of Cellular and Organismic Biology, formed the Translational Medicine Research Team. After 15 years of work, the team discovered that aryl hydrocarbon receptors (AHRs) can improve the survival of patients, and further demonstrated AHR's critical role in regulating the development of the neural system.



Using a screening method developed by Lee, the team discovered that the neuroactive steroid tetrahydrocortico-sterone (THB) can significantly suppress the growth of malignant cells and prevent metastasis. It was the first time THB was proven to be an endogenous ligand for AHRs. From studying animal models, the team found that AHR overexpression and THB promoted NB cell differentiation, and that AHR expression was inversely correlated to MYCN, an oncogenic driver in NB.

This study not only cast new light on the progression of NB but also opened a door to new ways of treating patients with NB. The treatment is still going through preclinical testing, and it is expected to enter the clinical trial phase after pharmacokinetics testing.

## Full Papers:

1. "Activation of Aryl Hydrocarbon Receptor by Kynurenine Impairs Progression and Metastasis of Neuroblastoma." *Cancer Res.* Aug 20, 2019. DOI:10.1002/adfm.201807616 (2019).
2. "Novel Endogenous Ligands of Aryl Hydrocarbon Receptor Mediate Neural Development and Differentiation of Neuroblastoma." *ACS Chem Neurosci.* Aug 12, 2019. DOI: 10.1021/acscchemneuro.9b00273.

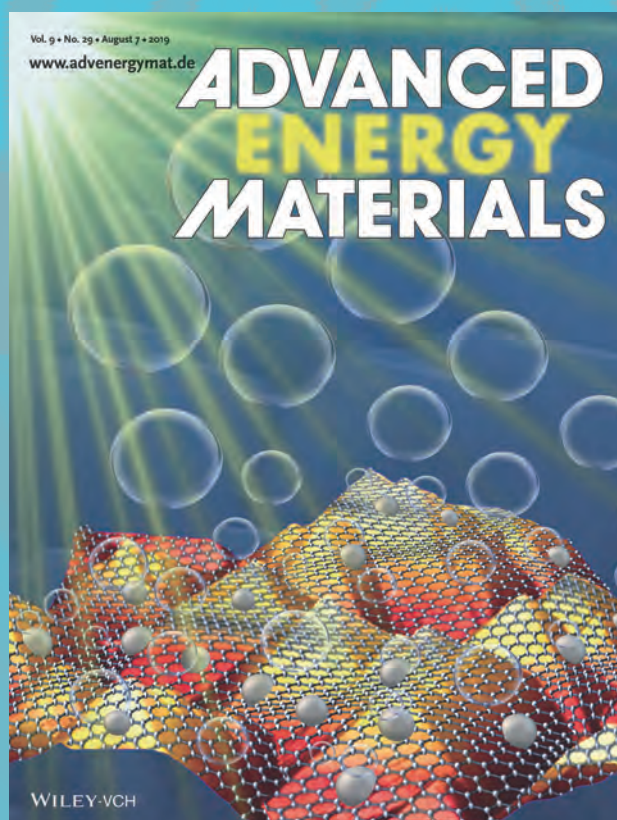


# NTU Makes Significant Breakthroughs in Solar Hydrogen Production

Prof. Chun-Wei Chen and his team from NTU's Department of Materials Science and Engineering and the Center of Atomic Initiative for New Materials (AI-MAT) made significant breakthroughs in their study of hydrogen production from solar energy. In recent years, scientific studies on renewable energy have made significant advances. Solar energy is regarded as an important source of renewable energy and is now more commonly seen in our daily lives. However, one of the greatest bottlenecks in solar energy application is the problem of storage. If solar energy cannot be stored, it can only be accessed when there is sunlight. Scientists have striven to discover how to effectively convert solar energy into fuel for storage and transportation to overcome solar intermittency. As a result, using solar power for water splitting and solar-to-fuel conversion is one of the most important research focuses nowadays.

Silicon is the most widely used material for converting sunlight into sustainable hydrogen energy due to its crystalline structure, exceptional ability to absorb sunlight, and ready availability in the market. However, silicon's instability in electrolytic solutions and high reflectivity poses a major problem. Chen's research team utilized graphene, an atomic layer material, and a silicon Schottky junction photocathode to enhance photo-electrochemical efficiency. Graphene is only one atom thick, making it the thinnest material on earth. Since its discovery in 2004, it has become one of the most promising materials and also led to the study of two-dimensional atomic layer materials. The 2010 Nobel Prize in Physics was awarded to Andre Geim and Kostya Novoselov for this groundbreaking discovery.

