

NTU



HIGHLIGHTS

Robotics Pioneer: Li-Chen Fu



- Owls Visit Campus
- NTU Launches Int'l Hub of Green Materials
- UTokyo, NTU Visualize Future Society
- Nobel Physics Laureate Mourou Speaks at NTU

Contents

01 Pioneer of Intelligent Robotics in Taiwan: Prof. Li-Chen Fu

Special Report

04 *Science Monthly* Celebrates 50th Anniversary by Donating Digital Content to NTU

05 2018 Nobel Prize in Physics Winner Gérard Mourou on His Quest for Light

06 NTU Library Innovates Comprehensive Research Support

Honors

07 Dr. Katherine A. Kim Named in MIT's "Innovators Under 35"

08 NTU Professor Receives 2019 Outstanding Science & Technology Contribution Award

International Corner

09 2019 UTokyo-NTU Joint Conference: Co-Creating the Future Society in Asia

10 Students from Around the World Gather at NTU for Plus Academy Winter Program

12 "New Southbound" Special Report: NTU Furthers Innovation with Partner Countries

Research Achievements

13 Accurate Prediction of Liver Cancer Risk in Patients with Hepatitis B

14 NTU Launches International Hub of Green Materials for a Sustainable Future

Teaching and Learning

15 Digitalizing the Global Text: Book Launch & Forum to Reflect on the Digital Wave of Globalization

16 Using Course Design to Bring Schools and Communities Together

17 The World Learns from NTUH's MSK Ultrasound Center

Back Cover

18 Christmas Gift from Mother Nature: Collared Scops Owls Appear on Campus



A collared scops owlet perches on the tree.

Publisher: Chung-Ming Kuan

Editorial Consultant: Lin-Lin Ku

Editor: Hsiao-Chih Sun

Executive Committee: NTU Secretariat

Published by National Taiwan University

Tel: 886-2-3366-2041

Address: No. 1, Sec. 4, Roosevelt Rd., Taipei 10617, Taiwan (R.O.C.)

Website: <http://ntuhighlights.ntu.edu.tw/>

Pioneer of Intelligent Robotics in Taiwan: Prof. Li-Chen Fu

Prof. Li-Chen Fu, a lifetime distinguished professor of NTU's Department of Electrical Engineering and Department of Computer Science and Information Engineering, is considered to be the pioneer of intelligent robots in Taiwan. He received his B.S. degree from NTU in 1981 and his Ph.D. degree from the University of California, Berkeley in 1987. A pioneer in the field of smart robotics, he was one of the first scientists in Taiwan to integrate artificial intelligence with robotics. He is currently the Director of NTU's Center for Artificial Intelligence and Advanced Robotics as well as the Co-Director of the Ministry of Science and Technology (MOST) and NTU's Joint Research Center for AI Technology and All Vista Healthcare. As the proud recipient of numerous awards for excellence in research over the past three decades, Prof. Fu was awarded the Ministry of Education's National Chair Professorship in 2019.

As a young boy, Prof. Li-Chen Fu was determined to follow in his father's footsteps and enter NTU's Department of Electrical Engineering. He studied hard to pass the highly competitive joint college entrance exam, to squeeze through the narrow gates of NTU. He looked up to his father as his role model, and like his father, Prof. Fu enjoyed taking things apart to see how they worked and putting them back together again.

At NTU's Department of Electrical Engineering, he majored in control systems. Taiwan's electronics industry was just starting to take off when he graduated from NTU, and there was a big gap between academia and industry. Thus, like many of his peers, he decided

to pursue further studies in the United States. Prof. Fu first got involved with robotics during his final summer internship prior to getting his doctorate. Robotics offered a brave new world that fascinated him, and he soon was deeply absorbed in the research and development of intelligent robotics.

After completing his studies overseas on a government scholarship, Prof. Fu returned to Taiwan to teach at NTU upon obtaining his doctorate. In the 1970s, the industrial infrastructure in Taiwan underwent overhauls and transformations, and the government prioritized factory automation systems. Artificial intelligence had not yet been applied to robotics, and Prof. Li-Chen Fu made it his mission to introduce intelligent robots into Taiwan.

Prof. Fu set up the multidisciplinary Intelligent Robotics Laboratory at the Department of Computer Science and Information Engineering to promote the application of artificial intelligence to robotics. The bringing together of electrical engineering, robotics, and information engineering was an unprecedented move in Taiwan at the time. He actively pushed the collaboration of academia and industry, sharing research results with industry and conducting research in the lab that addressed the needs of industry. Prof. Fu said, "Having taught and conducted research in academia for over three decades, I am glad that I was able to serve as a bridge between academia and industry, to make amends for being unable to directly contribute to industry as a practitioner." His efforts to pave the way for interaction and cooperation between



academia and industry have won him numerous awards and accolades from the Ministry of Education as well as the Ministry of Economic Affairs.

To most people, Prof. Li-Chen Fu is a pioneer and beacon in the field of intelligent robotics. But, he admits that he was once very lost and confused. His laboratory was first established to develop intelligent robots to meet the requirements of local industry. However, when Taiwan faced a shortage of blue-collar workers, the government opted to introduce blue-collar laborers from abroad instead of adopting industrial robots. Because of this change in government policy, Prof. Fu's research lost steam and momentum. He was later appointed as NTU's secretary-general, in charge of administrative affairs. While in office as NTU's secretary-general, he developed a service robot—NTU Number 1, Taiwan's first campus guide robot.

