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# NTU February 2017 No. 58 HIGHLIGHTS

## TED at NTU

NTU Biotechnologists Awarded  
for Innovation

Students Promote Public Health  
in Yunlin

Barry Lam Gallery Hosts  
Cutting-Edge Exhibit

Special Report

# ASAIHL Conference in Malaysia





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## Ching-Ray Chang

### EXECUTIVE VICE PRESIDENT FOR ADMINISTRATIVE AFFAIRS

The university introduced numerous changes in its administrative policies with the arrival of 2017. Commenting on these moves, Executive Vice President for Administrative Affairs Ching-Ray Chang affirms, "The university's administrative affairs have always been dynamic. Moreover, as the scale of the university expands many policies must be innovated to keep pace." At present, several important policy developments involve NTU's Chupei Campus, which is currently under construction. In the near future, NTU will establish a special projects office to coordinate research and theory for the new campus and design the innovative academic programs.

NTU and the Taiwan government have invested over NT\$ 6 billion in the development of the Hsinchu Biomedical Science Park. Construction is scheduled to proceed in two stages and be completed in four to five years. The campus project encompasses an academic campus and a biomedical park, which will be coupled in a symbiotic relationship similar to that between the NTU Main Campus and NTU Hospital. The university hopes the biomedical park will set the benchmark for hospitals in the Hsinchu area and make up for the lack of medical centers in the wider area, including Hsinchu City, Hsinchu County, and Miaoli County while delivering improvements to the region's medical treatment environment.

According to current plans, the academic section of the Chupei campus primarily will host interdisciplinary programs at the graduate level. Executive Vice President Chang says, "We hope to offer courses that will best utilize NTU's strengths in forming new interdisciplinary programs. We do not aim to compete with the existing science and engineering academic institutions in the area. Rather, we are focusing our plans on fields relevant to the area's main strengths and activities, for example, technology, law, and biomedical management."

The Ministry of Science and Technology has decided to allow NTU to formulate the criteria and curricula related concerning the research to be conducted at the Chupei campus. Executive Vice President Chang believes this is crucial, because as knowledge becomes more complex, academic labor is distributed ever more finely. Chang points to the situation in his own field, physics, to offer an example. While in the past an individual physicist could undertake a large volume of research, nowadays it takes an entire team of scientists and technicians to conduct even a single research project. As a consequence of the ongoing expansion of various fields of knowledge, ever more comprehensive and interdisciplinary approaches to research are required. Nowadays, large-scale scientific research projects can require the mobilization of hundreds if not thousands of people. In this new scenario, the question of how to designate the rights and responsibilities of each participant in a project is of the utmost importance.

Regarding the special projects office for research and theory, the executive vice president stresses that its most urgent mission at present is to formulate relevant support measures, acquaint researchers with the office's academic standards, and operate transparently in legal and rational fashion.

Executive Vice President Chang further maintains that, as the university grows, its interactions with society will increase and diversify. He concludes, "In response to a changing society and legal environment, we will constantly discuss positive responsive measures during which it will be of the utmost importance to strike a balance between sentiment, reason, and law, as well as maintain the feasibility of university policies."



# Book Highlights Singular Creativity of Gezaixi's Improvised Living Plays



**N**TU Press published the two-volume book *Taiwanese Improvisational Theater: Performing "Living Plays" in Gezaixi* in December. The highly-anticipated work is the culmination of nearly two decades of field surveys and research on the Taiwanese folk opera gezaixi conducted by Prof. Hoyi Lin of the Department of Drama and Theater.

Approaching her subject as improvisational theater, the author provides a probing and comprehensive exploration of the art of gezaixi and applies theoretical analysis in an attempt to construct

◀ Gezaixi narrator

a systematized dramaturgical theory for the genre. The book highlights the formerly unacknowledged accomplishments and singular creative approach of this traditional artform and broadens the academic community's awareness of its creative process and performance style.

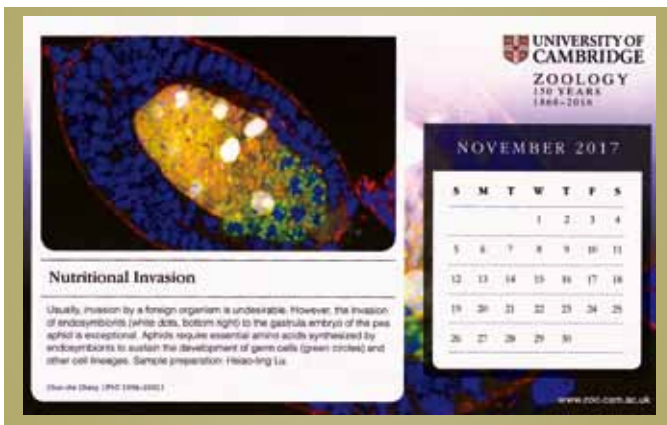
Gezaixi experienced a brief period of self-transformation during the 1920s. Aiming to win over audiences with fresh ideas, the gezaixi community pursued a scriptless improvisational performance style it called "performing living plays" and absorbed on a large scale the operas and performance styles of other major opera genres, including Beijing opera, Beiguan opera, and Gaojia opera.

Moreover, the community continuously revamped repertoires and performance content in response to the prevailing customs of the times. As a result of its innovations, the folk opera enjoyed two golden ages, one during the Japanese colonial period of the 1920s and 1930s and another during the post-war period of the 1950s and 1960s.

In Volume 1, Prof. Lin looks at gezaixi on the levels of history and development, research and practice, and performance troupe conditions and operational mechanisms in order to engage in a discussion of the theater people, actors, and musicians. Placing a special emphasis on the interaction and cooperation between the various performers, Lin presents an analysis of the creative process and manifestation of improvised gezaixi.