Chen's creation of a three-dimensional textured graphene/p-Si Schottky junction photocathode for hydrogen generation can enhance light harvesting efficiency by 20% and exhibits promising photo-electrochemical performance for hydrogen generation. In addition, graphene is stable in acid and base solutions, significantly improving the operational stability of using silicon for water splitting.



This study is chosen as the back cover of *Advanced Energy Materials*.

This innovative architecture for hydrogen production will be instrumental in future solar energy generation, and the study was selected as the back cover of *Advanced Energy Materials*.

This study was supported by the Taiwan Consortium of Emergent Crystalline Materials Project (Ministry of Science and Technology) and NTU's Center of Atomic Initiative for New Materials (Ministry of Education's Higher Education Sprout Project).

## Reference:

"Water Splitting: Creation of 3D Textured Graphene/Si Schottky Junction Photocathode for Enhanced Photo-Electrochemical Efficiency and Stability," *Advanced Energy Materials*, 1901022, August 7, 2019. DOI: 10.1002/aenm.201970115.



# 動物穿越 減速慢行

## Creating an Animal-Friendly Campus: “Slow Down, Animal Crossing”

At the end of the Royal Palm Boulevard, just in front of the Main Library, a conspicuous sign reads “Slow down, animal crossing.” Take a closer look and you will notice the image of a huge bird crossing the street and a car yielding to the bird — a common scene on NTU campus. According to NTU Student Association (NTUSA)’s Department of Sustainability, there are five commonly seen birds on campus: the Malayan night heron (*Gorsachius melanolophus*), the black drongo (*Dicrurus macrocercus*), the crested myna (*Cridotheres cristatellus formosanus*), the brown shrike (*Lanius*

*cristatus*), and the white-bellied green pigeon (*Treron sieboldii*). The Malayan night heron is easily spotted due to its large size. But, if you visit the campus during the day, you might have the opportunity to catch a glimpse of the other beautiful birds.

The dorky-looking bird on the animal sign depicts the Malayan night heron, a 40-cm large bird familiar to everyone on campus. The Malayan night heron does not move swiftly and would stand motionless for hours if it notices someone snooping around, an interesting behavior which earned it the nickname “Dummy Bird.” Though Malayan night herons are nocturnal animals, they can be observed near student dorms and in campus gardens during the day. They become fierce predators when hunting and feeding, a drastic contrast to their complacent dorky image. Consequently, students enjoy uploading videos and photos of the bird “feasting” and even created a Facebook fan page for the animal titled “Dummy Bird at NTU.”

In 2016, NTU Conserve noticed several Malayan night heron road kills on campus and proposed the idea of putting up signs to prevent the bird from being struck by vehicles during feeding. To help the sign blend in with the campus, the students spent 6 months on its design to ensure it is noticeable yet not obstructive. This “Slow down, animal crossing” sign can now be seen not only on the Royal Palm Boulevard but also in five other locations on campus.

Now birds, squirrels, and many other animals no longer have to worry about becoming roadkill and can thrive on campus. Campus safety and environmental quality are relevant not only to humans but also to the other living creatures on campus. As NTUSA’s Department of Sustainability advocates the safety and well-being of animals on campus and cooperates with NTU Conserve and other groups that value animal welfare, botanical life, and environment protection, NTU is becoming an ever more animal-friendly campus.





# A Talk with AI Expert Harry Shum

Dr. Harry Shum, Executive Vice President of Microsoft's Artificial Intelligence and Research Group, was invited by NTU's Executive Vice President Ming-Syan Chen to share his insights about Microsoft's business strategy and AI development, as well as his views on Taiwan's strengths and potentials on October 31. Shum graduated from Carnegie Mellon University and joined Microsoft Research in 1996. He is currently the highest-ranking Chinese employee at Microsoft and oversees Microsoft's overall AI strategy and frontier research. Shum is known for his contributions in computer visuals and graphics, and he was named ACM Fellow, IEEE Fellow, Foreign Associate of the US National Academy of Engineering, and International Fellow of the Royal Academy of Engineering in the UK.