Throughout his illustrious career as a scientist and researcher, Prof. Fu has applied his expertise, innovation, and tenacity to numerous projects, designing and developing family entertainment robots, office robots, and medical robots. These robots all address the needs of human beings because he believes that robots are developed to help humankind. In a recent statement, he noted that robotic researchers should shift their focus from hardware to software. In the early days of robotics in Taiwan, developers had to work on both hardware and software, since robotics was a new field with relatively few researchers. But now, Taiwan has top-notch hardware capabilities, so researchers in the fields of information engineering and electrical engineering can dedicate their efforts to developing the "brainpower" of robots. Robots are, after all, robots, so they lack human empathy. As robots and humans interact more frequently and intensively, ethical issues will arise. Consequently, the focus of research in intelligent robotics must shift to the harmonious coexistence of human beings and robots.

When it comes to the development of robots, Prof. Fu believes that "Not everyone will be besotted with robots, but people will definitely benefit from robots." For robots to be beneficial to human beings, they have to learn problem-solving with help from artificial intelligence.

People often ask, "Will robots replace human beings?" Prof. Fu believes that robots are created to help human beings and to make up for what human beings lack. Human intelligence, innovation, and the human spirit will always prevail.

Q&A

1. What is your favorite corner on campus?

My favorite spot on campus is the area in front of the Administration Building.

2. What are the prerequisites of an institution of higher learning?

A university must foster an environment conducive to the pursuit of knowledge and innovative research, so as to benefit society, the country, and even the universe.

3. What were you afraid of when you were a student?

I wasn't afraid of the exams. If I were afraid of anything, it would be future prospects after graduation.

4. What do you do in your spare time?

Research keeps me busy, really busy. So, I like to relax by watching movies when I am during the flight or with my family.

5. What is your favorite book?

The Old Man and the Sea.

6. What is your favorite movie?

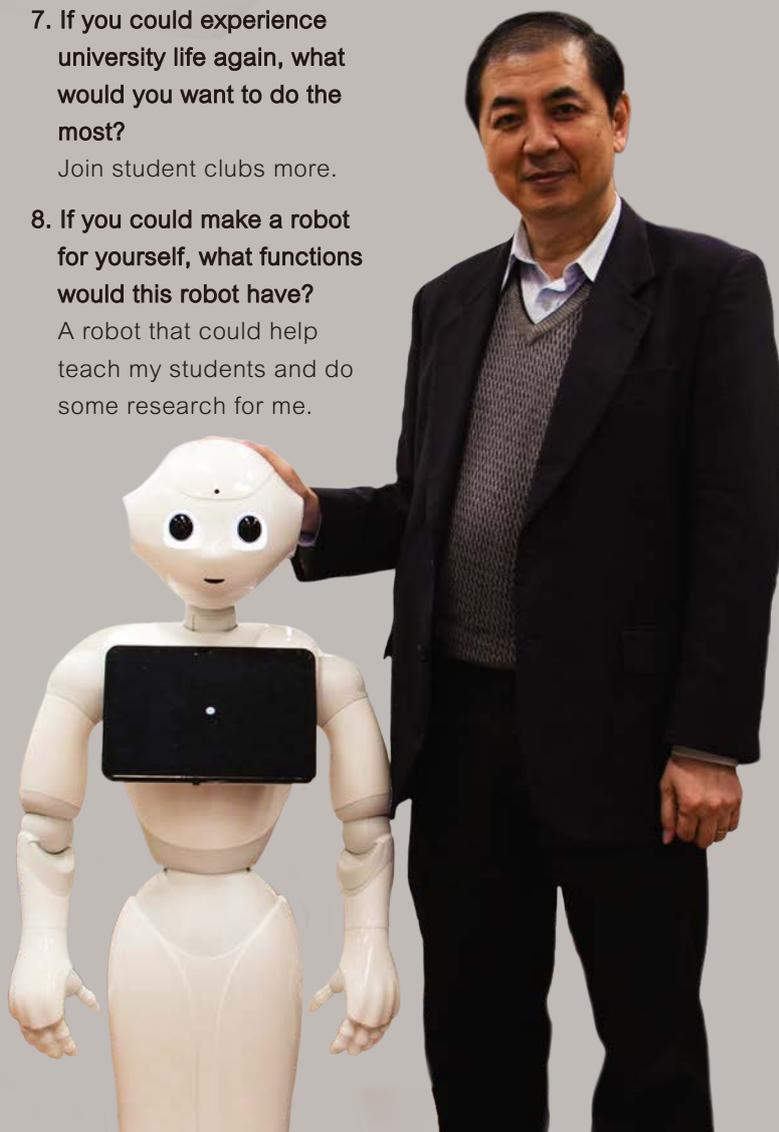
Invictus. I also like all movies that are related to AI.

7. If you could experience university life again, what would you want to do the most?

Join student clubs more.

8. If you could make a robot for yourself, what functions would this robot have?

A robot that could help teach my students and do some research for me.



Prof. Li-Chen Fu's Curriculum Vitae

Education:

- Ph.D. (1987) and M.S. (1985)
Dept. of Electrical Engineering and Computer Science, University of California, Berkeley
- B.S. (1981)
Dept. of Electrical Engineering, National Taiwan University

Current Positions:

- Co-Director, MOST Joint Research Center for AI Technology and All Vista Healthcare (2017.07-Present)
- Director, NTU Center for Artificial Intelligence and Advanced Robotics (2018.01-Present)
- Advisory Committee Member, Asian Control Association (2014.04-Present)
- Professor, Dept. of Electrical Engineering, Dept. of Computer Science & Information Eng., National Taiwan University (1991.08-Present)

Work Experience:

