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HIGHLIGHTS

NTU Entrepreneurship in Silicon Valley

Computer Scientists Awarded
ACM Fellows

Law Students Win Geneva WTO
Moot Court Competition

"Einstein" Painted by Robot

Special Report Linsanity at NTU





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President's Statement

PAN-CHYR YANG

Based on Ministry of Education statistics, the number of students entering university this August is forecast to shrink by 15,000 compared to last year, and the number of students beginning university education next August is expected to fall by an additional 14,000. Addressing the impact of the declining birth rate, NTU President Pan-Chyr Yang says that the phenomenon is not limited to Taiwan as student bodies all across the globe are reported to be contracting in almost every country. Instead of changing this fact, President Yang points out, "What the university should be considering is how to better educate the diminishing number of students." This is the direction in which NTU is currently striving to progress.

How do we create a better educational environment? President Yang raises two points: First, reduce the number of credits required for graduation to avoid forcing students to complete a large number of unrelated courses. Instead, students should be allowed to focus more deeply on a specialized field or study subjects in which they are interested. Second, cultivate students' interdisciplinary abilities so they can adapt to change. President Yang notes that, due to the rigidity of the present educational system, many students remain at the department they entered after testing into university and only discover after graduation that the knowledge they acquired in university is inapplicable in the real world, or that they are unable to keep up with the times because of societal changes. As a result, NTU is devoted to cultivating the concept of interdisciplinarianism so as to foster students' abilities to solve problems and adapt to the environment.

Presenting the Stanley Wang D-School@NTU as an example, President Yang says he hopes students from all colleges take part in the design school's programs so they can develop innovative concepts by engaging in discussions across multiple fields. As for NTU students who wish to start a business, the university encourages them to visit the new NTU Office in Silicon Valley, where they will come into contact with a wide variety of innovative thinking and expand their outlooks. In the future, NTU will create a platform that enables alumni to return to campus to share their successful entrepreneurial experiences.

President Yang declares with optimism, "I am not really concerned with the decline in enrollment because it is a reality that cannot be changed. What we should be doing is devising ways to help our students become better individuals." He hopes NTU becomes a model for achieving this goal and calls on other universities to follow NTU's lead so that students feel there is hope and that someone is supporting their march forward.



▲ Political Deputy Minister Liang-Gee Chen of the Ministry of Education



NTU HOSPITAL INTRODUCES NEW MEDICAL TECHNOLOGIES AT INTERDISCIPLINARY MEETING

NTU established the NTU Interdisciplinary Exchange Meetings as a way to promote mutual understanding among the university's colleges and create opportunities for interdisciplinary collaboration. Each month or two, NTU's 11 colleges and the NTU Hospital take turns hosting the meeting on a rotating basis. Following a meeting jointly organized by the College of Social Sciences and College of Law in March, the latest meeting was hosted by NTU Hospital on May 30.

NTU Hospital's most important mission is the cultivation of teaching, research, and service professionals. For its NTU Interdisciplinary Exchange Meeting, the hospital invited NTU President Pan Chyr-Yang, university- and college-level officials, and faculty members from each of the university's colleges to a day of exciting talks and inspiring conversations. The meeting, which drew a record-high attendance of more than 160 participants, centered on five topics introduced by NTU Hospital professors.

Prof. Chih-Hsin Yang opened the meeting with a briefing on the hospital's National Center of Excellence for Clinical Trial and Research. Established in 2005, the center endeavors to provide a world-class research environment and operating system for conducting clinical trials aimed at the development of new drugs, vaccines, and medical instruments.

The center was awarded the National Industry Innovation Award in 2011 and has garnered praise from international biotechnology and pharmaceutical companies and research institutions that have come to Taiwan to cooperate in conducting clinical trials. The center also actively seeks opportunities to cooperate with local biotechnology and pharmaceutical companies in developing new medical products.

Prof. Yang pointed out that the center currently focuses on clinical trials and research on molecular targeted therapy for the major forms of cancer in Taiwan (lung, liver, and gastric cancer), cardiovascular diseases, and the stomach bacterium *Helicobacter pylori*. It is also branching out into other areas, including diabetes and metabolic diseases, rheumatoid arthritis, and nerves and neurological diseases.

Next, Prof. Jin-Shing Chen addressed the issue of "Taking the Needs of Patients as Motivation for Innovative Medical Treatment and Research," emphasizing some of the hospital's research results that reflect its concern about the needs of the patients. For example, due to the high rate of recurrence following the traditional treatment of primary spontaneous pneumothorax, the hospital adopted an innovative treatment that not only reduces the rate of recurrence, but also avoids increasing pain for patients. Also, as early lung cancer screening using low-dose computed tomography has made it possible to detect lung cancer tumors of one centimeter or less in size, the hospital followed up with a minimally invasive procedure that relies on the latest preoperative tumor localization technology and non-intubated video-assisted thoracic surgery.

The third speaker, Prof. Tsung-Lin Yang, discussed "Applications of Interdisciplinary Technology in

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Otolaryngology and Head and Neck Surgery,” highlighting the rapid development of new technologies and techniques for medical treatment. In particular, Prof. Yang emphasized how the emergence of these newly-designed surgical procedures and imaging instruments as well as regenerative medicine techniques has spurred the development of numerous medical treatment technologies, further changing the doctors’ approaches to clinical diagnosis and the treatment of patients.

