

NTU



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President Lee Flies to Brazil

New Child and Youth Welfare Think 38 NSC

Academic Research Award Winners

World's Most Detailed 3-D Brain Images

Special Report
INSIGHT Center UXLab



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From the President's Office

Early this year, a delegation from Brazil's representative office in Taiwan visited NTU to explain the Brazilian government's new higher education initiative Science Without Borders, which is designed to allow 100,000 Brazilian university students to study abroad. I believe this is a very interesting plan and one from which NTU can learn. Therefore, I led a delegation to Brazil in May in order to visit higher education agencies, a higher education evaluation center, and three renowned universities, including the University of Sao Paulo.

Our delegation witnessed the Brazilian government's commitment to internationalization in higher education. The Science Without Borders initiative aims to send students around the world to study and then welcome them home to Brazil to continue their educations. The government covers 75% of expenses while the business community provides the remainder.

We also briefed our Brazilian counterparts on the high-quality education provided at NTU as well as NTU's soaring international rankings and superior strengths in Mandarin. At present, NTU and the Brazilian authorities are pursuing talks that might lead to NTU permitting 250 Brazilian students to study at NTU over a four-year period. It is expected these students would play an influential role in promoting political and economic cooperation between our two nations after they return home.

Besides promoting higher education exchanges, our delegation learned more about Brazil. As the world's sixth largest economy, Brazil is the leader of the BRIC nations, and many Taiwanese enterprises have invested there. Overall, it is very important for Taiwan to pay close attention to Brazil's development.

李嗣涔

President
Dr. Si-chen Lee

PRESIDENT LEE FLIES TO BRAZIL TO ATTRACT BRAZILIAN STUDENTS

In early May, President Si-chen Lee led a delegation of high-level NTU administrators on a whirlwind three-day visit to Brazil's higher education institutions. This official visit was made primarily in response to an invitation extended by Luiz Cláudio Costa, head of Brazil's Anísio Teixeira National Institute of Studies and Educational Research (INEP). Besides paying visits to prestigious universities and the INEP, President Lee's delegation met with Under Secretary for Higher Education, Amaro Lins, of the Brazilian Ministry of Education to discuss the possibility of NTU participating in Brazil's Science Without Borders initiative, a Brazilian government plan to help 100,000 Brazilian university students study abroad.

Upon arrival at the airport of the Brazilian capital, Brasilia, on the evening of May 9, President Lee's delegation was received by the director and employees of Taiwan's representative office in Brazil as well as the only NTU alumnus in Brasilia, Deputy Chairperson of the Chinese Association Chung Chin-chiang (Department of Agricultural Engineering, Class of 1961). During the ten-minute drive to the representative office, the director introduced the history and current situation of Brasilia to the delegation. At the office, he briefed them on the office's work, and later he hosted a banquet for President Lee and the delegation at his private residence.

University of Brasilia (UnB) Vice Rector João Batista de Souza led Director of the UnB International Relations Office Ana Flávia and a group of UnB professors to attend the banquet. As President Lee was in Brasilia for less than one day, the administrators of the two universities discussed establishing partner university relations over dinner.



They reached a basic consensus, leaving the details to be worked out later.

The following day, the delegation first visited the INEP where the two sides presented briefings and continued discussing how to implement international cooperation and NTU's participation in the Science Without Borders program. NTU would like Brazil to send students and researchers to universities in Taiwan, especially to NTU. The delegation then went to the Ministry of Education to meet Under Secretary Amaro Lins to discuss talent development, student exchanges and faculty matters.

While in Brazil, the delegation also signed partner university agreements with the University of São Paulo, University of Campinas and Pontifical Catholic University of Rio de Janeiro, and discussed signing a partner university agreement with UnB.

The delegation departed for Taiwan on May 11. Despite the brevity of President Lee's visit to Brazil, the delegation managed to hold numerous face-to-face talks on a variety of important issues, which made President Lee feel optimistic about participating in Brazil's Science Without Borders initiative.