- Director, Health Science and Wellness Center (2014.08-2017.07)
- Associate Dean, College of Electrical Engineering & Computer Science (2009.08-2012.07)
- Secretary General, National Taiwan University (2005.08-2008.07)
- Deputy Dean, College of Electrical Engineering & Computer Science, National Taiwan University (2004.02-2005.07)
- Deputy Director, Tjing Ling Industrial Research Institute, National Taiwan University (1998.08-2001.07)

Technical Experiences:

- Vice President, IEEE Control Systems Society (2017.01-2018.12)
- President, Asian Control Association (2012.03-2014.03)
- Board of Governors, IEEE Control Systems Society (2014.01-2016.12)
- Program Director, Control Program under Engineering Department, National Science Council (NSC), R.O.C. (2009.12-2012.11)
- Fellow Evaluation Committee Member (Co-Chair), IEEE Robotics and Automation Society (2010.01-2012.12)

Recent Honors and Awards:

- National Chair Professorship, Ministry of Education, Taiwan (2019.12)
- Y.Z. Hsu Science Award, Technology & Innovation, Y.Z. Hsu Science and Technology Memorial Foundation (2017.07)
- IFAC Fellow, International Federation of Automatic Control (2017.01)
- Academic Award, Ministry of Education, Taiwan (2015.10)
- Wook Hyun Kwon Education Prize, Asian Control Association (2015.07)
- Contribution Award for Promoting Industry Economy, Ministry of Economic Affairs, Taiwan (2010.08)
- Irving T. Ho Chair Professorship, National Taiwan University (2007.08)
- TECO Science & Technology Award, TECO Science and Technology Foundation (2005.10)
- Industry-Academia Collaboration Award, Ministry of Education, Taiwan (2004.12)
- IEEE Fellow (2004.01)

Research Areas:

Social Robotics, Smart Home, Visual Detection and Tracking, Virtual Reality, and Control Theory & Applications.



The donation ceremony at the Shih-Liang Conference Center.

Science Monthly Celebrates 50th Anniversary by Donating Digital Content to NTU

Taiwan's oldest popular science magazine, *Science Monthly*, recently celebrated its 50th anniversary. For half a century, a growing group of science-minded scholars and researchers has consistently contributed to local science education despite all obstacles. The editors have turned *Science Monthly* into a public asset by devoting themselves to this publication. To commemorate its 50th anniversary, the publisher decided to donate the digital version's right of use to NTU's Center for the Advancement of Science. All of magazine's content will be made public on the center's website, to be accessed by science minded readers around the world. The ceremony was held at the Shih-Liang Conference Center in the afternoon of December 27, 2019.

"We know that politics and economy are the key factors for social progress and modernization. However, we believe that improving the general public's knowledge and establishing a sound social value system are even

more essential," wrote Hsiao-Hsin Lin and Yi-Yan Li, founders of *Science Monthly*, in 1969. They hoped to run a monthly science journal not only as extracurricular reading material for students but also as an instrument for social progress. This journal is aimed to popularize science, introduce new knowledge, open up new horizons, and encourage a scientific mindset among the general public to lay the foundation for a sound and ideal society.

Few magazines in Taiwan have thrived for over 50 years, and *Science Monthly* is the only one among them that is dedicated to science education. Although directors and editors have come and gone, the magazine has never missed an issue or belonged to any person or faction. It remains the fruit of the labors of a group of knowledgeable people who enthusiastically learn from and inspire each other. Because many NTU staff members and researchers have been involved in the publication over the years, it is also regarded as an early concrete example of university social responsibility.

By donating the digital content and precious archives of its early days to NTU, *Science Monthly* is taking a further step in the popularization of science. Yuan-Tsun Liu, President of the Taipei Science Publication Foundation, handed the archives and hard disk to NTU President Chung-Ming Kuan during the donation ceremony, then Director Yeong-Chuan Kao of the Center for the Advancement of Science demonstrated the archival website dedicated to the publication.

2018 Nobel Prize in Physics Winner Gérard Mourou on His Quest for Light

Prof. Gérard Mourou, winner of the 2018 Nobel Prize in Physics, was invited jointly by the Leung Center for Cosmology and Particle Astrophysics (LeCosPA) and the Center for General Education at NTU to deliver a speech titled “A Lifetime’s Quest for Light” for the NTU Lectures on the Intellectual and Spiritual Pilgrimage at the NTU Chee-Chun Leung Cosmology Hall on November 9, 2019. For the occasion, Prof. Mourou talked about one of his major findings, chirped pulse amplification (CPA), as well as his experience at the Nobel Prize Award Ceremony.

Visible laser has been applied in a wide variety of research fields since its invention in 1960. However, by the 1970s, its development began to stagnate due to difficulties in building larger amplifiers for increasing laser power density. Prof. Mourou recalled how the idea of grating occurred to him when he was sitting on an ascending ski lift in a ski resort. He wondered whether dispersing a laser beam using gratings, stretching the split laser pulses to reduce their unit power density before amplification, and then compressing the pulses to reverse the dispersion would solve the problem. The research results were published in 1985, laying the foundation for Prof. Mourou and Prof. Donna Strickland’s 2018 win.

Knowing the potential of ultrashort laser pulses for performing precision ablation, Prof. Mourou collaborated with eye doctors in applying the pulses to corneal surgery and thus came up with “corrective laser eye surgery,” which has benefited nearly a million patients since 2001. Prof. Mourou then discussed further future application possibilities, including facilitating the next-generation particle accelerator, removing radioactive materials from nuclear waste, generating proton beams for proton therapy, and simulating a black hole.

Besides expressing appreciation to his wife, Prof. Mourou recounted his most memorable moment. It occurred when he was ushered into an office after the award ceremony and given an ordinary notebook with the autographs of all the previous Nobel Prize winners. He described adding his name to the list as standing

shoulder to shoulder with some of the greatest physicists in history, a tremendous honor.