Chen initiated the talk by quoting from Mary Meeker's report that ABC (AI, Big data, Cloud) would become the three major economic drivers of the 21st century. Chen congratulated Microsoft for outperforming its competitors and landing a US\$10 billion cloud-computing contract with the Pentagon. Shum replied that Microsoft has successfully transformed from a software company into an AI and cloud service provider. In terms of computer visuals, Microsoft not only launched HoloLens and Resnet but also ensured that its products are intuitive tools for all customers to use. He mentioned that a good product should be innovative

and applicable at the same time. As cloud development matures, massive amounts of data will migrate to the clouds and the future of technology will gradually shift to the Internet of Things (IoT) and edge computing.

Shum also mentioned Xiaoice's ability to make conversations and host shows to highlight Microsoft's work on conversational AI. Though AI can achieve human-level performance in conversation, speech, and visuals, people still need time to embrace these new innovations. It therefore remains important to promote explainable AI so people can regard it as an aid and not a threat. Shum believes that quantum computing will help unleash future AI potential. He also reiterated Microsoft's commitment to green computing, such as improving its data centers' power usage effectiveness (PUE) and using renewable energy.

Shum concluded his talk by offering students some advice. Taiwan's advantage in AI development lies in its talents, robust hardware industry, and its promotion of government open data. Shum believes that a "good student" should have good math skills, good programming skills, and a good attitude. Deep learning offers a massive number of pre-trained models, closing the gap between different fields of studies and AI — consequently, students should seize the chance to develop their expertise and careers. Finally, Vice President of Microsoft's AI Research and Development Center Yu-Ting Kuo gave a summary of Microsoft's research in Taiwan and expressed the company's desire to enhance its collaboration with NTU.



Prof. Ming-Syan Chen (left) and speaker Dr. Harry Shum (right).

# Reforms and Innovations in NTU's Academic Affairs

Taiwan's higher education system is facing increasing pressure from within and without the nation. Challenges such as the low birth rate and increasing global competition highlight the necessity for Taiwan's higher education system to increase the enrollment rate and retain talents.

The higher education system is beset by social and international changes to which it must respond and adapt. The NTU Academic Affairs is offering new courses and enhancing the quality of education to ensure students are equipped with the necessary skillsets to thrive in the future.

## Enhance Visibility and Recruitment

In the face of an increasingly competitive higher education market, NTU President Chung-Ming Kuan and faculty members hosted three admission seminars in Taiwan to introduce the excellent education and the abundant resources that NTU has to offer. NTU also established more scholarships, including the Fu Bell Scholarship, Technical Focus Doctoral Scholarship, Outstanding Doctoral Scholarship, and Direct Pursuit of PhD Degree Scholarship, to encourage students to pursue doctoral studies at NTU.

## Reform Education with Borderless Learning

NTU is a research university that also emphasizes excellence in teaching. Students are encouraged to conduct inquiry-based learning to identify problems and develop solutions. Besides joining theory and practice in class, instructors combine digital and physical resources through blended teaching. This year, NTU launched NTU COOL (NTU COurse OnLine) for teachers and students to leverage online learning activities and resources.

## Interdisciplinary Teaching and Flexible Learning

In this fast-changing world, schools must equip students with the interdisciplinary knowledge and skills required to excel in the future. NTU will assist its colleges to offer second field programs to help students prepare for their future careers. Colleges are encouraged to provide modular courses so that students with specific learning targets can customize their curricula to boost interdisciplinary core competencies.



NTU provides students with a safe and happy learning environment.

## General Education and Language Courses

Besides developing a high level of Chinese and English proficiency, students are encouraged to study a second foreign language to enhance their competitiveness and communication skills. NTU provides a range of language and writing courses to cultivate the students' foreign language skills. Basic programming language courses are also available to help students develop their computing skills.

## Internationalization through English-Taught Courses

NTU will systematically increase the number of English-taught courses to promote educational internationalization. The Departments of Civil Engineering, Mechanical Engineering, and Economics have introduced English-taught courses that benefit both international and local students. In addition, the Center for General Education also provides a wide array of general education courses taught in English, and the courses are digitalized to make them accessible to more learners. The establishment of the International College will also attract more talented international students and further internationalize the campus.

## Grants to Close Opportunity Gaps

NTU is expected to double the acceptance rate for disadvantaged students and provide the Hope Scholarship for students from middle- and lower-income families within the next two years. The Center for Teaching and Learning Development and the Office of Student Affairs also provide counseling and other resources to help disadvantaged students pursue and achieve success in education.

These series of academic reforms demonstrate NTU's determination to help its students thrive in college and beyond.