NTU and Chinatrust Establish Child and Youth Welfare Think Tank



Taiwan's declining birth rate entails an urgent need to promote research on child and youth welfare. Therefore, NTU and the Chinatrust Charity Foundation (CTCF) have established the NTU and Chinatrust Charity Foundation Child, Youth and Family Research Center as a think tank. The center's mission is to draw society's attention to issues of child and youth welfare to improve the wellbeing of children and young people.

The two parties chose to promote research on the problems faced by children, young people and families because this area of concern draws scant attention from either the government or the private sector and to counter the marginalization of child and youth issues. The new think tank will actively encourage scholars and young academics to undertake research on the welfare of children, young people and families and to conduct cross-country comparisons, publish journal

articles and develop approaches for integrating the resources of industry, government and academia to provide effective assistance for solving these problems. As a research platform, the center will build a local database of child and youth research. Moreover, it will hold regular Taiwan Child and Youth Welfare Forums and release white paper reports to help the government and private organizations improve the lives of the nation's children and young people.

The CTCF is providing NT\$51 million over five years to support the think tank. CTCF's Light Up a Life campaign has raised funds for disadvantaged children and families for 27 years. Last year, it began providing microloans to disadvantaged families to help them escape poverty.

New Center to Study Policy for National Development and Wellbeing

The Center for Public Policy and Law (CPPL) opened with a special ceremony as well as an exhibition of research achievements made in 2011 on March 29. Presiding over the ceremony, president Si-chen Lee declared that the CPPL's mission is to integrate NTU's researchers who work on public policy related to overall national development and public wellbeing so as to present feasible policy and legal recommendations.



The opening of the CPPL was made possible through a NT\$10 million donation provided by Attorney Jerry P. Yu, publisher of *The Law Monthly*.

President Lee was joined by Legislative Yuan President Wang Jin-pyng, Attorney Yu, NTU Vice President for Administrative Affairs and CPPL Director Tzong-ho Bau, Dean of the College of Social Sciences Yung-mau Chao, and Dean of the College of Law Ming-Cheng Tsai in unveiling the new center's sign. More than 60 honorable guests attended

the ceremony.

Research topics to be addressed by the CPPL this year include: a study of no-fault compensation schemes for medical injuries and a preliminary examination of public attitudes towards such schemes in Taiwan; a study of medical service and management problems; problems related to the wealth gap; new poverty and disparities between northern and southern Taiwan; and recommendations for building a framework for cross-straits peace. The center is also holding three public forums this year. The topics will include: recommendations for improving the existing tax system starting from capital gains taxes; problems and solutions for higher education; and the nation's food safety mechanisms and public health.



Sinology and Management Conference Promotes Wisdom of the Ancients

The First Sinology and Management International Conference took place at NTU on April 14-15. Organized jointly by the NTU College of Management, International Taoist Philosophy Academic Foundation, and ROC Taoist Philosophy Research Society, the conference drew scholars from Taiwan, China and other countries around the world. Such local luminaries as Taiwan's Vice President Wu Dunyi, Ruentex Group CEO Samuel Yin, United Microelectronics Corp. Vice Chairman John Hsuan, Fubon Financial Holding Co. President Victor Kung, and former Minister of Education and former director of the Council for Cultural Affairs Ovid Tzeng, were also in attendance.



management; universities in Taiwan offer only standard management courses based on Western thought. The conference organizers also noted that "learning from the past to know the future" had become a new approach to learning, adding that wisdom from the *Book of Change* (Yijing) and Sun Tzu's *The Art of War* (Sunzi Bingfa) had been successfully developed as tactics in management studies and market protection.

The Henry Lee Sinology Lecture Hall was inaugurated during the conference. Funds for the construction of the hall were donated by International Taoist Philosophy Academic Foundation Chairman Henry Lee. Mr. Lee proclaimed both that Chinese philosophy tends to be proactive and creative and instills the capacity to adapt rapidly to change, and that it is a serious mistake to view Chinese philosophy as outdated simply because it is ancient. He hopes to promote the establishment of a Sinology and Management Research Center at NTU-- to apply the wisdom of the past to modern business management today.