Finally, the Nobel Prize laureate commented that students can be equally capable of making groundbreaking contributions as established scientists. For example, Prof. Strickland created CPA technology during her doctoral studies and eventually garnered a Nobel Prize. As one of the few female Nobel Prize laureates in science, Prof. Strickland is a role model who inspires budding female scientists to shine.



Prof. Gérard Mourou gives his speech.



Prof. Mourou visits the Space-Time Discovery Exhibition at the Leung Center for Cosmology and Particle Astrophysics.

Dr. Katherine A. Kim Named in MIT's "Innovators Under 35"

NTU is pleased to announce that Dr. Katherine A. Kim, Associate Professor of NTU's Department of Electrical Engineering and a winner of the Jade Mountain (Yushan) Young Scholar Award, was named among the 20 "Innovators Under 35" for the Asia Pacific Region by *MIT Technology Review*.

This acclaimed list of "Innovators Under 35" is announced annually by MIT Technology Review to honor exceptional young scientists, all under the age of 35, whose work is changing the world. The list recognizes innovators who have developed new technology or creatively applied existing technologies to solve global challenges in such fields as biomedicine, energy, materials, software, transportation, and communication.

Formerly known as the TR100, *MIT Technology Review* first presented a list of "100 remarkable innovators under the age of 35" in 1999. In 2005, the list was shortened to TR35, only naming the world's top 35 innovators under 35. In 2013, the award was renamed "Innovators Under 35." Some of the most famous honorees include Facebook's Mark Zuckerberg and Google's Sergey Brin and Larry Page. Starting from 2010, the journal expanded its search and started to organize regional editions of the list. "Innovators Under 35 Asia Pacific" honors the top 20 young talents from the region. The 20 honorees will be celebrated at *MIT Technology Review*'s EmTech Asia on February 25-26, 2020 in Singapore, gaining mass media coverage and the chance to access an audience of distinguished peers, investors, and entrepreneurs.



Prof. Katherine A. Kim.

Selected from a pool of 200 exceptional candidates, Dr. Kim was recognized for her contributions to developing power electronics and control to maximize solar photovoltaic power for emerging applications. Dr. Kim received her master's and doctoral degrees in electrical and computer engineering from the University of Illinois at Urbana-Champaign (UIUC) in 2011 and 2014. After teaching at the Ulsan National Institute of Science and Technology (UNIST) in South Korea from 2014-2018, she was hired by NTU in 2019. She is an associate editor of *IEEE Transactions on Power Electronics* and served as the Chair of IEEE PELS Women in Engineering for 2018-2019.

頒獎典禮



Prof. Yih-Min Wu (first from right) receives the 2019 Executive Yuan Award for Outstanding Science and Technology Contribution.

NTU Professor Receives 2019 Outstanding Science & Technology Contribution Award

Prof. Yih-Min Wu, Chairman of NTU's Department of Geosciences, received the 2019 Executive Yuan Award for Outstanding Science and Technology Contribution from Vice Premier Chi-Mai Chen at the Executive Yuan Assembly Hall on December 12, 2019.

Prof. Wu is a pioneer in the research of earthquake early warning systems. The system which he designed and built during his tenure at Taiwan's Central Weather Bureau was the first of its kind to use real-time earthquake monitoring to meet the needs of seismic early warning. This system proved its worth in 1999 by determining the earthquake epicenters and magnitudes within 102 seconds after the 921 earthquake shook Taiwan, gaining the country global recognition for its R&D in earthquake early warning systems.

Wu joined NTU in 2004 and continued his research and development of on-site earthquake early warning systems and investigating the key relationship between P-waves and S-waves. The "P-Alert Strong Motion Network," which he designed, truly was a groundbreaking scientific and technological success. The Network can detect P-wave information, including acceleration, velocity, and longitude, within the initial 3

seconds of its arrival. As soon as the system received this information, it issues warning signals over 10 seconds before the arrival of the S-wave, giving people more time to evacuate. Importantly, since the system uses low-cost microelectromechanical system (MEMS) accelerometers, the cost of the P-alert device is just one-tenth of the cost of traditional strong motion detection instruments. This low-cost makes it feasible to have the device installed widely in communities, schools, factories, public transportations, and elevators.

Thanks to the support of the Ministry of Science and Technology, the National Science and Technology Center for Disaster Reduction, and the efforts of Prof. Wu, the P-alert device has already been deployed in over 700 schools around Taiwan, enterprise facilities in scientific parks, as well as Taipei MRT stations. The system generates detailed shake maps by collecting information from different stations via the internet, thus providing invaluable references for future natural disaster prevention efforts. Moreover, the reception and release of information are completely automatic, significantly mitigating the social and economic damage caused by seismic hazards.

During the past five years, besides dedicating himself to teaching and research, Wu has traveled around the world to promote the importance of earthquake early warning systems. His P-alert device is now utilized in China, Indonesia, India, Vietnam, South Korea, New Zealand, Greece, Mexico, Nepal, Bhutan, Solomon Islands, and the Philippines, helping to save lives in earthquake risk zones around the world and showcasing Taiwan's scientific prowess on the international stage.

2019 UTokyo-NTU Joint Conference: Co-Creating the Future Society in Asia

The 2019 UTokyo-NTU Joint Conference was held at the University of Tokyo (UTokyo) on December 9-10, 2019. The conference theme was “Co-Creating the Future Society in Asia,” and delegates from NTU and UTokyo discussed related topics during the two-day conference. This was the fourth time the schools hosted the event, and this time NTU President Chung-Ming Kuan led a delegation of 155 to Tokyo. This event drew over 400 attendees and representatives from both schools, including all 11 colleges of NTU, to actively participate in the rich academic discussions.