In Volume 2, the author compiles valuable resource materials related to the research of gezaixi. These include: a list of known operas performed in Taiwan; field notes of troupes performing improvised living plays; examples of various stage props; discussions of famous operas by renowned performers; performers' notebooks; and biographical information regarding influential theater people, actors, and musicians.

## Entomologists' Photos Appear in Cambridge Zoology Calendar



*Photographs snapped by a professor and an alumnus of the NTU Department of Entomology were named among the twelve winners of the 150th Anniversary Photo Competition of the Department of Zoology at the University of Cambridge*

**T**his wonderful coincidence and great honor is all the more special as the international competition was open to all current students and faculty members and alumni of the Cambridge department.

Prof. Chun-Che Chang earned his PhD at Cambridge in 2001. While there, he was a member of the Molecular Laboratory of the Museum of Zoology. Alumnus Syuan-Jyun Sun graduated from the Department of Entomology in 2014 and is presently a second-year PhD student of the Department of Zoology at Cambridge.

Prof. Chang's photo "Nutritional invasion" marks the month of November. The accompanying caption reads: "Usually, invasion by a foreign organism is undesirable. However, the invasion of endosymbionts (white dots, bottom right) to the gastrula embryo of the pea aphid is exceptional. Aphids require essential amino acids synthesized by endosymbionts to sustain the development of germ cells (green circles) and other cell images."

Sun's "All aboard!" represents April. Its caption reads: "Phoretic mites *Poecilochirus carabi* collectively 'hitch a ride' on a host burying beetle *Nicrophorus vespilloides* after reproduction. They both breed on carrion but, unlike the beetles, mites cannot fly. They use burying beetles as a jumbo jet to travel from one dead body to another."



The aphid in Chang's photo came from a line of pea aphids developed in Chang's laboratory. In honor of NTU's 88th Anniversary in 2016, Chang officially named the line "Line of NTU."

- ▼▶ The motto, logo, and mascot for the 47th National Intercollegiate Athletic Games were designed under the guiding concept of "green energy environment and healthy world."



## NTU PREPARING TO HOST PRESTIGIOUS NATIONAL INTERCOLLEGIATE ATHLETIC GAMES IN MAY

The campus is preparing to welcome student athletes from around the country for the 47th National Intercollegiate Athletic Games in May. Following a break of 38 years since the games were first held on the NTU campus in 1979, NTU will once again have the honor of hosting Taiwan's most prestigious athletic competition among the nation's universities, colleges and vocational institutes.

With preparations underway, many signs of the games' arrival have begun to appear, including a campus tour of public art designed for the games and a makeover of campus sporting facilities.

For hosting the games, NTU has adopted the theme of "green energy environment and healthy world" and is taking steps to ensure that the event will be environmentally friendly as well as scenic for the visiting athletes and spectators. The university is also renovating the campus sporting facilities, the athletic fields and tennis courts in particular, which will continue to provide NTU students and faculty members with world class facilities for athletic events and exercise as well as consolidate the campus' reputation as an ideal location for leisure activities and exercise.

A motto, logo, and mascot for the 47th NIAG at NTU were chosen through an open online competition that drew an enthusiastic response from people nationwide. The winners were determined by a panel of art experts and online voting by NTU students and faculty members.

"Vaulting Dreams in Palm Grove, Self Transcendence at the Games" was declared the best motto for the games, while the mascot duo Ye-Bao and Juan-Mei was chosen to represent NTU's royal palm and azalea blossoms, respectively. At a press conference on September 30, NTU President Pan-Chyr Yang presented awards to the winners and thanked them for their contribution to the success of the games.

This year's NIAG will be the first to feature wrestling matches. This will bring the combined number of competition categories to 16 for the first time. Besides wrestling, the other categories will include the 14 required events held in past games, including track and field, swimming, gymnastics (both artistic gymnastics and rhythmic gymnastics), table tennis, badminton, tennis, taekwondo, judo, fencing, archery, weightlifting, shooting, boxing, and karate, as well as cricket as an exhibition category. The addition of wrestling not only creates an elite competitive stage for the nation's wrestling fans, but also builds a bridge to international collegiate athletic competitions.

Thanks to a generous donation from Mr. Chi-Ming Luo of the Taoyuan Arts and Creativity Exchange Association, the instillation art commissioned for the games has been completed and is touring the campus. Moreover, a countdown clock has been positioned at NTU's Main Gate to stoke anticipation for the games.

NTU Vice President for International Affairs Luisa Shu-Ying Chang joins newly-elected ASAIHL President Dr. Hamid Mirzadeh of Iran's Islamic Azad University in signing a new cooperation agreement.



ANA news agency  
Photo: Alireza Mirzaei

## ASAIHL COOPERATION AGREEMENT ADVANCES NEW SOUTHBOUND POLICY

As part of NTU's effort to advance the government's New Southbound Policy, NTU Vice President for International Affairs Luisa Shu-Ying Chang and two colleagues from the OIA attended the 32nd General Conference of the Association of Southeast Asian Institutions of Higher Learning held at University Putra Malaysia in Putrajaya, Malaysia during December 4 - 7. At the conference Board of Trustees Meeting, Vice President Chang joined newly-elected ASAIHL President, Dr. Hamid Mirzadeh, of Iran's Islamic Azad University, in signing a new cooperation agreement between NTU and the association.

NTU is the only Taiwanese university in ASAIHL and its membership offers Taiwan an important foothold for the pursuit of academic diplomacy with ASEAN nations. The agreement sets a new milestone for the promotion of contacts and cooperation with universities in Southeast Asia and solidifies a cooperative relationship with ASAIHL members around the world.

ASAIHL was established in 1956 with the mission to enhance communication and cooperation between institutions of higher education in Southeast Asia and promote the advancement of teaching and research. While it is the oldest

regional organization in Southeast Asia, ASAIHL's membership includes 210 universities in 15 countries located in Asia, Europe, and the Americas.