The conference organizers observed that while several universities in China, including Peking University, recently had begun to offer advanced courses combining Sinology and management to postulate a new management approach that adds the insights of Chinese philosophy and thought to organizational



COLLEGE OF LAW UNVEILS PUBLIC ART "GARDEN OF KNOWLEDGE"



The College of Law held an unveiling ceremony for a new work of public art called "Garden of Knowledge" on March 26. The art is located outside the law college's new building.

President Si-chen Lee opened the ceremony by proclaiming that a beautiful environment is essential for nurturing the students' aesthetic sense as well as their overall quality of being. He said that he looks forward to the college cultivating ever more talented law professionals in such a beautiful environment.

Dean of General Affairs Fu-shu Jeng said that the college's new building had become a popular place for people to relax since the college returned to the main campus and that the installation of public art has made the building a great spot to appreciate the beauty of humanity. The artist, Ms. Tsun-tsun Lai, said that it was a great honor to create the artwork for the college and that she hopes its meaning will take root in the hearts and minds of the college's students.

NTU PROFESSORS CLAIM 30% OF NSC'S 2012 ACADEMIC RESEARCH AWARDS

Thirty-eight NTU professors claimed awards at the presentation ceremony for the National Science Council's 2012 Academic Research Awards on May 7. The NSC bestowed Distinguished Research Fellow Awards, Outstanding Research Awards and Wu Ta-yu



NTU's 38 recipients of the National Science Council's 2012 Academic Research Awards come together for a group photo.

Memorial Awards on 130 of the nation's outstanding researchers during the ceremony. That NTU professors earned approximately 30% of these prestigious awards demonstrates the university's leadership in research in Taiwan.

Six NTU professors were among the 16 recipients of the Distinguished Research Fellow Award this year. Winners must have earned Outstanding Research Awards at least three times. The NTU recipients were: Distinguished Prof. Kuang-chong Wu (Institute of Applied Mechanics), Prof. Wen-hann Sheu (Department of Engineering Science and Ocean Engineering), Distinguished Prof. Sy-yen Kuo (Department of Electrical Engineering), Prof. Chung-chin Kuo (Graduate Institute of Physiology), Distinguished Prof. Chern-lin Chen (Department of Electrical Engineering) and Distinguished Prof. Ren C. Luo (Department of Electrical Engineering).

Twenty-two NTU professors were among the 74 winners of the Outstanding Research Award. Recipients are awarded NT\$300,000 per year for three years. NTU's winners were: Distinguished Prof. Shih-tong Ding (Department of Animal Science and Technology), Prof. Ming-shiang Wu (Department of Primary Care Medicine), Prof. Yih-min Wu (Department of Geosciences), Prof. Yng-ing

Lee (Department of Mathematics), Prof. Shiming Lin (Center for Optoelectronic Biomedicine), Distinguished Prof. Wei-fang Su (Department of Materials Science and Engineering), Associate Prof. Jin-yuan Shih (Department of Internal Medicine), Prof. Yen-hsuan Ni (Department of Pediatrics), Prof. Jianye Ching (Department of Civil Engineering), Distinguished Prof. Hsiao-hung Chang (Department of Foreign Languages and Literatures), Distinguished Prof. Tei-wei Kuo (Department of Computer Science and Information Engineering), Prof. Yue-gau Chen (Department of Geosciences), Distinguished Prof. Homer H. Chen (Graduate Institute of Communication Engineering), Prof. Tony Hsiu-hsi Chen (Graduate Institute of Epidemiology and Preventive Medicine), Prof. Chun-wei Chen (Department of Materials Science and Engineering), Prof. Mu-hsuan Huang (Department of Library and Information Science), Prof. Tai-hong Young (Graduate Institute of Biomedical Engineering), Prof. Jye-shane Yang (Department of Chemistry), Prof. Joseph Yao-joe Yang (Department of Mechanical Engineering), Distinguished Prof. Jing-tang Yang (Department of Mechanical Engineering), Prof. Chein-shan Liu (Department of Civil Engineering) and Dr. Chia-ti Tsai (Department of Internal Medicine).