Prof. Po-Nien Tsao then discussed “Development and Regeneration in the Respiratory System.” During his talk, Prof. Tsao noted that while the most important function of the lungs is to perform the exchange of gasses, due to a lack of the appropriate research tools, scientists have yet to achieve a full understanding of the role played by the gas exchange function of the lungs’ epithelial cells, especially the type I alveolar cells. Therefore, researchers at NTU Hospital used gene knockout technology to explore the role played by Notch signaling in the growth of the pulmonary alveoli. Intrigued by their findings, the researchers formed an interdisciplinary team with Director Shan-Hui Hsu of the Institute of Polymer Science and Engineering that used 3D printing

▲ Participants in the Interdisciplinary Exchange Meeting rub shoulders for a group photo.

◀ Participants engage in intense discussion during the Interdisciplinary Exchange Meeting.

to manufacture an artificial trachea with an epithelium that can help patients in need of a trachea replacement.

Last to speak was Prof. Wen-Shiang Chen who introduced the concept of “Therapeutic Ultrasound.” He pointed out that the ultrasound with which most people are familiar is diagnostic ultrasound, which relies on ultrasound’s imaging capabilities. Examples of this technology include obstetric ultrasonography, which is used to track fetal growth, and echocardiography, which is used to diagnose heart diseases. However, Prof. Chen noted that ultrasound’s applications are not limited to the diagnostic. The biothermal and biomechanical effects produced by high-energy ultrasound can induce changes within cells and tissue. By taking advantage of these microscopic changes, modern therapeutic ultrasound can be used for such purposes as tumor ablation, drug delivery, transgenesis, and opening the blood-brain barrier.

During the post-meeting banquet, Political Deputy Minister Liang-Gee Chen of the Ministry of Education, who served as NTU’s executive vice president for academics and research until his MOE appointment, called on the members of the NTU faculty to think from the broad perspective of nation and society and to devote their research efforts to making contributions to NTU and Taiwan.

NEW START-UP CENTER IN SILICON VALLEY OPENS WINDOW TO US PARTNERS



1 Alumni share conversation during the opening of the National Taiwan University@Silicon Valley Center.

2 Participants in the opening of the NTU@SV Center pose for a photo.

NTU reached a new milestone in its effort to promote innovation and entrepreneurship with the establishment of a satellite office in the heart of California's Silicon Valley. The National Taiwan University@Silicon Valley (NTU@SV) Center was officially inaugurated on June 11 with a ribbon-cutting ceremony that was attended by government appointees, elected officials, NTU alumni, and members of the entrepreneurial community. NTU President Pan-Chyr Yang traveled from Taiwan to personally officiate at the event as well as give a talk on his vision and future plans for the university.



Speaking at the event, President Yang pointed out that NTU@SV is expected to open a window for NTU's new and emerging startup teams to strengthen strategic partnerships with academic and research institutes in the United States. The center is also aimed to serve as a bridge linking trans-Pacific ethnic-Chinese entrepreneurs with Silicon Valley's spirit of innovation as well as its abundant venture resources.

NTU@SV is a platform designed to encourage people "to inspire and be inspired, to collaborate, and to communicate." Consequently, President Yang said that the center's services would be extended not just to teams formed by NTU students, faculty members, and alumni, but also to young entrepreneurs from Taiwan as well as all Chinese communities across the globe. He also expressed his vision of duplicating the center's model in order to open more facilities that will nurture entrepreneurship across the Pacific.

The university has been active in introducing entrepreneurship programs and building a comprehensive, inter-connected entrepreneurship ecosystem in recent years. For example, the university formed the NTU Entrepreneur Association in 2012, and in 2013, NTU Garage, an initial-stage student startup incubator, was established. Taidah Entrepreneur Center began offering programs and classes to mentor young minds in 2014, and NTU Design School, which was established thanks to a generous donation from an alumnus, began operations in 2015. Moreover, the first HackNTU student hackathon featuring talks, workshops, and a competition took place in 2015. And, most recently, NTU@SV held its grand opening in 2016.

National Taiwan University will continue its long-term effort to nurture innovation and entrepreneurship both on and off campus.



LAW STUDENTS WIN TOP AWARDS AT WTO MOOT COURT COMPETITION IN GENEVA

A team of four College of Law students outmatched elite teams from prestigious law schools around the globe to claim two of the top awards at the 14th ELSA Moot Court Competition on WTO Law (EMC2) this year. Composed of Chih-Yu Lee, Ning Hsu, Li-Hsuan Wu, and Wan-Ling Lin, the 2016 NTU WTO Moot Court Team finished as a Semi-finalist in the Grand Final Oral Round and received the Award for the Highest Ranked Team from the Asia Pacific Region at the competition. The international competition was held at the WTO headquarters in Geneva in early June.

Established in 2003, the EMC2 is organized by the European Law Students' Association with the support of the WTO. It is an annual competition in which teams of law students take part in simulated sessions of the WTO dispute settlement system. In a moot court setting conducted entirely in English, competing teams formulate and argue fictive cases both for the complainant and the respondent before a panel made up of WTO and trade law experts.

