

# NTU HIGHLIGHTS



Special Report

## Cutting-Edge SerDes Tech

## Shakespeare at the Mahjong Game

- NTU Hosts Asian Engineering Deans' Summit
- Devotion to Japanese Studies
- NTUH Contributes to Cardio Health

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National Taiwan University Map

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# Words from Our Executive Vice President, Dr. Ming-Syan Chen

To me, the executive vice president's role is that of a "facilitator." I hope to provide NTU's faculty members with a sound environment and system, which would enable them to realize their full potential as researchers and teachers. Firstly, when it comes to the cultivation of talent, besides professional expertise, we also want our students to be citizens of the world with solid training in the liberal arts. They should be equipped with the ability to explore issues and solve problems. They also need to be able to meet challenges, get to the bottom of things, empathize with others, and be righteous and humble. And needless to say, we need the best teachers and a nurturing environment if we are to pursue excellence in education. It is imperative that all teachers do their very best. I think this is very important and most challenging.

We can optimize research findings through innovation and realizing the practical value of research. In order to achieve this goal, I think it is crucial to set up an up-to-date and win-win system. Consequently, in addition to the Office of Research and Development's Center of Industrial-Academic Cooperation, the Industry Liaison Office was established last year, with the aim of promoting industrial and academic cooperation at different levels. In the past year, the Office of Research and Development has provided teachers with various research incentives, including research funds for new faculty members and subsidies for team projects. Incentives, including scholarships, have also been offered to PhD students, and we have seen a subsequent rise in the number of PhD students. Furthermore, the University aims to provide more support and allow for more flexibility in industrial-academic cooperation in order to optimize the contributions of academic research and create a positive cycle.

In order to encourage innovation and entrepreneurship among students, the University has increased the depth and scope of many relevant courses and programs. I would, however, like to emphasize here that NTU does not wish to singularly glorify entrepreneurship, because

there are all types of students and teachers, and not everyone is suited to become an entrepreneur. There are a multitude of disciplines and professions reflecting different values. The entrepreneurial spirit is just one of the many types of manifestations specific to particular disciplines. It is imperative that NTU have in place a sound and comprehensive system that would allow those with the entrepreneurial drive to get the support that they need. The University will also actively work with industry to help students assess their abilities and aptitudes, and lend support to the students who aspire to become entrepreneurs.

Through the years, NTU alumni and teachers have played important roles in society, be it in teaching, research, or making practical contributions. When I worked at IBM Research, my credo was: "People are the most valuable assets," much more important than infrastructure or capital. If you have the right people, you will be able to rise to meet all kinds of challenges with confidence and agility. NTU has topnotch students and teachers. By working together, with continued support from the government and the private sector, we can strive to maintain NTU's flagship position, enhance social trust and recognition, and endeavor to become one of the best institutes of higher learning in the world.



# President Chung-Ming Kuan Visits Outstanding NTU Alumni in Silicon Valley

NTU President Chung-Ming Kuan, Executive Vice President Chiapei Chou, and NTU Alumni Center Director Ning Liu paid a special visit to Silicon Valley in the United States on July 17. The purpose of the visit was to extend NTU's gratitude to two outstanding NTU alumni, Stanley Wang and Fermi Wang. Specially designed appreciation plaques were presented to the two alumni in recognition of their contributions and service to their alma mater.

Stanley Wang graduated from NTU's Department of Business Administration in 1965. He founded his business in the US 40 years ago. Pantronix, the company he established, is a globally renowned corporation specialized in advanced semiconductor and photonic device packaging and testing. He has been a long-term supporter of academic research at NTU and has arranged scholarships for university students. Stanley Wang said that apart from dedicating himself to his company, he also considers it his corporate responsibility to contribute to education in the US as well as Taiwan. He was deeply touched by President Kuan's visit and said that he would be happy to continue to support NTU.

Fermi Wang graduated from NTU's Department of

Electrical Engineering in 1985. After receiving his PhD from Columbia University in 1991, Wang founded his company, Ambarella, in 2004. In 2016, he was recognized as an outstanding alumnus in the industry/commerce category by NTU. While in the US, President Kuan's delegation visited Ambarella, as well. During the visit, they met with five alumni from NTU who worked at Ambarella and impressed visitors with the synergy they create together. During his presentation, Fermi Wang introduced Ambarella, a fabless semiconductor design company that focuses on low-power, high-definition, and Ultra HD video compression, image processing, and computer vision processors. Ambarella's products are used in a wide variety of human and computer vision applications, including video security, autonomous driving, and robotics.

In addition to expressing NTU's gratitude to its alumni, President Kuan also presented NTU's vision, NTU's strategies to become more internationally connected, as well as plans to attract more international students to NTU. Executive Vice President Chou also encouraged NTU alumni to work closely with the University, and expressed the hope that they would support NTU students by giving them the opportunity to study abroad as exchange students. Fermi Wang said that he would be very happy to provide NTU students with internship opportunities at his companies in the US and Taiwan. He also offered to arrange scholarships for NTU students.

The NTU delegation's visit to Silicon Valley gave the delegation members a chance to witness the success of NTU alumni in the US, and they were most impressed by how attached the outstanding alumni remained to Taiwan and NTU!