Forty researchers, including ten NTU professors, earned Wu Ta-yu Memorial Awards. The NSC presents this award to encourage exceptional young researchers to throw themselves into long-term academic research. Recipients receive NT\$500,000 each year for three years. The NTU recipients were Associate Prof. Joseph Tao-yi Wang (Department of Economics), Assistant Prof. Jeng-Daw Yu (Department of Mathematics), Associate Prof. Yen-jung Lee (Department of Accounting), Associate Prof. Winston H. Hsu (Graduate Institute of Networking and Multimedia), Associate Prof. Ying-ger Kao (Department of Physics), Associate Prof. Carol Hsu (Department of Information Management), Dr. Kuen-feng Chen (Department of Medical Research), Associate Prof. Lin-chi Chen (Department of Bio-Industrial Mechatronics Engineering), Associate Prof. Huei-wen Chen (Graduate Institute of Toxicology) and Dr. Chen-hua Liu (Department of Internal Medicine).

Alumna Louise Chow Elected to US National Academy of Science



NTU alumna Dr. Louise Chow was elected as a foreign associate to the United States National Academy of Science, which is among the greatest honors awarded to a scientist or engineer in the United States, on May 1. Dr. Chow is a professor in the Department of Biochemistry and Molecular Genetics at the University of Alabama at Birmingham (UAB) as well as a senior scientist at the UAB Comprehensive Cancer Center.

Dr. Chow graduated from NTU's Department of Agricultural Chemistry in 1965. She earned her Ph.D. at the California Institute of Technology, and then pursued post-doctoral research at the University of California-San Francisco, where she gained the inspiration for her later work focusing on DNA tumor viruses.

In 1975, Dr. Chow joined the Cold Spring Harbor Laboratory in New York, where she investigated the genetic organization, RNA transcription, and DNA replication of human adenoviruses. Dr. Chow used an electron microscope to observe the structures of viral mRNA in a complex with the viral DNA, a new method in those days, and determined the structural changes of adenovirus mRNAs at different stages. A breakthrough came in 1977, when she witnessed the previously unknown phenomenon of split genes and RNA splicing, which became fundamental to the research of diseases related to genomics and proteins.

Dr. Chow moved to the University of Rochester in 1984, where she investigated human papillomavirus (HPV) genotypes. She devised a new strategy for the detection of HPV that is now a worldwide standard. Dr. Chow continued her work on HPV after joining the UAB Comprehensive Cancer Center in 1993. She developed a process to produce infectious HPV-18 for research, which enabled scientists to reproduce the entire HPV-18 infection cycle. This innovation was essential to furthering the study of HPV pathobiology.

Dr. Chow currently focuses on virus-host interaction, which is important for developing potential therapeutic agents to treat HVP infections.

Statistician Named as American Statistical Association Fellow



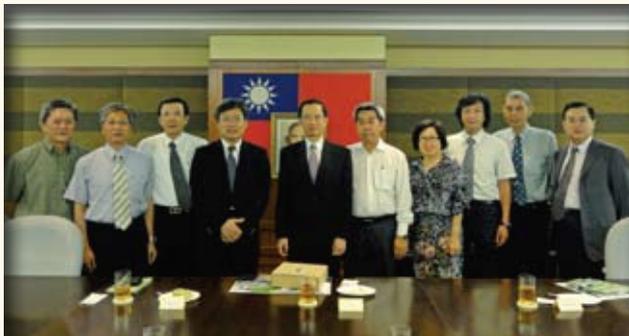
Prof. Jen-pei Liu is the first Taiwanese applying through a Taiwanese university to be named a fellow of the American Statistical Association.

Prof. Jen-pei Liu was named a fellow of the American Statistical Association in April. Prof. Liu is Director of the Statistics Education Center and teaches at the Department of Agronomy and Graduate Institute of Epidemiology and Preventive Medicine. He is the first Taiwanese scholar to apply directly through a local Taiwanese university or research institute to receive this honor. Only 48 people were honored as ASA Fellows this year; they came from 18 states in the United States and six countries.