Prof. Chang-Fa Lo and Prof. Tsai-Yu Lin founded the NTU WTO Moot Court Team and have since led students to compete in the

EMC2 in up to 12 occasions. In total, NTU has been able to advance from the Asia-Pacific Regional Round to compete in the Final Oral Round in Geneva seven times and, in 2008 and 2011, our students out-argued all other teams to win the competition's Grand Final Oral Round.

This year's team benefited from the support of former team members who shared their competition experience while providing invaluable instruction. Making the most of its time to prepare, the team kicked off its training and practice regimen immediately after forming in September 2015.

Led by student coaches Yueh-Ping Yang and Chieh Chiu, the team began its preparations by first covering basic knowledge of WTO regulations and accumulating case analysis experience before moving on to practice theoretical opinions, procedural operations, shaping arguments, and drafting and revising legal complaints. Finally, in the run-up to the competition, the team focused on honing its oral presentation skills and question-and-answer techniques and reaction time.

The team's outstanding performance at this year's EMC2 holds great significance for the nation, as Taiwan is an official member of the WTO and considers its active participation in the trade organization as a major foundation for international exchanges.

Photo provided by the NTU Student Association.



NBA star Jeremy Lin led a basketball exchange program for students of NTU, National Taiwan Normal University, and National Taiwan University of Science and Technology at the NTU Sports Center on June 13.

Lin, whose father is an alumnus at NTU's Department of Mechanical Engineering, said to the crowd, "I heard NTU students were the smartest," and jokingly added, "The number-one ranked university in the world is Harvard, number two is NTU!"

When asked about his life at Harvard, Lin shared, "I didn't like to go to class. Harvard was OK. Sometimes it was really fun, but there was really too much homework."

Speaking further on his life as a student, Lin said he chose economics as a major after he tried to prepare for mechanical engineering while in high school and found it too difficult.

Lin's event at the NTU Sports Center was his only scheduled meeting with university students during his seven-day visit to Taiwan. Speaking at the event, the basketball star recalled his time as a Harvard student, his experience of choosing a career in professional basketball, and his rise to fame through the Linsanity fan craze. He also shared advice about how to confront frustrations and racial prejudice and define the value of success.



Post-doc Discovers New Beetle in NTU's Xitou Forest Conservation Area



Located in Nantou County's Lugu Township, the NTU Experimental Forest's Xitou Nature Education Area is Taiwan's premier site for forestry scholarship, recreation, and environmental education. This year, the area again made the headlines for the discovery of a new family of beetle.

The Fenghuang Mountain range to the east of Xitou is shaped like a scoop, which allows the area to accumulate the atmospheric moisture rising up along the upper reaches of the Jhuoshuei River and the Beishi River. This phenomenon maintains a humid climate throughout the year and has allowed the mountains around Xitou to foster a number of unique plants species, many of which are named after the area.

Despite decades of experimental logging, forest restoration work, as well as the development of educational and recreational facilities, a section of primeval broadleaf forest continues to thrive in the Xitou area. Covering the west face of the Fenghuang Mountain range and extending southward to the northern foot of Lingtuo Mountain, this old-growth forest ranges in

elevation from 1,300 to 2,000 meters and is home to an extensive sample of the area's broadleaf trees. As it is the only remaining intact stretch of virgin forest in the Fenghuang Mountain range and the mountains to the west of the range, the forest is highly valued for its biodiversity.

In 2014, the NTU Experimental Forest granted the area special protection by establishing the Xitou Fenghuang Mountain Broadleaf Forest Conservation Area. During that year, Experimental Forest researchers also commenced the first comprehensive survey of the forest's biological resources, documenting fungi, birds, butterflies, and beetles, as well as plants that grow on the ground and on other plants.

During the survey, Chun-Lin Li, a post-doc fellow at the Department and Graduate Institute of Entomology who led the project's beetle survey, managed to capture specimens of a previously undocumented family of beetle.

As this beetle has been observed only in the Xitou area, it was given the name *Megistophylla xitoui*. Chun-Lin Li and Prof. Ping-Shih Yang of the Department of Entomology jointly reported the discovery in the June issue of the New Zealand international journal *Zootaxa*. As the only beetle to bear a Latin scientific name honoring Xitou, it serves to highlight the value of the forest's rich biodiversity.



Tei-Wei Kuo and Prof. Chih-Jen Lin of the Department of Computer Science and Information Engineering were honored for their world-class research contributions by being elected as 2015 Association for Computing Machinery Fellows in June. The ACM fellowship is the organization's most prestigious award. The election of Prof. Kuo and Prof. Lin is not only a great personal honor for these two professors, but a major event for the academic computer science community in Taiwan as well.

Founded in 1947, the ACM is the most important international organization in the field of information science, and its membership currently exceeds 100,000 computer science professionals. The ACM introduced the ACM fellowship in 1993 to recognize individuals who have made outstanding contributions to the field of information science.

COMPUTER SCIENCE PROFESSORS HONORED WITH PRESTIGIOUS ACM FELLOWSHIPS

The CSIE Chair, Kun-Mao Chao, points out that this year a mere 42 people were elected as ACM fellows, all of whom are leaders in their respective areas of specialization. Judea Pearl, the winner of the 2011 ACM Turing Award, which is considered the Nobel Prize of computer science, was also named among this year's fellows.