# Joint Eco-Friendly Agriculture Exhibition Presents Examples of Human-Nature Coexistence

With increasing environmental awareness, ecological restoration is one of the latest global trends that require dedication and hard work. To promote sustainable agriculture and international exchanges, the “Flying Birds over the Field: Eco-Friendly Agriculture Exhibition” co-curated by the NTU Agricultural Exhibition Hall and the city of Toyooka in Japan, was unveiled at the Agricultural Exhibition Hall on October 1. Mayor Muneharu Nakagai of Toyooka and Mr. Makoto Takahashi, the curator of the Toyooka Municipal Museum of the Oriental White Stork, traveled all the way from Japan to participate in the grand event. Mayor Nakagai also presented the Agricultural Exhibition Hall with a set of life-sized models of an Oriental white stork family to mark the special occasion.

In his opening remarks, Dean Huu-Sheng Lur of NTU’s College of Bioresources and Agriculture pointed out that modern agriculture and diet often cause pollution and damage to the environment. Therefore, this exhibition was organized to reconnect people with agriculture so that they can begin to realize how their seemingly simple food choices have great impact on our environment and future. Prof. Li-Pei Peng, the head of the Agricultural Exhibition Hall and Chairman of the NTU Department of Bio-industry Communication and Development, shared a local example of eco-friendly farming. A few years ago, the eagle population vanished from Donggang, Pingtung. An ecological investigation revealed that local farmers used highly toxic pesticides to kill turtle doves and sparrows during the harvest season, causing the eagles to die of indirect poisoning. After adopting an eco-friendly approach inspired by Toyooka, the eagle population was restored.

Similar examples of Oriental white storks in Toyooka and greater painted-snipes in Yilan were also displayed at the exhibition. Oriental white storks almost became extinct at some point due to the

increasing demand for produce. Mayor Nakagai eventually managed to restore the environment by changing farmers’ methods and producing “stork-friendly rice.” Success stories of eco-friendly agriculture, like this one, demonstrate that human beings can coexist with nature in peace.

With the help of high-tech and interactive devices as well as interactive installations, the visitors can enjoy a sensory experience that replicates the habitats of these birds at the exhibition. An international forum on the positive influence of eco-friendly agriculture was also held on the same afternoon. It is NTU’s sincerest hope that the exhibition will encourage people to make environmentally-friendly food choices to create a better world for future generations.



Specimens of greater painted-snipes.



Life-sized models of an Oriental white stork family.

# Teacher Education Students Discover Why Education in Finland Is Second to None in the World

Subsidized by the Ministry of Education, 12 students from NTU's Center for Teacher Education visited the University of Helsinki as well as middle schools and vocational colleges in its vicinity in August 2019. This precious experience allowed the students to discover why education in Finland is second to none in the world.

## **Bilateral Cultural Exchange Enhanced by Team Work**

Headed by Prof. Hsiou-Huai Wang, the delegation worked together on everything during the trip, including sharing research references on the education system in Finland, making travel arrangements, and preparing souvenirs from Taiwan for the hosts. The program covered educational theory and practice, from the essence of phenomenon-based learning to visiting nonprofit educational organization HundrED and nearby schools. At the end of each day, Prof. Wang led discussions that stimulated the students to reflect on what they had experienced and learned, while cross-referencing the existing systems in Taiwan.

## **Face-to-Face Discussions for Breaking the Myths of Finnish Education**

On the first day of the program, Dr. Heidi Krzywacki and Dr. Jari Salminen gave the students an overview of the educational system of Finland and its core values, analyzed the reasons for its outstanding performance from a historical perspective, and reflected on its current status. During the discussions, the myths revolving Finnish education were clarified one by one. The delegation was surprised to witness the degree of concentration the students had in a liberal classroom setting. The members were also able to observe how the teachers motivated the students and managed their classes, which no doubt provided substantial food for thought.

## **Bringing the World to NTU**

On the last day of the program, all of the student shared their learning experiences and suggestions for future cooperation with the collaborators at the University of Helsinki. Everyone hoped that this rich, informative program could lead to more structured cooperation in the future. Besides gaining firsthand observations about the Finnish education system, the delegation also built a model of positive exchanges with the host university through classroom discussions. "Coming here gives us the opportunity to bring the world to NTU," said Prof. Wang. "This time we were guests in Finland. In the future, we will invite them to Taiwan to learn more about our educational system." This program hopefully will be one of the many fruitful exchanges to be developed between NTU and the University of Helsinki. This experience has given the Center for Teacher Education a glimpse of the positive potential, and everyone is looking forward to making all of the wonderful possibilities a reality.



NTU delegation and student guides from Lagstad Skola.



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