The event commenced with the opening remarks of UTokyo President Makoto Gonokami and NTU President Kuan. In his speech, President Gonokami warmly welcomed the NTU delegation and highlighted the long-established cooperation and friendship shared by the schools. He also expressed his hopes to see UTokyo and NTU further their interdisciplinary cooperation and work collaboratively to meet the UN Sustainable Development Goals (SDGs). Next, President Kuan addressed the importance of offering diverse ways of learning. He suggested that the two schools build on the existing cooperation and strive to

develop more learning materials through online platforms to offer more diverse learning resources. Kuan also expressed his desire to see NTU and UTokyo further advance their flagship projects to support collaborative research, develop interdisciplinary research, and tackle the challenges of society nowadays.

At the ceremony, speakers from both schools presented their perspectives on the prospects of Asia and the major challenges it faces. Prof. Horng-Huei Liou, Vice Superintendent of NTU Hospital Yunlin Branch, focused on the challenges of an aging society in Asia, citing the National Geriatric Medicine and Health Welfare Center and the Project Apollo as examples of how to build a geriatric healthcare system to meet the goals of long-term care. Prof. Shin-Ichiro Takahashi from UTokyo’s Graduate School of Agricultural and Life Sciences introduced the One Earth Guardians Development Program, a project with the vision of achieving sustainable development by increasing human resources. Lastly, exchange students shared their experiences of studying at the two schools. The conference included 20 sessions, and participants exchanged their findings and thoughts covering a wide arrange of subjects.

Since NTU and UTokyo became partner universities in 2015, the schools have taken turns hosting the UTokyo-NTU Joint Conference. In the 2018 conference, President Gonokami became the first UTokyo president to visit NTU. This conference series not only strengthens the bond between the two schools but also serves as a platform to encourage further research and education collaboration.



Group photo at the 2019 UTokyo-NTU Joint Conference.

Students from Around the World Gather at NTU for Plus Academy Winter Program

The 2020 NTU Plus Academy Winter+ Program, organized by the Office of International Affairs (OIA), drew a total of 70 students from top universities all over the world to engage in short-term studies at NTU.

Three programs were offered this winter, namely, the Innovation and Entrepreneurship Program, the Chinese Language and Culture Program, and the Research and Culture Program. This group of students came from a wide range of universities, including Cornell University, the National University of Singapore, the University of Tokyo, Kyoto University, Osaka University, the University of Tsukuba, Tohoku University, Kyushu University, Seoul National University, Korea Advanced Institute of Science and Technology (KAIST), the University of Oklahoma, the University of Queensland, the University of New South Wales, the Indian Institute of Technology Madras, the City University of Hong Kong, the Hong Kong University of Science and Technology, and the University of Auckland.

The Innovation and Entrepreneurship Program, jointly offered by NTU and National Chiao Tung University, was a one-week intensive program that pooled teaching and campus resources of both universities. Students recommended by NTU's partner universities in the Association of East Asian Research Universities (AEARU) and students from high-ranking universities all over the world gathered at NTU to participate in the program. The program presented innovation case studies and offered practice in creative thinking, with an innovation workshop organized jointly by NTU's OIA and D-School. In this workshop, the students shared design concepts and explored and tested creative ideas through discussions, experiential learning activities, and hands-on projects. Besides learning in the classroom, the students also went on fieldtrips to Dadaocheng (an old town in Taipei), learned how to blue-dye in Sanxia, visited porcelain kilns in Yingge, experienced Hakka culture in Beipu, and visited Taiwan Semiconductor Manufacturing Company (TSMC), Taiwan's top semiconductor manufacturer.



The Chinese Language and Culture Program offered the students not only a chance to sharpen their Chinese language skills, but also a variety of cultural activities introducing them to Chinese art and literature, food and drink, and religion and folklore. The students were also provided with the opportunity to experience the indigenous cultures in Taiwan, thus gaining a glimpse into the rich cultural diversity of the island.

The Research and Culture Program hosted students from Mainland China, Hong Kong, and South Korea. The faculty members of this program included professors of psychology, geography, economics, and information engineering. The students both received instruction and guidance from their professors and worked with research teams on campus. Their research capacity and skills were considerably enhanced during the four-week program.

During these 1-4 week programs, the students studied, played, made friends, and experienced the cultural



Winter+ Innovation: A visit to Taiwan Semiconductor Manufacturing Company (TSMC).

landscape of Taiwan. Their New Year's celebration included enjoying the spectacular firework show at Taipei 101, Taiwan's tallest building.

A total of 12 NTU student advisors assisted in the planning and operation of the programs, offering support and consultation to the visiting students and helping them to get accustomed to life in Taiwan. This experience challenged the student advisors to improve their foreign language skills and enhance their multicultural sensitivity through their interactions with the visiting international students.

The NTU Plus Academy Winter+ Program offers international students a precious opportunity to learn more about Taiwan and to interact with local students. By offering these short-term programs, NTU's OIA aims to attract more international students to NTU and encourage them to pursue advanced studies here, thus enhancing the influence and visibility of Taiwan in the global academic community.



Winter+ Innovation: Taiwan Indigenous Culture Trip.



Winter+ Innovation: Orientation.



NTU delegation meets the dean and staff of the Faculty of Agriculture, the University of Peradeniya.