In granting Prof. Kuo this fellowship, the ACM cited Kuo for his "contributions to performance and reliability enhancement of flash-memory storage systems." When he started teaching at the CSIE in 2000, Prof. Kuo observed a need in Taiwan's embedded system and semiconductor industries and decided to throw himself into conducting research and development on embedded systems software, with a special focus on developing advanced technology for non-volatile memory products.

For more than a decade since then, Prof. Kuo has remained dedicated to promoting both theory and practical applications, establishing close relationships with industry, and developing commercially viable advanced technology. Recognized as an academic pioneer in many areas of specialization, Kuo has driven research and development in non-volatile memory software and made a profound impact on the development of storage and memory technology.

Meanwhile, the ACM recognizes Prof. Lin "for contributions to the theory and practice of machine learning and data mining." Lin began his teaching and research career at the CSIE in 1998, becoming the then newly-established department's first assistant professor. Prof. Lin's research is focused on machine learning and data science applications. He developed his interest in machine learning only after joining the department and recruited a team of outstanding and creative students, many of whom were university students, to join his lab.

Following years of hard work, machine learning has grown into a popular field and much of the software developed by Prof. Lin and his students has become widely used in both the academic and industry communities.

SYMPOSIUM EXPLORES LOSS AND GAIN IN TRANSLATION AND INTERPRETING

NTU's Graduate Program in Translation and Interpretation joined forces with the Taiwan Association of Translation and Interpretation in hosting the 20th International Symposium on Translation and Interpreting Teaching here at NTU on March 26-27.

A major annual event for the translation and interpreting community in Taiwan, the symposium was inaugurated by TATI in 1997 to provide translators, interpreters, and scholars an occasion for learning and exchanges. This year's theme was "Is to Focus on This to Forfeit That? Loss/Gain in Translation/Interpreting."

In his opening remarks, Dean Jo-Shui Chen of the College of Liberal Arts noted that because globalization has increased demand for professional translators and interpreters, he looked forward to the symposium's becoming a platform to stimulate ideas and opinions so that new possibilities for this new discipline could be explored.

Prof. Hsien-Hao Liao, the Executive Director of the Language Training and Testing Center, advised translators and interpreters to handle every translation problem carefully, calling translation a double-edged sword that had the potential to cause either loss or gain in each act of translation.

The symposium featured three keynote speakers: Franz Pöchhacker of the Center for Translation Studies at the University of Vienna, Lawrence Wang-Chi Wong of the Research Center for Translation at Chinese University of Hong Kong, and Uganda Sze Pui Kwan of Nanyang Technological University, Singapore.

In his speech "Interpreting Studies: Two Decades of Gains," Dr. Pöchhacker explored the systematic evolution of interpreting into an independent discipline. He also expressed his hope for increased interdisciplinary collaboration to further improve interpreting pedagogy.



Dr. Wong delivered his paper "Gongshi (Tributary Envoy), Qinchai (Ambassador Plenipotentiary), and Lingshi (Consul): Translating the Official Titles of the Government Representatives of Great Britain to China Before and Around the First Opium War." The paper discussed variation in the translation of British official titles during the late Qing dynasty and considering the complicated historical background and power structure behind the variant translations.

Presenting "The Imitation Gain: Thomas F. Wade's Sinophone Transliteration and the Technologies of the Chinese Language," Dr. Kwan examined the manuscript of the English-Chinese dictionary written by the sinologist Sir Thomas Francis Wade in Chinese Romanization and analyzed the Wade-Giles system's significance for learning and teaching Chinese from the perspective of translation history.

In addition to nearly 20 paper presentations, the symposium also included a panel discussion called "21st Century Translation and Interpreting Education in Taiwan: Significance and Prospects."

1 Deputy Vice President Wu shares NTU's experience with the implementation and reform of its internationalization strategy while speaking at the NAFSA's 2016 Annual Conference.

2 Deputy Vice President Wu discusses cooperation plans with his counterparts from the University of Melbourne.



Deputy Vice President for International Affairs Jiun-Huei Protty Wu and Manager Tzu-Yu Huang of the Office of International Affairs's International Programs Division attended the 2016 Annual Conference and Expo of the NAFSA: Association of International Educators in Denver, Colorado, from May 29 to June 3.

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OIA PROMOTES COOPERATION AND SHORT-TERM PROGRAMS AT US EDUCATORS CONFERENCE

Under the theme, "Building Capacity for Global Learning," the conference provided an opportunity for NTU to expand international cooperation, promote summer programs, discuss faculty exchange programs and dual-degree opportunities, as well as enhance the quality of NTU's current student exchange programs. Deputy Vice President Wu also represented the university as a moderator and speaker, sharing NTU's experience of implementing and reforming of its internationalization strategy.

The OIA officials held talks with the representatives of nearly 60 elite universities from around the world, including universities from Canada, the United States, Australia, France, Italy, and England.

The OIA has been active in designing a diverse range of short-term programs in recent years. These programs, such as the 22 short-term summer programs of this year, have become the standard for many of Taiwan's local universities. As a result of these efforts, student enrollment in these programs has grown by over 30% each year for the past two years.