The ASA selected Prof. Liu for this honor "for significant contributions of methodological research and applications in biostatistics, especially in bioequivalence, clinical trial design; for the leadership in statistics education reform and innovative approaches for promoting statistical literacy; and for excellence in consulting to government agencies and industries."

Among all international statistics academic organizations, the ASA boasts the most members and is recognized as the most important and most prestigious globally.

Delegation Pursues Deeper Exchanges on Tour of Vietnam and Malaysia



Vice President of Academic Affairs Ching-hua Lo led a delegation of NTU officials on a tour of Vietnam and Malaysia for six days in late March. Aiming to promote deeper exchanges with Southeast Asia and encourage international students and overseas Chinese students in the region to study at NTU, the NTU officials met with local university officials, NTU alumni and Taiwanese businesspeople.

While in Vietnam, the NTU delegation paid official visits to the Taipei Economic and Culture Office in Ho Chi Minh City, Ho Chi Minh City University of Technology (HCMUT), Alumni Association of National Taiwan University (Vietnam), Lawrence S. Ting School, and Council of Taiwanese Chambers of Commerce in Vietnam. In Malaysia, the delegation visited the Taipei Economic and Cultural

Office in Malaysia, Alumni Association of National Taiwan University (Malaysia), and Federation of Alumni



Associations of Taiwan Universities (Malaysia).

NTU and HCMUT reached a preliminary agreement to cooperate in hosting symposiums and offering dual degrees in the fields of engineering, medicine and management. HCMUT Prof. Dr. Phan Dinh Tuan also happily accepted an invitation to visit NTU in May. In Kuala Lumpur, Vice President Lo welcomed Malaysian students to apply to NTU in an interview with the *Sin Chew Daily*.

Students Share Their Experiences in Exchange Student Contest

The Office of International Affairs' eighth annual Exchange Student Contest was held right after mid-term exams. The contest's three main categories were: accomplishments, blogs, and photography.



Looking over the entries of the students who studied abroad during 2010 academic year, one realizes that most of the students are deeply appreciative of their time overseas as exchange students. Not only did most of them make personal breakthroughs and unleash their inner potential; all of them had to overcome each adversity as it arose.

Consider the case of Hang-yu Liou who went off to



study at the University of Iceland. Originally a student of foreign languages and literatures, he



discovered modern dance in Iceland and resolved to change paths completely by changing his major to dance. Also, some NTU students were attending Japanese universities precisely at the time of the 2011 Tohoku earthquake and tsunami. Their contest submissions reflected that they had gained a deeper appreciation for what they have in their lives as a result of experiencing the catastrophe.

TURKISH WOMEN'S RIGHTS ADVOCATE VISITS WOMEN'S AND GENDER PROGRAM

In early April, Dr. Ayse Feride Acar accompanied her husband, Middle East Technical University (METU) President Ahmet Acar, on a visit to NTU. On April 11, Dr. Acar spent the afternoon engaged in discussions with local gender researchers at the Women's and Gender Studies Program.

Dr. Acar is both a professor at the METU Department of Political Science and Public Administration and a women's rights consultant for Turkish and international organizations. She served as chairperson and vice-chairperson of the United Nations Committee on the Elimination of Discrimination Against Women (CEDAW) from 2001 to 2005. Dr. Acar began working at the European Council in 2006, and

has been the Turkish representative to the council's Convention on Preventing and Combating Violence Against Women and Domestic Violence, called the Istanbul Convention, since 2009.

During her visit, Dr. Acar met with NTU's women's and gender studies researchers as well as with representatives of Taiwan's women's rights NGOs, who asked her about her work with CEDAW. In turn, she was informed that even though Taiwan is not a member of the UN, Taiwan signed CEDAW in February of 2007 and completed its first CEDAW national report in March 2009.