NTU first accepted ASAIHL's invitation to participate as an observer member in 2005, became an official member in 2006, and joined the Board of Trustees in 2007. Since then, NTU has played an active role in the association, hosting the ASAIHL Conference and Board of Trustees Meeting in 2010 and 2016.

The main theme of the December conference was "Borderless Open Access Education," while its five sub-themes were Country Reports, Concepts at the Heart of Learning, Use of Innovative Technology in Learning, Equal Education for the Disadvantaged, and Academia and Industry Linkages.

Vice President Chang was accompanied at the conference by Director Margaret Wang of the OIA Center for International Education and Director Patricia Yang of the OIA International Students Division.

During the conference, Director Wang delivered a report on "Education without Borders," in which she discussed NTU's experience in implementing dual-degree programs and promoting OpenCourseWare (OCW), massive open online courses (MOOCs), and Coursera. Following the conference, the NTU delegation was approached by representatives of ASAIHL member universities in the United States, France, and Poland who expressed their interest in forming cooperative relationships with NTU.

## Honors



# NTU BIOTECHNOLOGY R&D TEAMS WIN NATIONAL INNOVATION AWARDS

**N**TU teams claimed awards for four cutting-edge technologies at the awards ceremony at the Institute for Biotechnology and Medicine Industry's 13th National Innovation Awards on December 22. The event drew its highest ever number of participants, with teams from 107 institutions submitting 142 entries.

Nearly 50 innovative technologies were exhibited on the day of the ceremony. The exhibition demonstrated that the quality of biotechnology research and development in Taiwan is driving the nation's international competitiveness in this important sector. Moreover, the long-term research and development plans presented by the participating teams revealed a growing maturity in terms of their understanding of such practical considerations as procedures for taking startups public, laws and regulations, international patents, and international clinical trials.

One of the winning NTU entries was a non-invasive imaging technique for the rapid evaluation of risk for stroke and cardiovascular diseases that was developed by teams led by Prof. Hao-Ming Hsiao of the Department of Mechanical Engineering and Prof. Hsien-Li Kao of the NTU Hospital Division of Cardiology. The judges were impressed by the innovative design concepts behind the technique's development and awarded an Academic Research Innovation Award as well as a Best Industry Potential Award.

Prof. Hsiao and Prof. Kao's non-invasive, no-contact imaging technique for the detection of carotid artery stenosis combines image processing with feature quantization. Subtle changes in the body's surface that are undetectable to the human eye are magnified so that the imaged features can

be quantized. The results enable doctors to rapidly detect signs of a number of diseases.

Prof. Ruey-Feng Chang of the Graduate Institute of Networking and Multimedia and Prof. Chiun-Sheng Huang of the NTU Hospital Breast Center were awarded a Clinical Innovation Award and Best Industry Potential Award for their development of a handheld ultrasound breast imaging scanner positioning and diagnostic assistance system. Using a magnetic tracker and ultrasound imaging analysis, their system offers improvements over the current technology for ultrasound breast examinations, which is time-consuming and has difficulty achieving accurate positioning.

An Academic Research Innovation Award went to a team led by Prof. Jane Yung-Jen Hsu of the Department of Computer Science and Information Engineering. Including researchers from NTU, National Chiao Tung University, and the National Health Research Institutes, Prof. Hsu's team developed novel N-methyl-D-aspartic acid (NMDA) receptor modulators for the treatment of negative and cognitive symptoms of schizophrenia. If the new drugs make it to market, they will help patients with such symptoms as apathy, lack of emotion, disorganized thoughts, and memory problems.

Prof. Hsien-Yeh Chen and two Master's students, Ya-Ting Tsai and Hung-Bin Hsieh, of the Graduate Institute of Chemical Engineering were presented with an Academic Research Innovation Award for their development of a customizable intraocular lens. The curvature of the lens can be adjusted to solve the vision problems of cataract patients, including nearsightedness (myopia), farsightedness (hyperopia), and presbyopia.



# Scholarships and World Ranking Main Draw for International Students

*According to the Office of International Affairs, NTU enrolled 749 international degree-seeking students in the first semester of the 2016 academic year. As the university continues to boost its enrollment of international students, local students are finding they have more and more opportunities to interact with students who come from other countries around the world during classes and social activities.*

In addition to enriching the university academically with their talents, NTU's international students also bring greater diversity to the campus and give local students opportunities to meet people from different backgrounds. The OIA recently met with a number of international students from countries in different parts of the world, including Vietnam, Japan, South Korea, Indonesia, India, Iran, and the United States, to listen to their perspectives on life on the NTU campus and in Taiwan. As they spoke, the students touched on a range of topics, including their reasons for choosing to pursue a degree at NTU, student-professor relations, and experiences of ethnic bias in Taiwan.

When asked to discuss their reasons for choosing NTU, most of the students mentioned scholarships and NTU's world ranking as the major factors





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1 In her free time, Tsai Yu Fang-Ming participates in the Vietnam Volunteer Group in order to help new immigrants living in Taiwan.

influencing their decisions. Other factors included academic exchanges with partner universities, freedom, personal discovery, and learning Mandarin.

### Scholarship and World Ranking

Tsai Yu Fang-Ming, a second-year student at the College of Law from Vietnam, says she had been hoping to study abroad and originally considered studying in an English-speaking country, but was reluctant to place an excessive financial burden on her family. "Then I happened to see that Taiwan offers full scholarships and applied to see if I had a shot," she says. Besides being enticed by the scholarship, she also had an interest in Mandarin Chinese and hoped to come to Taiwan to learn more about East Asian culture.