During the conference, many international universities expressed an interest in cooperating with NTU's short-term curriculums. Deputy Vice President Wu told the University of Melbourne that NTU could design a short-term Winter Plus Program that would fit the Australian university's semester schedule. Wu also worked with the University of South Carolina and University of British Columbia to arrange custom-designed summer programs, which are expected to begin in 2017.

In addition, the OIA officials discussed the feasibility of a faculty exchange program and visiting research student program with France's University of Bordeaux. It also arranged a three-university cooperation program with Japan's University of Tsukuba.

Moreover, Deputy Vice President Wu joined his counterparts from the University of Tsukuba and the University of Western Australia in delivering a speech called "Restructuring for Optimal Administration of Internationalization Efforts." NTU was the only Taiwanese university selected to deliver a speech, and Wu's performance served to enhance the university's international visibility and reputation.

NTU participated in the conference as part of a Taiwanese delegation that included the Foundation for International Cooperation in Higher Education of Taiwan and 18 local universities.

NTU President Pan-Chyr Yang delivers a speech during the APRU's 20th Annual Presidents



President Yang Heads Delegation to Belgium's Ghent University

NTU President Pan-Chyr Yang headed a six-member delegation on a mission to Belgium to visit NTU's partner university Ghent University from May 9-11. The purpose of the trip was to develop the two institutions' cooperative relationship through a match-making event that included one day of academic symposiums and two days of match-making activities. While in Belgium, the NTU delegation also took an excursion to Belgium's national biotechnology center and met with NTU alumni.

In addition to President Yang, the delegation included Vice President for International Affairs Luisa Shu-Ying Chang, Dean Ming-Syan Chen of the College of Electrical Engineering and Computer Science, Prof. Jeu-Jenq Yuann of the Department of Philosophy, Dr. Chiun Hsu of the College of Medicine, and Office of International Affairs Director for Global Alliances Linda Chang.

GU Rector Anne De Paepe first visited Taiwan in November 2015 under the arrangement of the Taipei Representative Office in the EU and Belgium. Impressed by the academic and research capabilities of Taiwan's institutions of higher learning, she wrote an invitation to President Yang immediately after returning to Belgium. Rector De Paepe expressed her university's interest in meeting with NTU representatives in the fields of cancer medicine, engineering and information science, and art and literature.

On the first day, GU officials first presented an overview of the NTU-GU partnership, and Taiwan's Representative to the EU Tung Kuo-yu delivered an address. NTU President Yang then presented the event's first lecture, titled "Inspire, Innovate, Impact—Shaping NTU to Meet Global Challenges." President Yang discussed how a research university can promote research, innovation, and interaction among students, faculty, and staff so as to create a lasting positive influence.

The NTU delegation later split up to participate in simultaneous symposiums with GU's faculties of Arts and Philosophy, Engineering and Architecture, Medicine and Health Sciences, Bioscience Engineering, Veterinary Medicine, Economics and Business Administration, Political and Social Sciences, and Psychology and Educational Sciences. During the symposiums, the delegation members discussed action plans for cooperation with their GU counterparts and visited laboratories and research facilities.

NTU and GU established their partnership in 2007 and began a student exchange program in 2010. Nearly 30 NTU students have studied at GU since then. Our College of Engineering, College of Electrical Engineering and Computer Science, and College of Liberal Arts also have faculty and administrative staff exchange agreements with their counterparts at the Belgian university.



NTU PRESIDENT ELECTED TO STEERING COMMITTEE AT APRU PRESIDENTS MEETING

▲ The opening ceremony of the APRU's 20th Annual Presidents Meeting.

► NTU President Pan-Chyr Yang presents a report during the APRU's 20th Annual Presidents Meeting.

NTU President Pan-Chyr Yang flew to Kuala Lumpur in June to represent NTU at the Association of Pacific Rim Universities Presidential Retreat and 20th Annual Presidents Meeting, which was hosted by the University of Malaya from June 26-28.



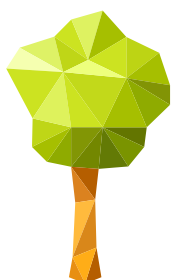
The president was accompanied by Vice President for International Affairs Luisa Shu-Ying Chang and Office of International Affairs Manager Cher Chiu at the event. President Yang played a significant role at this year's meeting as he was invited to present a report on "The APRU Vision" during the Presidents Meeting. He was also elected to the APRU Steering Committee, becoming the first NTU president to sit on the ten-member task force.

The APRU, which currently has 45 member universities, was established in 1997 to facilitate dialogue and cooperation among the premier research universities in the Asia-Pacific region. This year's presidents meeting attracted approximately 110 participants, including international affairs officials and administrators representing member universities and 20 university presidents.