# Asian Engineering Deans' Summit Hosted by NTU for First Time

The 2019 Asian Engineering Deans' Summit (AEDS) was hosted at the International Conference Hall of the Institute of Applied Mechanics at NTU during May 29-31. This was the first time the summit was hosted in Taiwan. The event was coordinated by the Ministry of Science and Technology (MOST)'s Center for Global Affairs and Science Engagement (GASE) and the five engineering-related colleges of the three member universities of NTU System, namely, the College of Electrical Engineering and Computer Science (EECS) at NTU; the Colleges of Engineering, Electric Engineering and Computer Science, and Applied Sciences at the National Taiwan University of Science and Technology (NTUST); and the College of Technology and Engineering at National Taiwan Normal University (NTNU).

AEDS is a jointly convened conference supported by the Global Engineering Deans Council (GEDC) and engineering educators at leading universities in Asia in hopes of improving engineering education and research in the region. The vision of AEDS is to provide a platform for researchers and professionals from government and academia to exchange ideas on the latest engineering education and research trends. Every year, AEDS attracts professors from leading universities to discuss the enhancement of engineering education.

The 2019 summit was presided over by NTU Executive Vice President Chiapei Chou, convened by NTU Dean of Engineering Wen-Chang Chen, and co-convened by NTU Dean of EECS Yao-Wen Chang, NTUST Dean of Engineering Jhy-Chern Liu, Dean of EECS Chang-Fa Yang, Dean of Applied Sciences Poki Chen, and NTNU Dean of Technology and Engineering Chin-Pao Cheng. The executive coordinator and vice executive coordinator of the event were NTU Associate Deans of Engineering C. Robert Kao and Chung-Che Chou, respectively.

NTU President Chung-Ming Kuan, NTNU President Cheng-Chih Wu, NTUST President Ching-Jong Liao



graced the opening ceremony and delivered welcoming remarks. NTU Executive Vice President Ming-Syan Chen and Vice President for Research and Development Pai-Chi Li were also among the guests.

The theme for this year's event was, "Global Education and Innovative Technology," and the goal was to examine Asia-Pacific's engineering research and education, explore how the region has been impacted by global engineering education, and discuss how innovative technology can help tackle present challenges. Former Dean of Engineering at the University of Hong Kong Norman C. Tien presented a keynote speech titled, "Challenges and Opportunities for Global Engineering Education," and Chairman of Taiwan's Industrial Technology Research Institute (ITRI) Chih-Kung Lee spoke on the topic, "Digital Economy: Exploring AI, IoT, Blockchain Technology in Various Engineering Applications."

The summit focused on the discussions and debates surrounding six topics: global education programs and student mobility; AI-based educational technology; green technology and sustainable environment; innovative technology and entrepreneurship; international research center with industrial collaboration; and recruitment of international students and/or female students.

The summit was a huge success thanks to the concerted efforts of all participating faculty members and the full support of GASE Director Hsiao-Wei Yuan. The event attracted over 130 participants from 13 nations, and more than 50 of the attendees were engineering and EECS scholars with a deanship or a senior position at prestigious colleges abroad. At the closing ceremony on May 31, the event's main convener, NTU Dean of Engineering Wen-Chang Chen, summarized the main topics and announced that University of Hong Kong would be the organizer of 2020 AEDS.

# 新世代網通晶片 制霸高頻寬商機

科技部價創計畫成果發表記者會



Group photo at the press conference (from left: Pai-Chi Li, Liang-Gee Chen, Patrick Yue, and Jri Lee).

## NTU's SerDes Technology Backed by Silicon Venture Capital

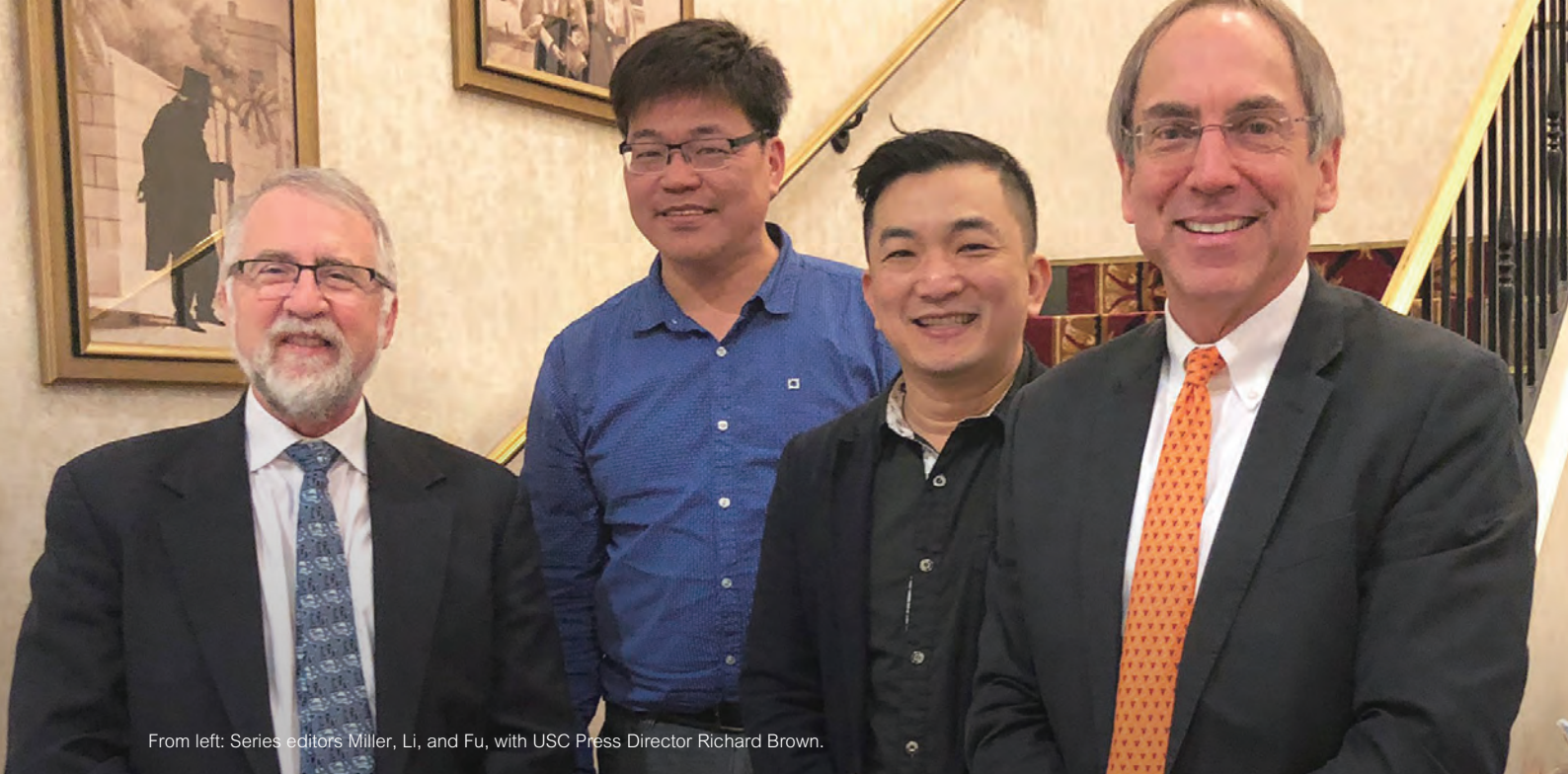
An academic research team at NTU received venture funding from Silicon Valley! Led by Prof. Jri Lee of NTU's Department of Electrical Engineering, a startup team devoted to the development of Ultra-High-Speed SerDes ICs, has successfully developed cutting-edge SerDes circuit design and systematic architecture technology. This new technology enables the production of communication chips at less power consumption, lower cost, and a significantly higher information conversion rate. With the grant received from the TRUST-U Project, the team founded a company named Midasmicro. The company is now an investee of PYJ-Dynasty Venture and is valued at approximately NT\$450 million.