Opportunities for exchanges and Taiwan's cultural atmosphere ranked among the other factors that international students take into consideration when choosing to study in Taiwan. "Many schools in Malaysia have cooperation programs with Taiwan," says Lee En-Hao, a second-year Master's student at the Graduate Program of Teaching Chinese as a Second Language. During his junior year of university in Malaysia, he took the

chance to come to Taiwan to study at Ming Chuan University's School of Communication through a university partnership exchange program.

American Gao Lan-Jie majored in Chinese at a university in the United States and once spent half a month in Beijing. Still, he opted to come to Taiwan for graduate school. He prefers Taiwan's open environment because, for example, he is free to use Youtube and Google here, while these websites are prohibited in China. "In addition, Taiwan has preserved more research materials, so I decided on NTU," says Gao Lan-Jie.

Huang Shih-Hsuan, a senior in the School of Forestry and Resource Conservation, came to NTU because he wanted to learn more about Taiwan. He is a Taiwanese Japanese whose parents met while in university in Japan, got married after graduation, and decided to stay in Japan to raise a family and work.

"I speak Mandarin with my parents at home for the most part. While in elementary school, I discovered that my family's cultural customs were different from those of my classmates and I would often question who I was," says Huang Shih-Hsuan. He hopes that his time at NTU will help him to better understand the homeland in which his parents grew up.

Qin Wo-Ling is a junior in the College of Law from South Korea. Her parents are both Korean, yet she went to schools for expatriate Taiwanese and Chinese from the time she started kindergarten and only considered applying to universities in Taiwan. "My parents sent me to expatriate schools because they didn't want me to experience the academic pressure of the South Korean school system," says Qin Wo-Ling. She says that South Korean high schools have night study periods that make for a long day at school, while the expatriate schools forego this requirement.

### Cultural Differences

When discussing cultural differences, more than a few international students mention that Taiwanese display a closer sense of personal space and tend to not make a clear distinction between public and personal matters.

"In Taiwan, one often sees many couples engaged in intimate physical contact in public. One would absolutely never see this in Japan," say Huang Shih-Hsuan and Shan Tien Liou Guang, a Japanese exchange student in the Department of Economics. The two also make the comparison that, when having meals in Taiwan, their classmates usually gather all of their friends together to form a large group, while

# International Corner

in Japan, if there is an unfamiliar person at the table, someone will offer an introduction to the others first.

Still, Shan Tien Liou Guang says that, after having lived in Taiwan, he has discovered that there are more similarities between Taiwan and Japan that he had at first imagined. He also notes that he did not have much trouble adapting to NTU because, apart from the fact that many NTU students can speak Japanese, he has met many students who have an interest in Japanese culture.

## Student-Professor Relations

Law student Tsai Yu Fang-Ming also observes that relations between students and professors are much closer in Taiwan than in Vietnam. Offering an example of the lofty status afforded to teachers in Vietnam, she says that, during Vietnamese New Year, while people return to their mothers' family homes on the second day of the New Year, they also pay a New Year's visit to their teachers' homes on the third day. In Taiwan, she says, students and professors are on a more equal standing and are able to interact with each other without ceremony.

Qin Wo-Ling believes that class differences in Taiwan are not as obvious as they are in South Korea. She says, "You can't directly wave your hand to your teachers to say goodbye in South Korea, you must address them very politely." Moreover, she says that it is necessary to display a certain degree of respect to upperclassmen and unacceptable to treat them the same as students in one's year. Qin Wo-Ling says she was a little surprised by the way Taiwanese interact with each other with few boundaries and it took her a little time to adapt.

## Ethnic Bias

When discussing difficulties adapting to Taiwan, Tsai Yu Fang-Ming says



- 2 During their time at NTU, Huang Shih-Hsuan (left) and Shan Tien Liou Guang have gained a better familiarity with Taiwan's cuisine, traffic, and forms of interpersonal interaction. 3 Qin Wo-Ling believes that class differences in Taiwan are not as obvious as they are in South Korea. 4 Gao Lan-Jie transferred to the Department of Chinese Literature due to his interest in Chinese grammatical structure and culture. 5 Pan Di is deeply interested in politics and pays close attention to political issues in his homeland of India and around the world.

she sometimes feels Taiwan's discrimination against people from Southeast Asia. "One time when I was taking a taxi," she says, "the driver could tell from my accent that I am from Vietnam. Then, he asked me directly whether I had come to get married and said he could help introduce a man to me." She says that although Taiwanese do not practice obviously malicious discrimination, she can still tell that she is treated differently than people of other nationalities.

Master's student Lee En-Hao also feels he is treated differently than people from Western countries. The Malaysian says that most Taiwanese remain stuck on an impression of Southeast Asia as a region of poverty and that, if they were to go to Jakarta or Bangkok, they would come to know that those cities are even more prosperous than Taipei.

## Student Clubs

While talking about extracurricular activities, Tsai Yu Fang-Ming mentions that she has joined a few student clubs, including the Vietnam Volunteer Group and the NTU judo team. "NTU is rich in student clubs and club activities," she says, "There's a club to join for anything you can possibly imagine." She says the factors that most influence the participation of international students in certain student clubs is their level of Mandarin proficiency and the pressure of their studies.

Qin Wo-Ling says that, while she serves as president of the Korean Students Association, she spends the rest of her time focused on her law studies. Shan Tien Liou Guang teaches English to local children through NTU's International Companions for Learning. He says NTU enjoys a campus of diversity and openness where you can see people from all over the world.

▲ International students from Germany's Friedrich-Alexander University Erlangen-Nuernberg get to know local NTU students.



*More than 1,500 students eager to learn more about the abundant opportunities for overseas studies offered through NTU attended the 2017/2018 NTU Study Abroad Fair on November 15. Organized by the Office of International Affairs, the event took place under the theme "Dream the World" and aimed to encourage students to follow their dreams of seeing the world and bringing the fruits of their experiences back to Taiwan..*

The fair enjoyed the participation of more than 100 NTU partner universities from countries spanning the globe. Students from partner universities who were studying at NTU as exchange students and NTU students who had traveled abroad as exchange students set up booths representing their respective overseas institutions. At their booths, the students shared valuable first-hand information with curious NTU students, including information and statistics about their overseas universities, details about

# STUDY ABROAD FAIR ENCOURAGES STUDENTS TO DREAM THE WORLD

courses and programs, and their personal experiences of living and studying in another country.