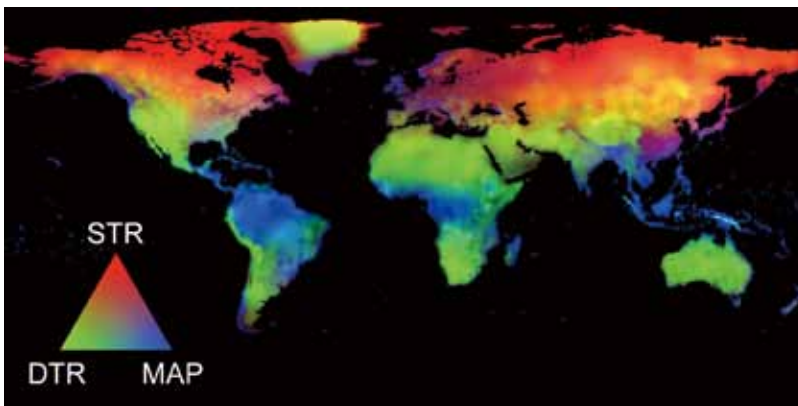
In his report, President Yang described the close cooperation and contact NTU currently enjoys and continues to expand with other APRU members. He first noted that, over the 14 years since the founding of the APRU in 2002, NTU has organized and participated in numerous symposiums on such topics as climate change, the environment and energy, public health, university library museums, and women's leadership.

This year, NTU has joined the University of Oregon and University of New South Wales in forming a core team focused on sustainable urban and landscape architecture development, which will serve as an extension of NTU's existing cooperation with the University of Illinois at Urbana-Champaign. President Yang also highlighted the three-university joint Master's program established by NTU, the University of Tsukuba, and University of Bordeaux, which drew great interest and inquiries from the audience.

President Yang's election to the Steering Committee came as the result of a year of dedicated effort by the Office of International Affairs. Yang's two-year term on the committee runs until 2018. It will be in that year, which is the year NTU celebrates its 90th Anniversary, that President Yang and NTU will have the honor of hosting the APRU Annual Presidents Meeting.



Daily Variations Have Opposite Effect to Seasonal Fluctuations on Species Distribution



◀ Long-term averages of global seasonal temperature range (STR, the red channel [R]), diurnal temperature range (DTR, the green channel [G]) and mean annual precipitation (MAP, the blue channel [B]).

▼ A photo taken by study participant Prof. Cho-ying Huang in the Chilan Mountain area in April 2016

It is a known fact among scientists that spatial distributions of fauna are sensitive to climate variabilities. Classic ecological hypotheses have all suggested that greater seasonal climatic fluctuations will result in a wider geographic distribution for a species. Proposed about a half century ago, these hypotheses have been heavily tested throughout the years. However, scientists at NTU noted that animals experience not only seasonal climatic changes but diurnal meteorological dynamics as well; however, these daily variations are rarely addressed or investigated.

To address this subject, Prof. Cho-Ying Huang of the NTU Department of Geography recently participated in a collaborative study that spent over five years analyzing a global dataset studying the distribution of species. Using new technologies to assess the influences that short-term physical environmental drivers have on a species' elevational range size, the team was surprised to find that, in general, the size of a species' elevational range is negatively correlated to the diurnal temperature range. In other words, the greater the temperature variation, the narrower the species' distribution range is recorded over different altitudes. This result is the opposite of the effect of seasonal fluctuations.

The team, which includes Wei-Ping Chan, Sheng-Feng Shen, and Wei-Chung Liu of Academia Sinica, I-Ching Chen of National Cheng Kung University, and Robert Colwell of the University of Connecticut, had its results published in the prestigious international journal *Science* in March.

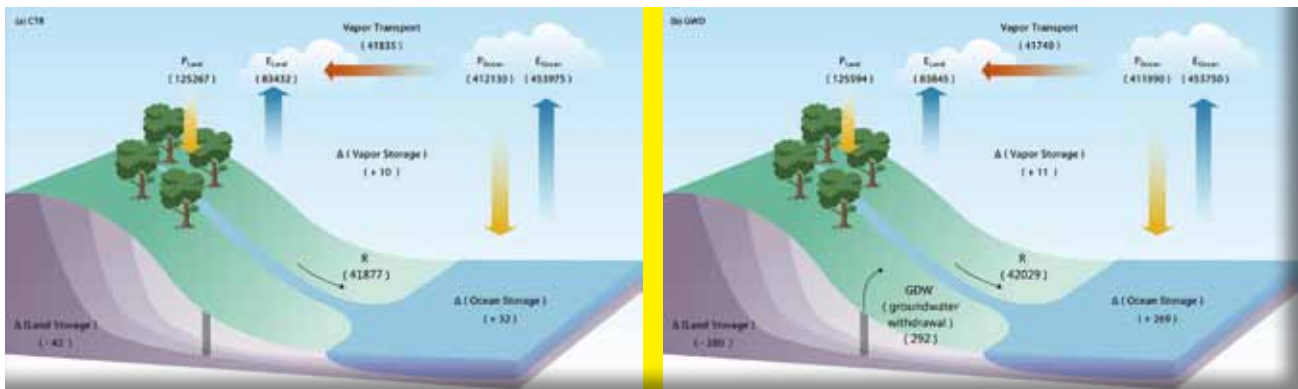
The climatic variability hypothesis states that organisms distributed across wider geographic ranges are associated with greater climatic variability. Hence, tropical mountain species are recognized to be more susceptible to climate change than species in temperate regions because tropical species are inhabitants of stable climate regimes with narrower elevational range sizes. However, this is inconsistent with what scientists have observed in the mountainous areas of tropical and near-tropical regions where daily temperature variability tends to be pronounced.