On June 19, the Ministry of Science and Technology (MOST) held a press conference inviting Lee and his team to share their research and achievements. Among the guests were Minister of MOST, Liang-Gee Chen; PYJ-Dynasty Venture Chairman, Patrick Yue; NTU Vice President for Research and Development, Pai-Chi Li; TRUST-U's Principal Investigator, Ping-Hei Chen; and Executive Manager of NTU Industry Liaison Office, David Peng.

There is a growing demand for high-speed network and communication bandwidth requirements in corporate data centers. This indicates an urgent need for backbone network and fiber-optic link technology upgrade as well as more integrated chips and communication serial ports with higher efficiency. Taiwanese developers have been focusing on enhancing the speed of SerDes wired communication chips, yet their insufficient conversion rate impedes chips from processing all the information fiber optics carry. Manufacturers are often forced to resort to advanced processes (7nm or smaller) in order to enhance circuit performance, which results in higher cost, poorer noise-reduction performance, and limited application.

Thanks to Lee and his team's 20-year research experience in high-end SerDes and the support of TRUST-U and NTU, a new circuit and system architecture with a faster transmission rate and a lower cost was made possible. This design not only helps overcome SerDes' bottleneck but can also be customized. Currently, the team has finished the development of 28Gb/s NRZ and 56Gb/s PAM4 and is now striving to develop 112Gb/s and 224Gb/s chips and their system.

Midasmicro's technology is highly praised by leading companies at home and abroad and has received its first round of funding from PYJ-Dynasty Venture. It is our hope that the world can see NTU's leading technology and more overseas investors will be attracted to breathe new life into Taiwan's startup sector.



From left: Series editors Miller, Li, and Fu, with USC Press Director Richard Brown.

## NTU and USC Advance International Humanities Publications with New Joint Book Series

National Taiwan University Press (NTU Press) and the University of South Carolina Press (USC Press) are pleased to announce the establishment of a new interdisciplinary and collaborative book series: East-West Encounters in Literature and Cultural Studies. This innovative English-language series will focus on scholarly works on intercultural encounters in a range of disciplines, such as language, literature, drama, and cultural studies, and across different periods, including precolonial, colonial, modern, and contemporary East-West contacts. This book series will provide an international forum for cutting-edge humanities research.

The series editors are Dr. Paul Allen Miller, USC Vice Provost, Director of International Affairs, and Distinguished Professor of Classics and Comparative Literature; Dr. Bennett Fu, NTU Professor of Foreign

Languages and Literatures; and Dr. Chi-She Li, NTU Associate Professor of Foreign Languages and Literatures.

“This new series is not only a historic breakthrough for our two great university presses, but it also offers a new venue for innovative scholarship on East-West encounters,” said Dr. Miller. “We seek not just to trace the reality of those interactions but to foster new dialogues, open new horizons, and bring forth a truly global perspective at this critical juncture in world history.”

“After more than two years of negotiation, the co-publication is a significant milestone of bridging East Asian and Anglophone scholarly productions and contributions,” said Dr. Fu. “With this project we also seek a global readership across continents,” added Dr. Li.

The first volume in the series, *Digitalizing the Global Text: Philosophy, Literature, and Culture*, edited by Dr. Miller, will be published jointly by NTU Press and USC Press in December 2019 in both print and digital editions. Future volumes will include essay collections that address, among other topics, cosmopolitanism and global queer sexualities, as well as monographs by single authors.