In addition to the student-run booths, representative from many NTU partner universities, including the University of Oxford's Hertford College, University of British Columbia, Waseda University, and Ewha Womans University, also came to Taiwan in order to take part in the event. The university representatives expressed praise and appreciation to the OIA for the great effort and attention devoted to organizing the education fair.

While the partner university booths drew throngs of enthusiastic students interested in finding out more about the overseas study opportunities offered through those universities, the OIA also led information sessions explaining the overseas exchange student programs and summer programs run by NTU. The information sessions featured video presentations introducing NTU's study abroad programs.

One of the videos showed interviews with NTU students who had previously studied overseas and their parents. The student's stories about their personal growth and experiences abroad left many of the fairgoers hoping to pursue their own dreams of studying and living in another country. For students concerned about their parents' feelings about overseas studies, the moving expressions of love and support by the parents in the video provided encouragement and eased their worries.

At the invitation of NTU, Irene Tsai, the chief representative of the Taiwan Office of Trade and Investment for the Commonwealth of Pennsylvania and Taiwan Representative Office at Temple University, came to Taiwan to participate in the fair for the first time. She held an information session introducing the Dual Bachelor's Master's Degree Program at Temple University, explaining how students can earn a Bachelor's degree from NTU and a Master's degree from Temple University in just five years. Attracted by this enticing opportunity, quite a few students attended the session and inquired about the program's details.

The official representative offices of many countries in Taiwan as well as numerous education centers and language institutes also participated in the fair.

The 2018/2019 NTU Study Abroad Fair is scheduled to take place on November 11.



Vice President for Academic Affairs Hung-Chi Kuo and Director of the Undergraduate Academic Affairs Division Tai-Hsiung Horng promote NTU to students in Indonesia.

## Administrators Promote New Admissions Channel on Southeast Asia Tour

Globalization and the rapid development of information technology have prompted education systems in every country around the globe to move beyond existing frameworks and pursue reforms oriented towards inter-regional cooperation, diversity, flexibility, and efficiency. Along with this international trend, NTU has endeavored to merge Taiwan's local characteristics with a global outlook, internationalize the campus with a central focus on the recruitment of ethnic-Chinese students from around the world, and promote knowledge innovation, cross-cultural exchanges, and the cultivation of international professionals.

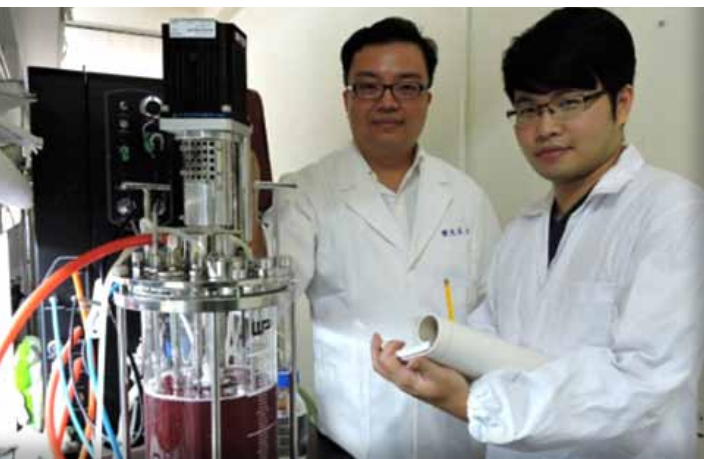
Aiming to boost the number of international students on campus, NTU introduced a new recommendation-based admissions process for high school students from Southeast Asia, Hong Kong, and Macau for the 2016/2017 academic year. These areas comprise the primary source of overseas students in Taiwan due to their geographical proximity to Taiwan. Offered as an alternative to existing channels for the admission of ethnic-Chinese and other international students, the new process invites high schools to recommend outstanding students and submit admissions applications on their behalf instead of having the students apply on their own.

The university processed applications submitted through this new channel in two stages, the first for students from Malaysia, and the second for students from Thailand, Indonesia, Vietnam, Hong Kong, and Macau. Through this channel,

28 students from Malaysia and 16 from the other areas gained admission. All of the admitted students were evaluated by their NTU departments to be outstanding or very outstanding.

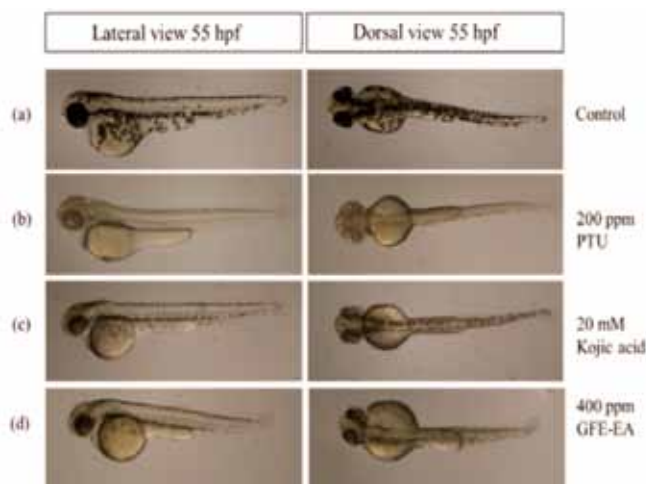
Aiming to build on this recruitment success as well as support the government's New Southbound Policy, NTU expanded the promotion of the new admissions option for the 2017/2018 academic year by teaming up with National Taiwan Normal University, National Taiwan University of Science and Technology, National Yunlin University of Science and Technology, and National Formosa University. The expansion included raising the number of openings offered at NTU through this channel to 188 and permitting the high schools to also recommend students as international degree-seeking students. The five universities offered a combined 356 openings.