In order to investigate the comprehensiveness of this hypothesis, project leaders Shen and Chan organized a research team comprised of

ecology theorists I-Ching Chen and Robert Colwell, statistician Liu, and spatial analyst Prof. Huang. They applied structural equation modeling to investigate the relationships among climatic factors from high-resolution climatic spatial datasets and more than 16,000 species elevational range sizes on 180 montane gradients. The study's results reveal a novel macroecological rule: species elevational range sizes are influenced by diurnal and seasonal climatic variability in opposite ways.

In the past, assessments of the impact that climate change has on a species' movements have focused mainly on long-term climatic trends, especially elevated temperatures. By focusing on short-term daily variations, this study provides fresh insight that indicates a new direction for climate research.





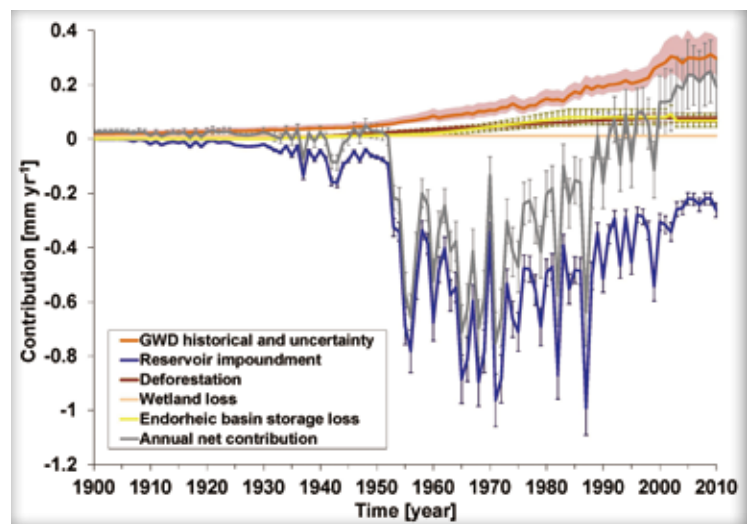
▲ Schematic diagram of global water budget over land and ocean.

Study Lowers Estimate of Groundwater Contribution to Sea Level Rise

Prof. Min-Hui Lo and Prof. Ren-Jie Wu of the Department of Atmospheric Sciences participated in an international study called “Fate of water pumped from underground and contributions to sea-level rise” that was published in the journal *Nature Climate Change* in May.

The rising sea level is a threat to coastal regions and small islands. Hence, accurately projecting rates of sea level rise is important, especially under the influence of rapid climate change. However, recent assessments also indicate that groundwater depletion (GWD) may become the most important positive terrestrial contribution to ground subsidence. Future projections of man’s increasing reliance on groundwater also suggests that GWD will become the most important singular terrestrial contribution to sea level rise over the next 50 years, likely equal in magnitude to the current contributions from glaciers and ice caps.

However, a critical assumption, including the estimates used in the International Panel on Climate Change’s Fifth Assessment Report, is that nearly 100% of groundwater extracted from aquifers ultimately ends up in the ocean. Due to limited knowledge of the pathways and mechanisms governing the ultimate fate of pumped groundwater, the relative fraction of



▼ Time series of the estimated annual contribution of terrestrial water storage change to global sea level over the period 1900-2010.

global GWD that contributes to sea level rise remains unknown.

In the study, Prof. Lo and Prof. Wu joined their international counterparts in presenting a coupled climate-hydrological model simulation that tracked the fate of water pumped from underground so as to calculate exactly how much GWD contributes to sea level changes. Their results show that when considering the land-atmosphere interactions from groundwater withdrawal, the fraction of GWD that ends up in the ocean is only 80%. This indicates that previous studies have substantially overestimated the contribution of GWD to global sea level rise by a cumulative amount of at least 10mm during the 20th century and early 21st century.

The new study improves on previous estimates by accounting for feedbacks between the land, ocean, and atmosphere. The missing 20% of water unaccounted for also means that the gap between modeled and observed sea level rise is even wider, suggesting that other sources are contributing more water than previously estimated.



Student's Robot Artist Wields Brush to Win Art Grand Prize



The future is bright for the intelligent robotics industry and NTU's International Center of Excellence in Intelligent Robotics and Automation Research (NTU-iCeIRA) stands at the forefront of all Taiwanese universities in both the scale of its robotics research as well as its success in using technology transfers to produce practical applications.

While most of the center's research is focused on industrial, medical, and service robots, one student working under the guidance of iCeIRA Director Ren C. Luo has used visual feedback and artificial intelligence to adapt and program a robot that can step into the realm of artistic creation. Moreover, Ming-Jyun Hong's robot artist not only wields a brush to reproduce images like a human painter, it does a pretty good job, as it recently won Grand Prize in the First International Robot Art Contest.

After scanning an image, the robot automatically calculates the colors it will need and mixes the colors from the basic colors of cyan, magenta, yellow, white, and black. Then, it uses the painting technique of underpainting to lay down a layer of paint that serves as the background color for the image.