“New Southbound” Special Report: NTU Further Innovation with Partner Countries

In recent years, Southeast Asia has experienced rapid development. In step with the government’s 2016 New Southbound Policy, the Ministry of Education launched higher education exchange programs that same year to attract talents from partner countries in Southeast Asia. As the top university of the country and a regional leader in higher education, NTU has actively participated in international organizations and targeted the partner countries for international student recruitment and research collaboration.

Strategy 1: Delivering Keynote Speeches in Southeast Asia to Increase International Visibility

The annual conference of the Association of Southeast Asian Institutions of Higher Learning (ASAIHL) was held at the University of Kelaniya in Sri Lanka on December 9-10, 2019. The conference theme was “Revitalizing Higher Education for Sustainable Development.” Prof. Bi-Fong Lin, NTU’s Deputy Vice President for International Affairs, attended the event on behalf of the university and delivered a keynote speech on “Bridging International Collaboration and University Social Responsibility.” Besides illustrating the frequent and extensive exchanges with partner universities, Prof. Lin also mentioned NTU’s

collaborative projects with the Taipei City Government and local enterprises, as well as its involvement in the EU CRUNCH project, to boost the university’s visibility and leadership.

NTU is currently the only Taiwanese member of ASAIHL and serves as a board director, which is significant for fostering cooperation with institutions of higher learning in Southeast Asia. ASAIHL has over 200 member universities in 25 countries. Since becoming a member, NTU has actively participated in various Association events and hosted the ASAIHL International Conferences in 2010 and 2016.

Strategy 2: Expanding Academic Exchange Opportunities by Building Connections in Sri Lanka

Sri Lanka has been listed as a new target for further cooperation since 2018. Assistant Prof. Hiran Anjana Ariyawansa of NTU’s Department of Plant Pathology and Microbiology, who is from Sri Lanka, facilitated a visit to the University of Colombo, the University of Peradeniya, as well as the National Institute of Fundamental Studies located in Kandy, Sri Lanka during December 12-13, 2019, with a delegation led by Prof. Tsai-Kun Li, Deputy Vice President for Academic Affairs and Dean of Preparatory Office for International College. The delegation included Prof. Tang-Long Shen, Director of the Center for Biotechnology; Prof. Shih-Shun Lin of the Institute of Biotechnology; and Ms. Yu-Wen Chen, Manager of International Affairs. Research collaboration in bioresources and agriculture was the top priority on the agenda. Both parties have agreed to sign a memorandum of understanding to facilitate research cooperation and academic exchange.



Members on the research team.

Accurate Prediction of Liver Cancer Risk in Patients with Hepatitis B

Hepatitis B is not only a common viral infection in Taiwan; it is also a major public health issue worldwide. Patients with chronic hepatitis B suffer a high risk of developing liver cancer. At present, there is no permanent cure for chronic hepatitis B besides prevention by vaccination. Therefore, researchers have worked hard to find biological indicators that can accurately predict patients' risk of liver cancer so as to implement early intervention and reduce complications. Moreover, patients unlikely to develop liver cancer are identified to avoid overtreatment and frequent follow-ups, thereby saving medical expenses and achieving the goal of personalized medicine.

Under the leadership of experienced researchers, the NTU College of Medicine and the NTU Hospital's liver disease research team have been committed to conducting basic and clinical research on hepatitis and liver cancer. Previous research findings indicate that viral loads are an important indicator for predicting the risk of liver cancer. For patients with a high viral load, namely over 20,000 viral copies per millimeter of blood plasma, antiviral treatment will be prescribed to reduce the risk of liver cancer. Patients with a viral load

of 2,000-20,000 copies/mL are categorized as medium-risk patients. As their risk of developing liver cancer is only slightly higher than that of patients with a viral load of lower than 2,000 copies/mL, controversies exist in the international treatment guidelines concerning whether antiviral treatment is necessary. To solve this problem, the research team applied a novel hepatitis B virus protein quantitative indicator, namely Hepatitis B core-related antigen (HBcrAg), to optimize the current prediction model.

The team followed up a total of 2,666 patients with chronic hepatitis B at the NTU Hospital for over 15 years. At the time of inclusion, the team performed antigen tests on the patients' plasma samples and conducted viral load analysis. It was determined that a positive correlation exists between HBcrAg levels and liver cancer incidence. Patients with a HBcrAg level of higher than 10,000 KU/mL face significantly higher risks of developing liver cancer in the future than those whose HBcrAg level is lower than 10,000 KU/mL.

Published in prestigious medical journal *Gastroenterology* in December 2019, this paper was the first study in the world to demonstrate that HBcrAg levels can be analyzed in conjunction with viral load levels to more accurately predict the risk of liver cancer. If confirmed by other empirical studies, HBcrAg levels will become an important clinical indicator for assessing patients' viral activity and liver cancer risk, enabling clinicians to improve personalized medicine.

NTU Launches International Hub of Green Materials for a Sustainable Future

NTU has long striven to direct its research and education in line with the UN Sustainable Development Goals (SDGs). Green materials, namely materials that contribute to clean water, affordable green energy, industrial innovation, climate change mitigation, and circular economy, rank among NTU's main research and instructional focuses. In recent years, tremendous effort has been made toward achieving a green and sustainable future, and international cooperation is crucial in facilitating breakthroughs in green materials as well as sustainable manufacturing processes. In 2019, NTU organized the first international workshop in this field and acted as a hub for green materials research in the international community.

Co-hosted by the College of Engineering (COE) and the Advanced Research Center for Green Materials Science and Technology (ARC-GMST), the first International Green Materials Workshop was held on October 31 and November 1, 2019. The main goals of the conference included linking global research groups, developing a collaborative platform for students and researchers, providing support to the research community, and addressing critical issues in working to create a sustainable future. Leading

scientists from Japan, France, and Australia were invited to present their recent work and findings and discuss possibilities for future cooperation.