Moreover, Vice President for Academic Affairs Hung-Chi Kuo and Director of the Office of Academic Affairs' Undergraduate Academic Affairs Division Tai-Hsiung Horng toured Southeast Asia last year with the goal of promoting the new admissions channel and encouraging outstanding students to study in Taiwan. Enjoying the support of local NTU alumni associations and Taiwan's overseas representative offices, the NTU officials visited prestigious high schools in Malaysia, Thailand, Indonesia, Vietnam, Hong Kong, and Macau where they held information sessions introducing NTU's academics, campus life, and admissions channels.



◀ Prof. Kuan-Chen Cheng (left) appears in the lab with the study's lead author PhD candidate Kai-Di Hsu.

▼ *Ganoderma formosanum* ethanolic extract (GFE-EA) inhibits the formation of melanin in zebrafish larvae. (a) Non-treated control group, (b) PTU control group, (c) kojic acid group, and (d) GFE-EA group



## ZEBRAFISH USED IN FIRST ANIMAL TESTS TO PROVE SKIN WHITENING EFFECTS OF LOCAL FUNGUS

The overproduction and accumulation of melanin causes hyperpigmentation and abnormal melanism, such as freckles, solar lentigines, and dark spots, which many people consider to be aesthetically undesirable. The cosmetics industry has responded by marketing a variety of skin whitening products; however, only a few skin depigmenting agents are legally approved. In Taiwan, the Ministry of Health and Welfare has authorized the use of only ten agents. Although one of these agents, kojic acid, remains commercially available in Taiwan, it has been banned in Japan due to concerns that it is carcinogenic.

Researchers in academia and industry have been actively searching for new whitening agents that are safe as well as effective. Among them is Prof. Kuan-Chen Cheng, who works at the Institute of Biotechnology and Institute of Food Science and Technology of the College of Bioresources and Agriculture. Prof. Cheng's research team has shown that mycelium extracts of *Ganoderma formosanum*, an endemic species of *Ganoderma* in Taiwan, can act as an effective demelanizing agent. Moreover, their study is the first one to use animal subjects to demonstrate the whitening effects of this local fungus, commonly known as *lingzhi*.

Tyrosinase is a crucial enzyme promoting the formation of melanin. Researchers have been searching for specific molecules capable of inhibiting tyrosinase's activity or volume of protein expression in hopes of creating safe, new whitening agents. The lead author of this study, PhD candidate Kai-Di Hsu, spent one

year testing a variety of fermentation conditions in order to cultivate *G. formosanum* mycelium and improve the production of its extracts. Hsu found that the ethyl acetate fraction of *G. formosanum* ethanolic extract (GFE-EA) produces the highest inhibition of tyrosinase activity among the fractions tested.

Using in vitro cell experimentation, Hsu discovered that GFE-EA reduced melanin production by 40% to 80%. In addition to running cell experiments, Hsu and his teammates sought the technical support of the TechComm Zebrafish Core at the College of Life Science to conduct in vivo animal tests using zebrafish larvae.

Zebrafish are considered ideal for testing melanogenic regulatory compounds due to their rapid pigment formation during embryonic development and are an effective model for drug, toxicology, and cosmetics testing because their embryos undergo percutaneous absorption of small compounds through skin and gills. The in vivo tests showed that, unlike kojic acid, GFE-EA neither leads to morphological malformations or mortality, nor significantly influences heart rate. Moreover, GFE-EA required just one-seventh of the dosage of kojic acid to achieve a comparable depigmentation effect.

Prof. Cheng affirms that the liquid fermentation technology employed in this study greatly reduces the raw materials cost of *G. formosanum* and that the team is currently applying for a patent for its innovative extract production process.

The team's study, "Extract of *Ganoderma formosanum* Mycelium as a Highly Potent Tyrosinase Inhibitor," was published in Nature Publishing Group's online journal *Scientific Reports* in September.

# Research Achievements

## MICRORNAS MODULATE CIRCADIAN RHYTHM GENES TO HELP ZEBRAFISH WITHSTAND COLD



▲ A study conducted by Prof. Shyh-Jye Lee's research team at the Research Center for Developmental Biology and Regenerative Medicine was published in the journal *BioMed Central Genomics* in November.

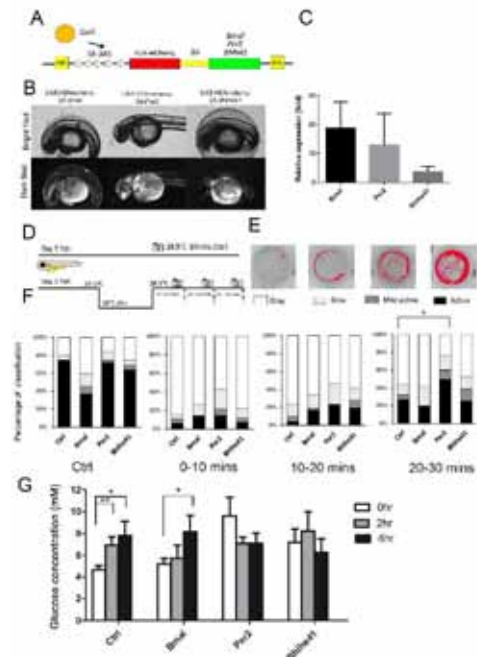
**P**rof. Shyh-Jye Lee of the Department of Life Science, director of the Research Center for Developmental Biology and Regenerative Medicine, led his research team in demonstrating that microRNAs (miRNAs) regulate the cold response of fish. Using genomics methods, the team found that miRNAs fine tune circadian rhythm genes that help zebrafish withstand cold. The team's study, "MicroRNAs regulate gene plasticity during cold shock in zebrafish larvae," was published in the journal *BioMed Central Genomics* in November.