As the robot paints, a camera on its wrist monitors the artwork and continuously compares it with the original in order to make corrections and minimize discrepancies. Among the reasons cited for awarding Hong's robot artist the Grand Prize were its automatic color-mixing stage and its ability to paint in the manner of a human artist.

Hong gained his inspiration to combine his own talent for painting with his robotics research during a conversation with friends and spent nearly a year sharpening his algorithms in order to adapt and program the robot for the competition.

Bearing such titles as "The Beauty of Taiwan," "King of Beasts," "Albert Einstein," and "Still Life," the robot's paintings might not be completely accurate reproductions, but they are thought-provoking and do expand the boundaries of the imagination.

Hong says he has no plans to create a commercial application based on the robot artist due to the lack of research on the required technology as well as the limited attention it would draw as an entertainment product. Still, he concedes that there is commercial potential for the robot because its integration of technology and art provides it with a draw as an object of curiosity. Hong adds that real success for the robot artist would come if it could achieve a higher level of artistry and greater adaptability and create paintings that were indistinguishable from human paintings.



Teaching and Learning



► A machine used in the "Fermentation Production Processes Practicum."



Life Science College Boosts Real-world Industry Internships

The College of Life Science was established in 2003 and currently comprises two departments, five graduate institutes, and one degree program, all of which are rich in content and diverse in training.

The Department of Life Science's educational goals emphasize instruction in both academic knowledge of the life sciences as well as current applications in technology. Its curriculum begins with instruction in the basic sciences. Second year students gain a solid proficiency in biology by studying the core subjects of contemporary biology, including genetics, cell biology, biochemistry, physiology, and ecology. At higher levels, students enjoy flexibility in selecting advanced courses that allow them to explore their fields of interest.

In recent years, the college has increased opportunities for students to pursue international studies and exchanges and expand their global perspectives. This effort includes strengthening international exchange partnerships and creating more internship opportunities and courses. Many members of the college faculty also participate in NTU's remote teaching courses. In addition, the college has teamed up with the Department of Life Science at Taiwan's Tunghai University as well as Japan's University of the Ryukyus, Indonesia's Bogor Agricultural University, and Thailand's Prince of Songkla University to offer the short-term course "Exploration of the Biodiversity and Ecology in Ryukyus—An International Summer Field Course." Organized on a rotating basis by the four universities, the ten-day course draws 30 to 40 students and professors each year.

The Department of Biochemical Science and Technology is an interdisciplinary department focused on biology as a research system and chemistry as an experimental tool. Its most distinguishing feature is its integration of the dual specializations of life science and chemistry. The department courses cover microbial and cellular technology, biochemistry, systems biology and biophysics, nutritional science, medical science, and plant and agricultural technology.

Moreover, the department program places equal emphasis on students' mastery of experimental techniques and accumulation of knowledge of both theory and practice. Aiming to promote the integration of scholarship and practice, the department opened the following two specialized courses in 2015.

"Fermentation Production Processes Practicum" is a short-term intensive laboratory summer course that takes microbiology to the level of industrial applications. Students perform experiments that develop their understanding of industrial fermentation production processes. Meanwhile, "Biochemical Technology Industry Internship" is an elective summer course designed for students after their third year. In the two-month course, students work at biotechnology companies where they gain real-world experience and practical insight into the present and future of operations in the biotech industry.

NTU at a Glance

The NTU Graduation Association carried on the NTU tradition of organizing a Taiwanese-style bando banquet for graduating students by holding its sixth banquet on May 29. The festivities were held on Royal Palm Boulevard and featured an array of 230 banquet tables.

Held for large groups on special occasions, Taiwan's bando banquets revolve around multi-course meals served at large round banquet tables and typically take place outdoors under colorful makeshift tents.

Due to the large number of students who register for the event each year, the association relies on a lucky drawing to determine which students can attend. This year, more than 2,000 lucky students won tickets.

The association cooperated with Chinatrust Commercial Bank in organizing this year's banquet. Breaking with tradition, instead of giving students entrance tickets, the organizers presented them with certificates that could be exchanged for commemorative graduation chopsticks. Not only were the utensils used during the meal, they were also taken home as a memento of the good times they shared at NTU.

Graduating Students Enjoy Bando Banquet on Royal Palm Blvd.



NTU RANKED 15TH IN ASIA

NTU garnered a ranking of 15th in the Asia University Ranking 2016, which was released by Times Higher Education in June. This year, 24 Taiwanese universities were included in the ranking's top 200. Rising two positions compared to last year, NTU was the highest ranked among the universities in Taiwan.

This is the fourth year THE has published the Asia University Ranking, and this year the survey covers the entire Asian continent. The survey relies on indicators that are assigned different weightings to quantify a university's relative standing in terms of its core missions of teaching, research, knowledge transfer, and international outlook.

This year, THE lowered the ranking's weighting of its teaching indicator from 30% to 25%, while increasing the weighting of industry income from 2.5% to 7.5%. This reflects an increased emphasis on industrial application in higher education. The weightings for the other indicators, research, citations, and international outlook, remained the same at 30%, 30%, and 7.5%, respectively.

NTU is continuing to raise its visibility and influence in the international academic community by enhancing teaching quality, developing interdisciplinary research, boosting capacity for innovative R&D, and building partnerships with elite international universities and research institutions.



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