A call for manuscripts is being issued in the United States, Europe, and Asia. Interested scholars should contact either NTU Press or USC Press about submitting book proposals and manuscripts.

# NTU Dean of Engineering Wen-Chang Chen Wins SPSJ International Award

Dr. Wen-Chang Chen, Dean of the NTU College of Engineering, received the International Award from the Society of Polymer Science, Japan (SPSJ) at the annual meeting held in Osaka, Japan during May 29-31, 2019. The SPSJ was founded in 1951 and has over 10,000 members. The International Award was established in 1994 to honor international scholars who have made significant contributions to polymer science. The award is the greatest honor that SPSJ confers to international scientists and is presented annually to three scholars at most. The SPSJ awarded the honor to Dr. Chen for his “contributions to the development of the organic polymers and nanostructured materials for electronic and optoelectronic applications.” Dr. Chen delivered a keynote speech featuring his awarded research on May 29, followed by the award ceremony on May 30.

Dr. Chen has long committed himself to the design, synthesis, property control, and device application of functional polymers, block copolymers, and polymer nanocomposites for electrons and photoelectrons. To date, he has published a total of 365 journal articles, obtained 55 invention patents, and achieved a high productivity and citation impact (h-index = 60). Of his published papers, 17 were selected as the front or back cover story in prestigious journals, including *Advanced Materials*, *Advanced Engineering Materials*, *Advanced Functional Materials*, *Small*, and *Journal of Materials Chemistry A*. His research achievements have been internationally acclaimed, winning him numerous honors and awards, including Franco-Taiwanese Scientific Grand Prize (2018), Ministry of Education’s Academic Award (2016), Y. Z. Hsu Scientific Chair Professor (2015), Fellow of the Royal Society of Chemistry (2014), Hou Chin-Tui Award (materials science) (2013), TECO Award (2013), and three National Science Council Outstanding Research Awards (2004, 2009, 2012). Dr. Chen has also been invited to serve as plenary speaker or keynote speaker 62 times. Besides conducting advanced academic research, Dr. Chen has also transferred 17 technologies he developed to the chemicals and materials industry for further development in high value-added materials technology.



Dean of Engineering Wen-Chang Chen receives the SPSJ International Award.



Award-winning team.

# NTUEE Team Wins Second Place at 2019 ISPD Initial Detailed Routing Contest

The ACM International Symposium on Physical Design (ISPD) Contest, held by the world-renowned Association for Computing Machinery (ACM), is the leading electronic design automation (EDA) contest in the world. This year, the NTU team led by Prof. Yao-Wen Chang of the Department of Electrical Engineering (NTUEE) and the Graduate Institute of Electronics Engineering (GIEE), including NTUEE and GIEE students Chia-Ming Chang, Chen-Chia Chang, Wei-Kai Liu, and Chen-Hao Hsu, won second place for developing an initial detailed routing solution, the NTUIdRoute. The final results were announced during the International Symposium on Physical Design (ISPD) held in San Francisco in the United States.

The NTU team led by Prof. Chang has participated in 13 of the past 15 ACM ISPD Contests and achieved an outstanding winning record (1st, 2nd, and 3rd place, three times each, and 4th place, twice). This team has the best record in the ACM ISPD Contest series worldwide, followed by the University of Texas at Austin, the University of Michigan at Ann Arbor, and the Chinese University of Hong Kong. This winning record testifies to NTU's leading role in the EDA field,

and adds tremendous academic prestige and international visibility to the University.

The ACM ISPD Contest is sponsored and organized by an industry-leading company each year. Cadence sponsored this year's contest; previous organizers have included IBM, Intel, and Mentor Graphics. Generally, the hosting company for the year announces a topic in December, and the participating teams submit their R&D results and systems the following March, for the company to test. Finally, the year's winners are announced at the annual ACM ISPD symposium in April. The topics chosen each year reflect the most crucial issues regarding the physical design process for integrated circuits.

The problem for this year was initial detailed routing, a critical problem for advanced-node enablement. Participants had to achieve successful routing results on 10 test circuits provided by Cadence, and deliver solutions that could handle more challenging rules, bigger benchmarks, and harder runtime and memory constraints. These problems are similar to the real challenges faced by industry.

The contest attracts outstanding research teams from around the world to develop solutions to the most challenging physical design problems currently facing industry and academia. According to *EE Times*, "The best engineering minds on the planet compete each year in the ACM's ISPD design contest." This year, a total of 33 teams from top universities in Asia, North America, South America, Europe, and Africa participated and competed in the contest, making its rate of participation one of the highest since the first ISPD Contest was held in 2005.



Satellite Event at Freie Universität Berlin (photo provided by FUB).

## NTU Promotes Higher Education Cooperation at Going Global Conference 2019

To promote international higher education cooperation, Deputy Vice President for International Affairs Bi-Fong Lin represented NTU at the Going Global Conference 2019 in Berlin, Germany from May 13-15. This conference, organized by the British Council, is one of the most significant higher education conferences in the world. This year, around 950 higher education leaders from 85 participating countries, including Germany's Federal Minister of Education and Research Anja Karliczek and representatives from the British Council, attended the conference.

Lin, together with delegates from the United Kingdom, Thailand, Malaysia, Vietnam, and the Philippines, delivered a presentation on the topic, "University Links for Industry Engagement: New and Flexible Partnership Models for the Fourth Industrial Revolution and Beyond." She also met with representatives from NTU's German partner universities to discuss future

cooperation on research exchanges and joint internship programs. Among the representatives were Prof. Günter M. Ziegler, President of Freie Universität Berlin; Claudia Schmidt-Memmler, Acting Head of the International Strategy Office, Humboldt Universität zu Berlin; and Evelina Skurski, Head of the Division for International Scientific Cooperation, Office of International Affairs, Technische Universität Berlin.