Prof. H. Sunny Sun of National Cheng Kung University and Prof. Tsung-Ming Chen of National Kaohsiung Marine University cooperated with Prof. Lee in undertaking the study. NTU Master's students I-Chen Hung and Yu-Chuan Hsiao served as the team's main research personnel. The study was supported by a Ministry of Science and Technology program for the promotion of advanced agricultural biotechnology.

Every winter, cold fronts regularly lead to massive die-offs of aquatic animals, which results in enormous losses for Taiwan's aquaculture sector. Unfortunately, fish farmers have no effective means to prevent this cold damage. The rapid decline in environmental temperatures causes the body temperature of fish to fall quickly, which leads to a series of physiological and stress responses called cold shock.

While previous research has shown that cold shock causes death and other physiological changes in fish, scientist have yet to explain the mechanisms of molecular regulation behind these changes. MiRNAs are small non-coding RNA molecules that regulate development, cell division, and metabolism. Existing studies show that miRNAs are an important factor in the regulation of environmental stresses, including temperature changes.

As miRNAs can inhibit the degree of expression of their target mRNA, Prof. Lee and his fellow researchers, working with zebrafish larvae, performed small RNA-seq and RNA-seq analysis to gain a better understanding of the overall changes in miRNA and mRNA in response to cold. Small RNA-seq and RNA-seq are high-throughput,



▲ Prof. Shyh-Jye Lee's team discovered that microRNAs regulate the cold response of zebrafish.

next-generation sequencing methods used for miRNAome and transcriptome profiling.

Hung and Hsiao's miRNAome profiling revealed 29 up-regulated and 26 down-regulated miRNAs in response to cold shock. Further analysis showed that these miRNAs and mRNAs are involved in many cellular physiological responses, among them circadian rhythm regulation.

As previous mammalian research has shown that the enrichment of circadian clock genes assists in the regulation of cold tolerance, the team set out to characterize the functional roles of circadian clock genes in the cold response of zebrafish larvae.

The researchers discovered that most of these genes were up-regulated under cold stress, especially *per2*, one of the core clock genes, which was overexpressed by a degree of ten times. Furthermore, they found that the overexpression of *per2* in the zebrafish larvae resulted in significantly better recovery from cold shock compared to the control group. Also, glucose concentrations in the *per2* overexpressing larvae were higher than in the control group, which shows that this gene might modulate the metabolism of glucose under cold shock to achieve the goal of cold tolerance.



## BARRY LAM GALLERY GIVES BACK WITH ART AND CREATIVITY



**M**englian In the eyes of the general public, NTU's Department of Electrical Engineering is a renowned institution that produces talented professionals in electrical engineering and computer science, one that has graduated numerous influential scholars and engineers and leaders of the technology industry. NTU students, for their part, view the department as one that has benefited from the generosity of its outstanding alumni and enjoys abundant resources. Yet, few people are aware that, down in the basement of the department's Barry Lam Hall, lies an exhibition space brimming with art and creativity called the Barry Lam Art Gallery.

The department's art gallery differs from the average art gallery in that it was founded on the ideal of giving back. Consequently, not only does it eschew commercial exhibitions, it also keeps its doors open free to the public. Moreover, due to its proximity to the College of Electrical Engineering and Computer Science, the gallery has become a space for the presentation of cutting-edge exhibitions that highlight the integration of art and information technology.

In November, for instance, the art space hosted the presentation of a new virtual reality system that enables users to experience the sensation of floating or flying through the scenes of historical murals and archaeological sites. Visitors who strapped on the system's head-mounted display found themselves within Cave 61 of the Mogao Caves in Gansu, China. The virtual travelers could then enter the scenes of the cave's individual paintings where they could move in three dimensions among the brushstrokes or press a time-freeze button in order to pause to examine details. A team led by the college's Prof. Yi-Ping Hung worked in collaboration with the National Palace Museum and China's Dunhuang Research Academy to create the VR system.

The Barry Lam Art Gallery does not limit its exhibitions to only those involving the creative works of students and faculty members, but also seeks to curate a wide diversity of art events to provide artistic stimulation to groups with different tastes and backgrounds. When the gallery opened in 2007, it featured a long-term exhibition of nearly 120 works of calligraphy and traditional Chinese painting by the Taiwanese calligraphy master You-Jia Huang. While Huang is considered the heir to the great master Yu-Jen Yu, he is also an NTU electrical engineering alumnus.

For a past exhibition that explored the emergence of locally-created comic books in Taiwan, the gallery invited famous Asian comic book artists to take part. The latest exhibition showcases the imaginative art of students of the Creativity and Entrepreneurship Program. Aiming to breakthrough existing biases and frameworks of understanding, the exhibition challenged the students to merge contemporary ideas and postmodern elements into classic paintings.





# Teaching and Learning



## Students Design Interventions to Promote Health of Residents Living Near Naphtha Cracker

▼ Local residents lead an environmental and ecological tour of Wengang Village.

The College of Public Health's Institute of Health Behaviors and Community Sciences introduced the course Health Promotion in Remote Communities during the summer of 2016. Focusing on public health, the new course aims to investigate the health issues of remote and disadvantaged communities, help students develop a basic knowledge of these issues, and gain an understanding of the environmental determinants of health and health behavior.

As part of the course, the students went on two two-day/one-night excursions to communities in the vicinity of Formosa Plastics Corporation's Sixth Naphtha Cracker, including Dacheng Township in Changhua County and Mailiao Township and Taisi Township in Yunlin County. During the excursion, they conducted field interviews to gain a practical understanding of the communities' environments and resources, the health needs and viewpoints of local residents, and the current status of the Sixth Naphtha Cracker. By participating in the excursions, the students acquired the basic abilities necessary for the design, implementation, and evaluation of community health interventions.