This workshop was chaired by Prof. Wen-Chang Chen, Dean of NTU COE and Director of ARC-GMST. The secretary was Associate Prof. Hung-Wei (Homer) Yen, Executive Director for International Affairs of COE. The international participants included Prof. Hiroyuki Nishide (Waseda University), Prof. Toshifumi Satoh (Hokkaido University), Dr. Redouane Borsali (University Grenoble Alpes), Prof. Veena Sahajwalla (University of New South Wales), Mr. Anirban Ghose (University of New South Wales), and Prof. Jun Huang (University of Sydney). The NTU participants included Prof. Ai-Chun Pang, Associate Dean of NTU's College of Electrical Engineering & Computer Science; Associate Profs. Yi-Tsu Chan and Hao-Ming Chen from NTU's College of Science; Prof. Wei-Fang Su from the Department of Materials Science and Engineering; and the members of ARC-GMST.

The talks concentrated on energy materials, materials for CO₂ capture, mini-factory of circular economy, green materials, materials for water purification, and the recycling process. Through this workshop, the attendees not only held in-depth discussions on key research topics and issues but also talked about future academic cooperation, including faculty/student exchanges, internships, and joint research. Moreover, every delegation agreed to take turns hosting future workshops. This international research network manifests and affirms NTU's leadership in the cutting-edge field of green materials.



Group photo at the 2019 International Green Materials Workshop.

Julie Choi, *Leiba Womans University*
The Garden of Living Paths: Interactive Narratives in Global Geek Culture
Mon-Lan Wong, *National Taiwan University*

Part Three: The Global Object World: Literature and Ontology in Late Capitalism

The Ontological Turn: A New Problematic for Literature and Globalization
Meili Steele, *University of South Carolina*

Altered Realism in Ontological Fiction: *Never Let Me Go* and *Point Omega*
Chi-she Li, *National Taiwan University*

Ghost in the Machine: Fetishism and the Laboring Body in Marx, Dickens, and Mayhew
Hisup Shin, *Leiba Womans University*



Speaker Prof. Paul Allen Miller.

Digitalizing the Global Text: Book Launch & Forum to Reflect on the Digital Wave of Globalization

Organized jointly by NTU Press, the Department of Foreign Languages and Literatures, and the Institute for Advanced Studies in the Humanities and Social Sciences, the book launch and forum for *Digitalizing the Global Text: Philosophy, Literature, and Culture* was held at the NTU Agricultural Exhibition Hall on December 4, 2019. As the book's editor and one of its authors, Prof. Paul Allen Miller, Vice Provost of the University of South Carolina, was invited to give a talk and discuss the aim and content of the book with Prof. Hsien-Hao Liao, Dean of the Institute for Advanced Studies in the Humanities and Social Sciences.

This new release is the first book in the East-West Cultural Encounters in Literature & Cultural Studies series, initiated and co-published by NTU Press and the University of South Carolina Press. The forum topic was "Exploring Paths to the Global Humanities." Citing his chapter in the book, "On Being Old and Queer," Prof. Miller reflected on the current state of globalization and the comparative studies of Eastern and Western literatures. The forum discussion was rich and many in the audience raised precious ideas on this topic.

At the end of the forum, Prof. Chun-Che Chang, Deputy Director of NTU Press, presented Prof. Miller with an exquisite souvenir produced by NTU Press. It is our fondest hope that this series of co-published books can continue to introduce thought-provoking cross-cultural perspectives for ever more readers.

For more information about the book, please scan the QR code below.





Group photo.

Using Course Design to Bring Schools and Communities Together

As the new curriculum guidelines take effect, colleges and high schools have been actively working together to incorporate diversity into the curriculum. NTU D-School has collaborated with various local high schools to transform education and make social contributions. On December 30, 2019, NTU D-School Director Bing-Yu Chen hosted an international exchange event with participants from Wesley Girls High School, Jhieh Shan High School, and Japan's Toyooka Senior High School.

The event kicked off with a presentation by participants from Toyooka Senior High School on the famous Oriental white stork-friendly rice. "Stork-friendly rice is a way to ensure sustainable coexistence between animals and agricultural activities. Every step of this farming method, from the transplanting of rice seeds to duck farming and harvesting, is entirely environmentally friendly and does not involve the use of any agricultural machinery," explained the representative. Li-Hsiu Chou, President of Wesley Girls High School, expressed her approval of this farming method and commented: "The food we choose will impact the environment we live in and our future. The stork-friendly rice from Toyooka is a successful regenerative and ecological conservation practice that is well-known to the world and worth learning for schools and industry."

This is the third semester since NTU D-School began its collaboration with Wesley Girls High School. The two schools have successfully designed five reality-inspired games that highlight sustainable development and circular economy. As students gained hands-on experience by playing the games, Chi-Ping Li, the teacher in charge of the high school's practical education curriculum, commented that the 18 months of collaboration between NTU and Wesley Girls High School have already given the students the opportunity to learn more about such important subjects as natural disaster prevention, food and agriculture, and game design. This project has also provided them with a practical understanding of how university social responsibility can be carried out.

Students from Jhieh Shan High School shared their experience of working with NTU D-School to interact with residents of Daxi District and create new opportunities to learn outside the classroom. It is the goal of NTU D-School to change the current curriculum, increase student autonomy, and turn the entire Daxi District into an arena for learning. NTU also introduced the concept of timebanking to encourage students to learn life skills from community residents.