To recruit outstanding German students, Lin also represented NTU at Germany's annual education exhibition, Study World. NTU and its 35 partner universities in Germany are now offering a wide range of joint programs, including student exchanges, faculty exchanges, and double degrees. These programs have allowed NTU to attract the best talent from Germany's top universities, including LMU Munich and RWTH Aachen University, to pursue advanced degrees at NTU.

In the Global Competitiveness Report 2018 issued by the World Economic Forum, Taiwan and Germany were listed among the four countries worldwide with the highest innovation capability. Bearing this finding in mind, we can expect even more active and diverse bilateral higher education cooperation between Germany and Taiwan in the future.

# NTU Hosts the First International Degree Students' Farewell Party

On June 1, 2019, NTU's Office of International Affairs organized the first International Degree Students' Farewell Party to celebrate the academic achievements of the 2019 international graduates. International graduate degree students from 18 countries, namely, the United States, the Netherlands, Japan, South Korea, Singapore, Brazil, Guatemala, Haiti, Vietnam, Malaysia, India, Indonesia, Ukraine, Iraq, Turkey, Ecuador, Swaziland, and Burkina Faso, brought family members and friends to share their joy.

The event kicked off with an opening speech delivered by NTU Executive Vice President and Vice President for International Affairs Chiapei Chou, who warmly welcomed all the guests and wished the graduates a bright future. Student representatives also seized the chance to share their reflections and the lessons they had learned during their time at NTU.

Tomo Aoi, an electrical engineering graduate from Japan, shared his difficulties when first arriving at NTU. At first, he was reluctant to seek help from others; as a result, his academic performance suffered. However, his grades quickly improved after he started to ask help from his peers and engage in class discussions.

Audrey Lau, a graduate in finance from Singapore, shared her experience as a member of the NTU tennis team, where she made many new friends and improved

her Chinese. She thanked her teachers at the College of Management for their support and expressed her gratitude for being able to rapidly find a job in Taiwan.

Omer Bahadir Celik, a graduate in mechanical engineering, said that although he had studied Chinese for a year before coming to NTU, he quickly realized that his command of Chinese was not sufficient. As a result, he prioritized improving his Chinese and, while doing so, experienced the friendliness of locals and the NTU community.

Civil engineering graduate, Yahya Namiq Abdullah, from Iraq, thanked his teachers and the NTU staff for helping him throughout his time at NTU. He has now mastered the Chinese language—something he had never imagined before.

Vu Tuan Pham from Vietnam, who received a PhD in public health, expressed his pride in being an NTU student. He is grateful for the superb quality of NTU's learning environment, faculty, and administrative staff, as well as the abundant help he received during his time at NTU. He was a member of the NTU Vietnamese Student Association and enjoyed playing football with his classmates. His only regret was not being able to perfect his Chinese.

During the past few years, NTU has made efforts to internationalize the campus. International students can benefit from generous scholarships and receive help starting from the admission process until graduation. It is hoped that these measures will help NTU create an excellent learning environment, educate international talent, and attract exceptional students from all over the world.





Admission events at Tokyo Metropolitan Kokusai High School.

## NTU Seeks to Recruit the Brightest International Students

NTU Office of International Affairs (OIA) delegates participated in the 2019 Taiwan Higher Education Fair in Japan to recruit talented Japanese students. Besides hosting admission events in Tokyo and Ibaraki, the OIA delegates also visited local high schools to share information about NTU's cutting-edge research and academic excellence.

During the trip, the OIA delegates visited 10 Japanese high schools, including Kaisei Academy, Azabu Junior and Senior High School, Hiroo Gakuen Junior and Senior High School, and Tokyo Metropolitan Kokusai High School, all of which are considered prestigious high schools. NTU's offering of free Mandarin Chinese courses, generous scholarships, as well as a variety of exchange programs, dual degree programs, and internship opportunities, drew the attention of many of the students and their parents.

When visiting Mita International School, Kazuki Ikushima, an alumnus and also the first Japanese to enroll in NTU through the "Recommendation by Overseas Senior High School Program," shared his

experience with students at Mita. Ikushima mentioned that studying in Taiwan allows students to enjoy a high-quality education and living standard without having to pay expensive tuition. In addition, there are also ample opportunities to learn Chinese and English, as well as intern in Japanese or international companies.

Andrew Tsung, Executive Director for Strategic Partnerships, and Yu-Fang Cheng, Manager for Global Recruitment, also announced that the 2019 Fall enrollment period will be shifted to an earlier date in order to prepare for the First NTU Science Innovation School for Global Young Scientists in August and the 2019 Global Education Forum in Taiwan in November.

The First NTU Science Innovation School for Global Young Scientists will be the first such large-scale camp hosted by NTU. The themes of this year's science camp will be "Quantum Science and Information" and "Life Science Technology." Student teams from 11 countries including Japan, Korea, Singapore, Malaysia, and Russia will participate in a project competition after receiving training for one week. In addition to the 300-1,000 USD prizes, NTU will also offer pre-admission and guaranteed scholarship to outstanding international students. It is hoped that the event will showcase NTU's excellence in teaching, increase its international visibility, and attract international students with potential.