▲ Students engage in conversation with residents of Taisi Township in Yunlin County.

Enjoying the support of the Ministry of Education's Top Universities Strategic Alliance of Taiwan Overseas Cooperation Project with the University of California, Berkeley, the course was jointly taught by Prof. Winston Tseng, a visiting assistant professor from the University of California, Berkeley, and Prof. Shu-Sen Chang of the Institute of Health Behaviors and Community Sciences and Prof. Chang-Chun Chan and Prof. Tzu-Hsuen Yuan of the Institute of Occupational Medicine and Industrial Hygiene.

The students who took the course included majors in public health, medicine, and health promotion and education at NTU, National Yang-Ming University, and National Taiwan Normal University, summer program

▼ The small groups made the final presentations of their health promotion projects at the end of the course.



During the first field excursion, the students met with different groups and organizations to gain an understanding of the range of viewpoints regarding health issues in the community. The excursion included meetings with personnel at the Public Health Bureaus and hospitals in Changhua County and Yunlin County, interactions with local residents during visits to communities near the plant, and visits to local non-governmental organizations for discussions with people concerned about health issues. The visits helped the students choose topics and develop

students from abroad, doctors and nurses, as well as people experienced in medical equipment and imaging work.

As health is a basic human right, the field of public health should strive to eradicate health inequalities. Social and environmental conditions are frequently the primary factors that lead to health inequalities and create health differences between residents of remote areas and those with access to sufficient resources. For instance, significant differences exist between mortality rates in urban and remote areas.

Therefore, the public, government, and the whole world need to work together to pursue the goals of understanding the main health issues impacting remote areas and the associations between social and environmental factors, developing community projects, and formulating policies aimed at the promotion of public health and the reduction of health inequalities.

Prof. Chan, who is also vice dean of the College of Public Health, has led his research team in studying the links between air pollution and the health of residents living in areas in the vicinity of the Sixth Naphtha Cracker over the last seven years. However, he has encountered radically different attitudes and reactions from the people of surrounding communities, local governments, the central government, businesses, and hospitals regarding his explanation of the relationship between the naphtha plant and local air pollution and his recommendations about personal health care responsibility and the distribution of resources. Lately, the question of whether to relocate the students of elementary schools near the plant to other schools has become the subject of heated debate.

The course was conducted during three weeks in July. The first week included two half-day classroom lectures each day that addressed community health, health promotion, and health issues affecting the area surrounding the naphtha plant.

ideas for their health promotion intervention projects.

During the second week of the course, the students attended classroom lectures and met for small group discussions to share their impressions of the first field excursion and finalize the objectives of their second round of field interviews. On the second excursion, the students first conducted an observation visit of the naphtha cracker's facilities and then separated into small groups to contact community groups and local residents in order to conduct further interviews that would facilitate the formulation of their intervention projects.

During the third week, the small groups met for discussions and completed their projects. Finally, the small groups made the final presentations of their health promotion projects and held discussions with the professors and other students concerning the projects.

Through the health promotion intervention projects, the groups proposed a variety of approaches aimed at helping the local communities. One aimed to build community identity by using interviews and video documentation to tell the life stories of community residents. Another proposed using the idle space in elementary schools to organize children's health activities. Targeting the students and teachers of Mailiao Township, one project designed a survey intended to determine educational needs to improve environmental awareness and promote health.

One project aimed to enhance the psychological health of elderly residents of remote communities through a long-term care plan. Another project developed a survey aimed at evaluating the health risks of farmers, such as exposure to pesticides, in Mailiao Township.

Impressed with the students' proposals, the College of Public Health decided to permit the students to apply for the Professor Shu-Yu Lee Scholarship so that they could have the chance to implement their projects.

## Men's Basketball Team Builds Cohesive Unit for Success

The NTU men's basketball team is composed of students pursuing degrees in fields not directly related to physical education. Nonetheless, under the leadership of their head coach, Department of Athletics Prof. Lien-Hsi Lin, and assistant coach, senior team member Chih-Kuan Yang, the team has continued to exceed expectations and produce surprising results.

While the basketball team succeeds in fighting its way into the top 32 teams every year, over the last five years, the team has managed twice to finish in the final eight in Division 2 of the University Basketball Association and even ended the season in fifth place in 2015.

Education at NTU is based on constant discussion and identifying and solving problems. Basketball is a thinking person's sport that allows players to put education into practice. This spirit has been a part of the basketball team from the beginning.

Apart from practice sessions and competition, the greatest challenge for the team is building a team culture, as the players come from a wide variety of places and backgrounds. Among the players are students from the College of Medicine and exchange students from Africa. By confronting the difficult task of integrating the players into a cohesive unit, the team hopes to realize its goal of being able to go head to head with teams from physical education universities.





# Salon Explores Human Perception of Time

The first TEDxNationalTaiwanUniversity salon took place on December 18. Focusing on the theme of "Transience," four speakers led the audience in exploring the human perception of the passage of time.

Prof. Chen-Gia Tsai of the Graduate Institute of Musicology discussed music and the perception of time. Prof. Kuang-Chi Hung of the Department of Geography addressed evolution and classical time. Chih-Liang Hung, a writer for Scientific American magazine, looked back to the beginning of time by way of gravitational waves. Po-Jang Hsieh, a doctor of cognitive neuroscience, spoke on the human perception of time.

This year's TEDxNTU events are taking place under the main theme of "24:01" and aim to decipher the meaning of these numbers from such aspects as framework and the future. The TEDxNTU Pitch Day will take place on March 11 and the TEDxNTU Annual Meeting be held on May 6.

For more information, please visit the official TEDxNationalTaiwanUniversity website.



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