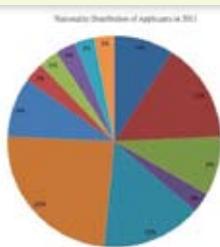
Dr. Acar praised Taiwan's efforts to eliminate gender discrimination and promote gender equality,



and encouraged everyone here to continue their endeavors to develop international contacts and exchanges to promote the notion that "women's rights are human rights."

INTERNATIONAL STUDENTS COME TO ATTEND WORLD-CLASS CHINESE LITERATURE PROGRAM

The Department of Chinese Literature offers a Bachelor's Degree Program in Chinese Literature for International Students to provide students from overseas the opportunity to learn from the department's world-class faculty and resources. The program attracted 18 international students during the 2011-2012 academic year, the highest enrollment since its introduction in the 2008-2009 academic year.



The department welcomed incoming international students for this academic year with a freshmen orientation in early September. The orientation provided the new students with detailed information on required courses, professors, the course selection process, curriculum, scholarships, and so forth. It also provided an occasion for the students to introduce themselves to one other.

Pressure from coursework is a necessary part of university life, yet international students face additional challenges, such as using a new language and balancing their budget while away from home, as well. They must handle homework and tests while also managing their finances so they may make the most of this opportunity to experience and enjoy a different culture.

The program provides instruction in classical Chinese literature and literary theory, Chinese history and geography, as well as modern literature. Courses in comparative culture, linguistics and philology allow the students to better understand the differences between languages and cultures.

There has been growing interest in the program since its introduction. In 2008, enrollment was eight students; in 2008 it was 14, in 2009 it was 17, in 2010 it was 16, and in 2011 it was 18. The program's application deadline comes every March.



Prof. Laurent Zimmerli's research team at the Institute of Plant Biology recently had two articles published that demonstrate the importance of a novel class of receptor kinases in plant resistance to microbial pathogens. Specifically, the team, working with the model plant *Arabidopsis thaliana*, discovered that the two lectin receptor kinases LecRK-VI.2 and LecRK-V.5 play a critical role for innate immunity in plants. Prof. Zimmerli's findings make a major contribution to the effort to produce crops that are more resistant to microbial pathogens.

First published in the journals *The Plant Cell* and *PLoS Pathogens*, these findings garnered high impact factors of 9.396 and 9.079, respectively. Prof. Zimmerli is the first NTU faculty member to publish research findings in these journals.

Prof. Zimmerli's research focuses on the response mechanisms of plants to microbial pathogen attacks, and his articles appear regularly in prestigious journals. While there is an abundance of research documenting the importance of lectin receptor kinase in mammal's innate immunity, the function of lectin receptor kinases in plant innate immunity remains unclear.

In *The Plant Cell* article, published in March, Zimmerli's team reports that LecRK-VI.2 is a positive regulator of *Arabidopsis* innate immunity. Notably, *lecrk-*

JOURNAL ARTICLES FURTHER UNDERSTANDING OF INNATE IMMUNITY IN PLANTS



The consequences of bacterial infection in the *Arabidopsis thaliana*

VI.2-1 knock-out mutants were more sensitive to bacterial infection. Enhanced sensitivity was correlated with reduced innate immunity activation, such as defective up-regulation of innate immunity marker genes, impaired callose deposition, and stomatal closure upon bacterial infection. Overexpression studies combined with genome-wide microarray analyses indicated that LecRK-VI.2 positively regulates *Arabidopsis* innate immunity. In addition, the team pointed out that LecRK-VI.2 works independently of the microbe-associated molecular pattern flagellin receptor complex, suggesting a new signaling pathway in plant innate immunity.

Stomata are small pores on the lower side of leaves that are critical for CO₂ uptake and photosynthesis. Pathogenic bacteria penetrate leaf tissue through stomatal openings. As an innate immunity response, plants close stomata that come in

contact with bacteria.