# Fighting Global Warming: NTU International Study Published in *Science*

A research team formed by Associate Prof. Hao-Ming Chen of NTU's Department of Chemistry and Prof. Xile Hu of the Swiss Federal Institute of Technology in Lausanne discovered a new low-cost catalyst- a groundbreaking discovery that may help reduce the amount of greenhouse gases in the atmosphere. Leveraging the National Synchrotron Radiation Research Center's (NSRRC) Taiwan Light Source (TLS) and the Taiwan contracted beamline at Japan's synchrotron radiation facility (SPring-8), as well as the technology of Operando X-ray absorption spectroscopy, the team spent three years making real-time observations about catalytic valence and chemical environment during the electrochemical reduction of CO<sub>2</sub> to CO.

Using Operando X-ray absorption spectroscopy, the team discovered "single-atom iron with a high valence of +3," a catalyst with superior activity and the potential to substitute gold, silver, and other precious metals. The catalyst can electrochemically reduce CO<sub>2</sub> to CO with high conversion efficiency and low energy consumption, drastically reducing the cost. This finding promises not only to postpone the threat of global warming by efficiently recycling CO<sub>2</sub>, but also to create great economic value, since CO can be reconverted into fuel. The breakthrough discovery of the study was published in the June 14, 2019 issue of *Science*.

The electrochemical CO<sub>2</sub> reduction reaction is recognized as the most promising potential solution to global warming, by reducing CO<sub>2</sub> to CO and then converting it to renewable fuels. Precious metals, such as gold and silver, are often used as catalysts due to their high activity. Less expensive materials, on the other hand, require large amounts of electricity to achieve similar effect, making the process uneconomical. This study is the first to show how "single-atom dispersed iron ions in a +3 oxidation state" can reduce CO<sub>2</sub> to CO at a faradaic efficiency of 90%, even with extremely low voltage. This is by far the best conversion efficiency, outperforming the efficiency of precious metals. Chen used the beamlines of NSRRC in Taiwan and Japan in

combination with his team's Operando X-ray absorption spectroscopy to uncover the secret of this high-activity catalyst. He revealed that these single-atom iron catalysts have such high activity and conversion efficiency due to their stable, high oxidation state during the CO<sub>2</sub> reduction process.

The catalyst not only efficiently and cost-effectively recycles CO<sub>2</sub> but can also produce CO, which can be converted into fuel, plastic, and other materials. If the CO<sub>2</sub> reduction process could be powered by solar energy in the future, humanity would have achieved "artificial photosynthesis," a great stride in modern technology.

NSRRC's TLS and SPring-8 facilities have made significant contributions during the past two decades. The Operando X-ray absorption spectroscopy is also broadly applied in the field of catalysis and electrochemistry in order to understand substances' electronic and atomic structures during chemical reactions. Chen utilized this technology to demonstrate the crucial role of single-atom iron catalysts in improving the conversion efficiency of CO<sub>2</sub> reduction. The findings of this research not only offer insights to renewable energy but are also of great potential commercial value.



Prof. Hao-Ming Chen of NTU's Department of Chemistry.



At the press conference.

## NTUH Discovers Link between DEHP and Cardiovascular Health

Phthalates can increase the elasticity of materials and are often used to soften polyvinyl chloride (PVC) to make it flexible, bendable, and easy to mold; as a result, phthalates can be seen everywhere.

While conducting a longitudinal study, Prof. Ta-Chen Su of National Taiwan University Hospital (NTUH) discovered that people in Taiwan are frequently exposed to di-2-ethylhexyl phthalate (DEHP), a phthalate used in PVC. Through a prospective cohort study, Su and his team discovered that mono-2-ethylhexyl phthalate (MEHP), a metabolite of DEHP, is associated with the increase of subclinical atherosclerosis, insulin resistance, and lower testosterone levels in young people.

By controlling the concentration of DEHP, the team discovered that intima-media thickness at all segments of carotid arteries significantly increased with urinary MEHP concentration, indicating a link between DEHP exposure and coronary heart disease. The team's

findings were published in the April 2019 issue of *Environmental Pollution*.

In addition, Su's own research discovery of an association between phthalate exposure and cardiovascular risk factors was published in the May 2019 issue of *Ecotoxicol Environ Safety*. According to the cross-sectional studies, cardiovascular patients are exposed to higher concentrations of phthalates, mainly DEHP, when hospitalized. Further investigation showed that urinary concentrations of MEHP and mono-n-butyl phthalate (MnBP) were still associated with higher cardiovascular risks even after excluding hospitalized subjects.

Last year, research on the dust in eight Taipei elementary classrooms showed a high concentration of DEHP both indoors and outdoors. A household environment air quality study conducted during 2017-2018 also proved that a high level of DEHP was found in all 56 households. Another noteworthy problem is that the saline solution IV bags and pipelines in hospitals also contain DEHP. It can be concluded that DEHP is present at home, workplace, laboratories, and in our daily commodities. These studies highlight the hazard caused by phthalates and the imminent need to lower phthalate exposure to prevent atherosclerosis and cardiovascular risks.

# From Accountant to Wine Lover: A Sip of Wine That Led to Big Dreams

Serena Chan graduated from NTU in accounting in 2017. Like many of her peers, she prepared for the accounting examinations in Taiwan and America before graduating and successfully entered one of the top accounting firms in Taiwan soon after graduation. However, after six months of work, Serena decided to embark on a different journey, traveling around the world to pursue her dreams of winemaking and connoisseurship. Now, she is heading to Bordeaux, the greatest wine capital, to study vineyard and winery management at Bordeaux Sciences Agro.