This event not only provided a rich opportunity for the students to learn from cultural exchanges and showcase the achievements of their collective efforts; it also inspired new ideas for interdisciplinary course design and demonstrated how colleges, high schools, and the community can work together to create human value.

The World Learns from NTUH's MSK Ultrasound Center

The Department of Physical Medicine & Rehabilitation of NTU Hospital (NTUH) was one of the first rehabilitation units to be established in Taiwan. In 2006, the department inaugurated the Musculoskeletal (MSK) Ultrasound Examination Room and became a pioneer in MSK ultrasound examination research. The MSK Ultrasound Examination Room was later integrated with the Therapeutic Ultrasound Lab to become the MSK Ultrasound Center. The Center provides diagnostic medical ultrasound services, emphasizes the research and practice of therapeutic ultrasound, and meets patient needs with the most advanced medical care. Now, the MSK Ultrasound Center examines over 600 patients monthly.

The Center has published over 200 articles in ultrasound research, many of which have appeared in prestigious international journals. For example, several of the Center's clinical studies on ultrasound elasticity imaging have been published in *Radiology*, a medical journal that features the highest quality research in the field of radiology. Basic medical research on ultrasound-mediated gene transfection and ultrasound controlled drug release has also been published in such journals as *Journal of Controlled Release and Ultrasonics Sonochemistry*.

In addition, the Center published an English handbook on MSK ultrasound examination, *Musculoskeletal Ultrasound Examination (English)*, in 2014, followed by a second handbook, *Musculoskeletal Ultrasound Examination Part II: Essential Pathologies (English)*, in 2018.

The MSK Ultrasound Center is recognized nationally and was accredited by the Resource Office of Medical Service Industry under the Joint Commission of Taiwan (ROMSIT-JCT) in 2015, and by the Symbol of National Quality (SNQ) under the category of hospitals and hospital social services in 2017. In 2019, it also received the 2018 NTUH Best Medical Team Award.

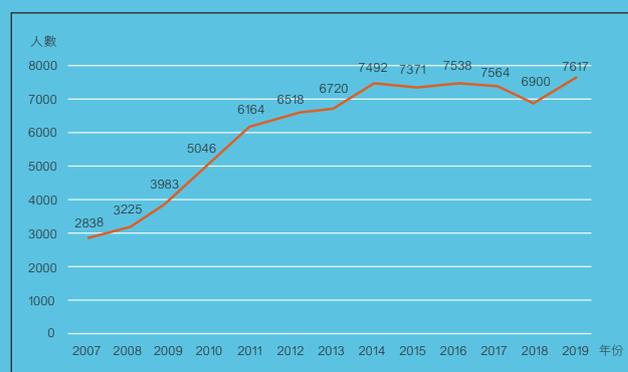
Currently, there are only 140 certified interventional pain sonologists (CIPS) in the world, and 5 of them work at NTUH's MSK Ultrasound Center. Center members are frequently seen in international and domestic training workshops and seminars. In 2012, the Center introduced

a training program for foreign health professionals to foster international clinical medical education exchange. By 2019, 128 physicians from around the world had visited NTUH to learn more about ultrasound examination technology. Regarding basic medical research, the Center also conducts international collaborations with research institutes in France, Latvia, Lithuania, and China.

MSK ultrasound is a promising field of research. The Center has been actively promoting collaboration with experts at home and abroad, learning from them and conducting research with them in a variety of fields ranging from the peripheral musculoskeletal system, the axial skeleton, to the peripheral nervous system. The Center aims to offer patients the best medical care and become the world's leading institution of diagnostic and therapeutic ultrasound research and education.



Photo with foreign physicians.



The number of examinees at NTUH's MSK Ultrasound Center from 2007-2019.

Christmas Gift from Mother Nature: Collared Scops Owls Appear on Campus

Symbolizing wisdom in Western mythology, owls have won the heart of many people with their adorable appearance. Scarce in number and nocturnal by nature, owls tend to keep hidden and still in tall trees during daytime. Therefore, they are rarely spotted in urban areas.

On Christmas Day 2019, Mother Nature sent NTU a "Christmas gift" in the form of four collared scops owlets at the Luming Square. One of them was older than the other three, but the four always stuck together. Sometimes, they perched on the Cajuput tree next to Shine Mood Waffles; at other times, they perched on the Luchu pine in front of the Common Subjects Classroom Building. This rare sighting of the four owlets attracted a large number of people to come for birdwatching and photography.

The collared scops owl (*Otus lettia*) is one of the 13 owls native to Taiwan. Members of this small-to-medium owl subspecies typically grow to 22-26 centimeters in length and 150-220 grams in weight. They usually rest during daytime and hunt for small vertebrates and large insects by night. Due to strong territoriality, owls usually live alone. Only the young birds that have just left the nest gather together, like the four owlets at NTU. However, they will soon go their separate ways.

Collared scops owls are the most commonly-seen owls in the urban areas of Taiwan. They can be seen and heard in Da'an Forest Park, Taipei Botanical Garden, and occasionally on the NTU campus. Studies have shown that collared scops owls prefer the woods as their habitat, which makes the tree-lined campus of NTU a perfect choice.

Since large-scale human activities may have an impact on the behavior and life of collared scops owls, people are reminded to maintain a proper distance. To create an environment where owls and humans can coexist in peace, loud noises and flashlights are discouraged to avoid startling the birds. Moreover, any behavior that might interfere with the lectures and campus order is not allowed. Let's work together to make NTU campus a safe home for this precious gift from Mother Nature!



Collared scops owlets perch on the tree.



Birdwatchers gather for the collared scops owlets.



中華郵政臺北雜字第1146號
執照登記為雜誌交寄

ISSN 977-1997-90300-1



9 771997 903001