The team's *PLoS Pathogens* article, published in February, demonstrates that LecRK-V.5 is vital to *Arabidopsis* stomatal immunity. Loss of LecRK-V.5 function increased resistance to surface inoculation with virulent bacteria, while lines overexpressing LecRK-V.5 were more susceptible to bacteria. The team also discovered that LecRK-V.5 is rapidly expressed in stomata after bacterial inoculation. They also showed that LecRK-V.5 interferes with abscisic acid signaling, a plant



An electron microscope photograph reveals stomata on the underside of a leaf.

hormone involved in stomatal closure, upstream of reactive oxygen species production. These results provide genetic evidence that LecRK-V.5 negatively regulates stomatal immunity. The team's data reveal that plants have evolved mechanisms to reverse bacteria-mediated stomatal closure to prevent long-term effect on CO₂ uptake and photosynthesis.

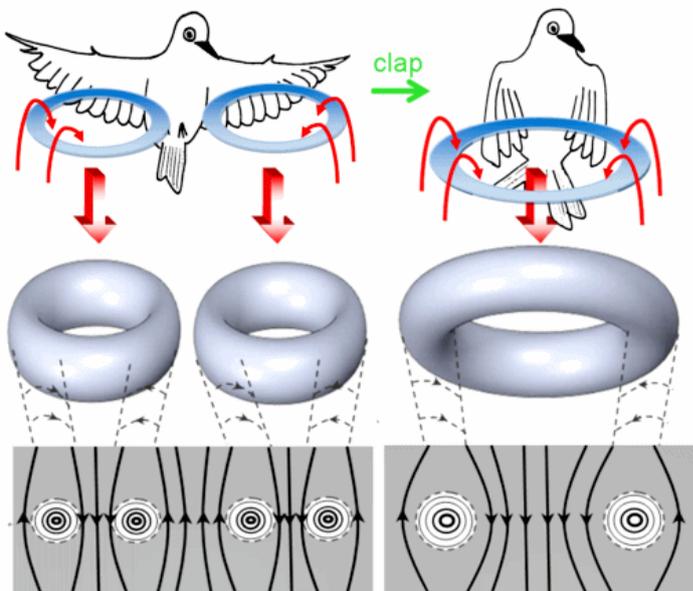
Up to 25 % of agricultural yield is lost every year to attack by microbial pathogens. The identification of central plant defense elements, such as LecRK-VI.2 and LecRK-V.5, may generate novel breeding strategies for establishing a sustainable agricultural system.

STUDY OF EYE STABILITY OF HOVERING BIRDS FEATURED IN *NATURE PHYSICS*

The findings of a research team led by Prof. Jing-tang Yang, Department of Mechanical Engineering, on how small birds hold the position of their eyes steady while hovering were featured in an article, "Aerodynamics: Bird's Eye View," by Senior Editor Andreas Tröbsinger in the "News and Views" section of *Nature Physics* (August 2011). Prof. Yang's findings were also reported in the American Physical Society's *Physics Buzz* blog in a piece titled, "How Some Birds Keep Their Eyes on the Prize" (June 2011). The findings were first reported in the article, "Aerodynamic Trick for Visual Stabilization During Downstroke in a Hovering Bird," which appeared in *Physical Review E* (DOI:10.1103/

The study points out some impressive capabilities of small birds. Hummingbirds, for instance, manage to fly backwards and sideways, while other small birds have also mastered hovering flight, with their bodies seemingly suspended in midair as they rapidly flap their wings. Prof. Yang's team identified a phenomenon that makes this feat seem even more remarkable, at least from a mechanics point of view: the most stable point of the bird's motion while hovering is not at its center of gravity but at eye level.

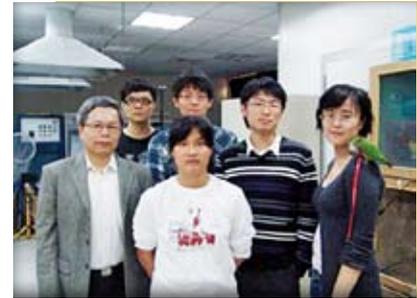
To work out how hovering birds manage to stabilize their position such that their eyes remain at the center of motion, the researchers studied a passerine bird known as the Japanese White-eye. They



These graphics show the dynamic structure of the downward air jet generated by the downstroke of the wings of the Japanese White-eye.