During the first semester of her senior year at NTU, Serena participated in a student exchange program to Brussels, Belgium—a life-changing experience that ignited her passion for wine. “It was wine tasting when I was sober and pleasure when I was mellow,” recalls Serena. She had never had a drink before in her life, but that first sip of wine dazzled her and she began buying and tasting all the wines she could find in the supermarket. “Each bottle tastes different, and the taste also changes over time,” she likes to say.

Wine can have many different flavors, and it pairs perfectly with different kinds of food. When paired with French fries, it helps cut the grease; when paired with chocolate, it highlights the sweetness; when paired with waffles, each sip is a blend of sweetness and tartness. “Nothing is simple when it comes to wine,” said Serena.

During a Christmas holiday, Serena was hosted by a Belgian friend, and her friend’s father brought out a 2002 Bordeaux to celebrate. He slowly poured the Bordeaux into a decanter, and as oxygen blended with the 15-year-old wine, the mesmerizing aroma filled the room. “That’s the first time I’d tasted a wine that was over 10 years of age and the first time I’d seen someone decant. That day I decided that I wanted to work in the wine industry,” said Serena.

To acquire more experience, Serena started working at a wine store and a vineyard in Taichung to learn more about winemaking that summer upon her return to Taiwan. Although she was determined to pursue her dreams, she still lacked the courage to quit her job at the accounting firm. The work at the firm was tiresome, yet she took French lessons during weekends and eagerly sent job applications to wineries all over the world. After sending out over 200 applications and four months of waiting, Serena finally got the chance to quit her job and go to work at a vineyard in New Zealand. Later, she also worked at vineyards in California and Chile and published an autobiography recounting her experiences.

When asked about her time at NTU, Serena said that she feels very grateful for the education and the abundant resources NTU offers. The course “Leisure and Life Education” gave her the courage to pursue her passion even in times of uncertainty. She also took Spanish, French, and barista lessons during her studies. Her accounting background gave her an advantage over other applicants when applying for graduate schools. All the experiences she had during her years at NTU have become important assets that enriched her life.



Serena Chan (second from right) cultivates wine fermentation yeasts with her colleagues at a winery in New Zealand.

# NTU Drama and Theatre Department Celebrates 20th Anniversary with Production of *Shakespeare at the Mahjong Game*

NTU's Department of Drama and Theatre celebrated its 20th anniversary by staging a production of *Shakespeare at the Mahjong Game*, the most recent play by former Department Chair and Professor Emeritus Wei-Jan Chi. A prolific playwright, Chi is also winner of the National Award for Arts. The play was performed four times at the Taipei Metropolitan Hall from May 31 to June 2. During the performances, members of the audience were invited to join four Western master playwrights in playing mahjong while making comments on the game, life, and drama.

In *Shakespeare at the Mahjong Game*, a playwright named Hao Cheng, who was suffering from a severe case of writer's block as well as a losing streak at mahjong, accidentally summoned William Shakespeare, Anton Chekhov, Henrik Ibsen, and Samuel Beckett. The famed playwrights, accompanied by four characters from their most famous works- Hamlet, Nina (from Chekhov's *The Seagull*), Nora (from Ibsen's *A Doll's House*) and Lucky (from Beckett's *Waiting for Godot*)- discussed big questions about the meaning of life with Hao Cheng.

Po-Shen Lu, the production's director, said *Shakespeare at the Mahjong Game* aimed to help the audience reflect on the anxieties and hardships of living in modern Taiwanese society, and perhaps provide a solution to the problem of how to escape self-entrapment.

Approximately 3,000 people attended the four performances, including NTU students and faculty members as well as the general public. The audience feedback was overwhelmingly positive.

NTU's Department of Drama and Theatre was established in 1999. In 2009, the play *Mulan* was performed to celebrate the 10th anniversary of the department. In the following decade, the play was revamped four times and performed 56 times, always to critical acclaim. It has been lauded as the first original musical in Chinese to meet the standards of Broadway shows.

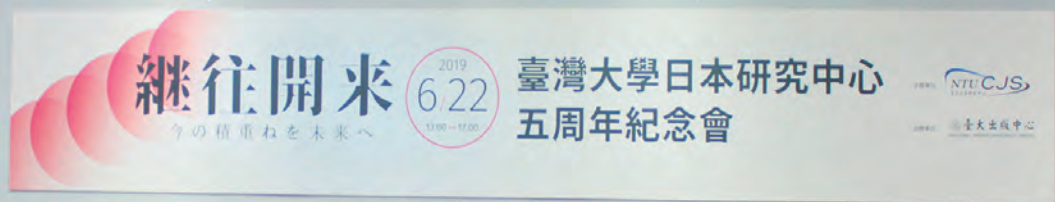
It is expected that NTU's Department of Drama and Theatre will continue this glorious tradition and stage more sterling theatrical productions and dramatic performances as it ushers in the next decade.







Four playwrights playing mahjong (from left: Ibsen, Shakespeare, Beckett, and Chekhov).



Group photo at the anniversary event.

## From Strength to Strength: NTU CJS Celebrates 5th Anniversary Milestone

On June 22, NTU's Center for Japanese Studies (CJS) celebrated its fifth anniversary at the College of Liberal Arts. The event, titled "From Strength to Strength," honored the past and heralded the future, celebrating the inauguration of the new editor in chief of the Japanese Studies Series.

Jo-Shui Chen, former Dean of the College of Liberal Arts; Fu-Chang Hsu, Associate Dean of the College of Liberal Arts; Tay-Sheng Wang, Director of NTU Press; Kazuki Matsubara, Director of Media and Culture at the Japan-Taiwan Exchange Association; and Chi-Yi Kao, Consultant of the General Chamber of Commerce, Republic of China, all attended the auspicious ceremony and delivered their remarks.

The Japanese Studies Series is Taiwan's first academic research collection written in Japanese. The purpose of the collection is to foster academic dialogue by showcasing the research of Taiwanese scholars and encourage research cooperation between Taiwan and Japan. A total of 32 volumes have been published in the series to date.

Prof. Shing-Ching Shyu, the founding Director of NTU CJS and the President of Chinese Culture University, was invited to give a keynote address. In his speech on "The Prospects of Japanese Studies in Taiwan," Shyu mentioned challenges, such as the lack and dispersion of research resources in Taiwan, as well as the necessity to cultivate young research talents with proficiency in Japanese studies. He also discussed how Taiwanese scholars can offer their own unique perspectives and distinguish themselves from Japanese, Chinese, and Korean scholars in this field.

In the afternoon, Japanese scholars from home and abroad participated in two forums, one on the challenges and prospects of Japanese studies in Taiwan and the other on how to help young researchers be proficient and active in the field.

Japanese studies in Taiwan are conducted in literature, language, history, philosophy, political science, economics, and diplomacy, yet most Taiwanese scholarship is focused on just one discipline. It is the mission of NTU CJS to encourage interdisciplinary Japanese studies in Taiwan and bring scholars with different areas of expertise together to enrich all fields of Japanese studies.

At the closing ceremony, Li-Ping Lin, Director of NTU CJS, extended her sincere gratitude for the generous support of all parties and the positive efforts of the participating faculty members. She reflected on the center's achievements and expressed her determination that the center would pass "from strength to strength" and make steady progress during the next five years.

# NTU Shows Passion for Pharmaceutical Research

NTU's School of Pharmacy held the 2019 Research Day and International Conference from May 15-18 at Shui-Sen Hall. A total of 150 people attended the event, including 10 pharmaceutical researchers from the University of Michigan, the Ohio State University, and Kyoto Pharmaceutical University.

Before the event, the delegates toured the campus and visited the School of Pharmacy, NTU Centers of Genomic and Precision Medicine, and NTU Hospital's Department of Pharmacy.

The 2019 Research Day and International Conference was a two-day event. The first day was focused on research, with a mission to promote pharmaceutical research, expand international academic cooperation, and improve student research ability. A thesis contest was held for students to share their research in four areas: "drug R&D," "pharmaceutical technology," "medical and pharmaceutical biotechnology," and "clinical pharmacy."

Five oral presentations and 52 poster presentations were selected after a preliminary preview. The contest

served as a platform for students and faculty members to exchange knowledge and ideas as well as to improve the students' research ability. Contestants presented their research findings to the jury and a winner was selected in each area. During the closing ceremony, the four winners were publicly recognized and awarded. Dr. Chih-Ming Chen, a 2004 Distinguished Alumnus of NTU, was invited to the ceremony to reflect on his 20 years of experience as a startup entrepreneur and encourage young researchers.

The second day of the event included 12 keynote speeches given by scholars from the four participating schools. Their talks offered insights on recent breakthroughs in three areas: "drug R&D," "pharmaceutical technology," and "clinical pharmacy," giving the audience much food for thought.

The 2019 Research Day and International Conference included a thesis contest, round table symposium, and keynote speeches, allowing NTU students and guests with many opportunities to exchange ideas and foster academic cooperation. The event was made possible thanks to the generous support of XinChen Medical Research Foundation, Professor Russel Rhei-Long Chen Memorial Award-Elite Scholarly Fund, and the Ministry of Science and Technology's Research Promotion Center of Life Sciences.



Group photo at 2019 Research Day and International Conference.

# 2019 Young Out Expo Invites Youth to Go on a Journey of Self-Exploration

Would you describe yourself as indulgent, courageous, exuberant, independent, or contemplative? Are you interested in education, public affairs, or innovation? It is time to step out of the classroom and learn more about yourself!

The 2019 Youth Out Expo hosted by NTU D-School and the Ministry of Education's Youth Development Administration (YDA) was held at Huashan 1914 Creative Park's W1 Building during May 16-19. The event, also known as "YDA Rock the Future Expo," was aimed to attract youth participation and introduce government resources available to young people. The three-day exhibition attracted over 3,000 visitors.

NTU D-School created a series of interactive exhibition zones for the event. Minister of Education Wen-Chung Pan attended the exhibition to see the fascinating technology and creativity on display, as well as to interact with the young people. Minister Pan stated that young people are characterized by their boundless creativity, and that the ministry has adjusted the 2019 curriculum guidelines to help the younger generation thrive and develop. The new

guidelines will place emphasis on context-based learning, allowing students to explore and understand themselves better and decide who they wish to become. When students understand themselves better, they will be more passionate about learning and more motivated to pursue their goals and fulfil their dreams. Besides, a context-based curriculum will offer them more opportunities for interdisciplinary education and problem-based learning.

The 2019 Youth Out Expo invited students to reflect deeply on themselves to discover who they wish to become on this journey of self-exploration. In the exhibition, information about career guidance and YDA's abundant resources were provided to the participants. It is hoped that as young people learn more about themselves and the world, they will have the courage to unleash their potential and rock the future.

The 2019 Youth Out Expo was initiated by the Ministry of Education's YDA, organized by NTU D-School, and co-organized by ZA Share and Huashan 1914 Creative Park.



Visitors at the exhibition.



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