PhysRevE.84.012901; July 2011), a publication of the American Physical Society.

trained the birds to perform their hovering flight inside a chamber monitored by high-speed cameras, each recording 1,000 frames per second, which is fast enough to

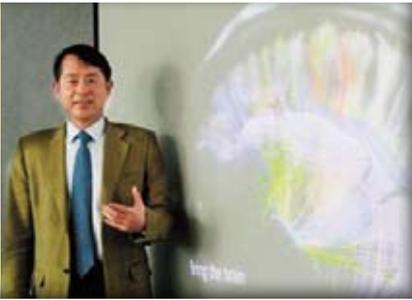


Professor Jing-tang Yang (left) and his NTU research team show off one of their feathered friends.

finely resolve the flapping motion at around 24 Hz.

The videos reveal that the bird's body swings up and down quite substantially during hovering. The point of action of the lifting force does not, however, coincide with the center of mass of the passerine; instead, its position is slightly dorsal. The team discovered this by studying the aerodynamic mechanism of the bird's flapping. The Japanese White-eye swings up and down while hovering. During downstroke, the extended wings generate a downward air jet that pushes the bird up. However, when the wings are retracted, the bird becomes aerodynamically inactive, and the bird drops under gravity to its original position. The bird can further stabilize its head and eyes by muscular and skeletal motion. This enables it not only to keep a level head, but also to maintain a steady gaze and keep its eyes on the prize.

There is much to be learned and imitated from other creatures. Understanding the aerodynamic mechanisms that allow small birds to maintain the position of their eyes while hovering could lead to innovative applications in the development of micro aerial vehicles.



RESEARCHERS PRESENT MOST DETAILED 3-D IMAGES OF BRAIN CONNECTIVITY IN *SCIENCE*

The human brain comprises approximately 100 billion neurons that are interconnected in a dense network made up of an even far greater number of threadlike nerve fibers. In the March 30 issue of *Science*, Prof. Wen-yih Tseng of the College of Medicine and Dr. Van Wedeen of Harvard Medical School reported on their landmark imaging research that has shown the brain's neurons to be organized in a simple three-dimensional geometric grid structure. This research has generated the most detailed images of the brain's structure to date and is expected to bring scientists closer to unraveling many of the mysteries of the brain.



Using sophisticated mathematical analysis of data produced by the most powerful magnetic resonance imaging (MRI)



scanner of its kind, the investigators discovered that the nerve fibers of the brains of four species of monkey, as well as of humans, are organized in a simple three-dimensional structure constituted of nerve fibers laid out either parallel or perpendicular to each other, like the rows and columns of a chessboard. The nerve fibers are arranged parallel to the three axes of the body, which run from front to back, left to right, and top to bottom. This type of structure conforms to the dimensions of three-dimensional space and thus might explain how the human brain interprets the three-dimensional location of spatial information accurately.

This simple three-dimensional structure of brain connectivity had remained undiscovered because the traditional method of using chemical tracers in neural pathways to image neurons allowed only the observation of a small portion of nerve fibers rather than overall structural patterns. The team's breakthrough was made possible by the use of advanced MRI method of diffusion spectrum imaging (DSI).

Dr. Wedeen's team is working as part of a consortium of institutions

to work on the US National Institutes of Health's Human Connectome Project, which aims to build a network map of the human brain.

At the end of 2011, the Ministry of Economic Affairs began funding Prof. Tseng's research team to develop an MRI system for the study of the connective structure of the brain. The ministry hopes to utilize this project to cultivate professional medical instrument research and development personnel so as to spur the development of Taiwan's medical instrument industry.

Prof. Tseng's research team is presently working closely with medical centers in Taiwan and abroad to investigate the six major neurological diseases of schizophrenia, hyperactivity, autism, dementia, epilepsy and strokes. Prof. Tseng expects to complete the production of Taiwan's first prototype brain connectivity MRI system in 2014 and use it to establish a database of the connective structures of brains from normal subjects and those suffering from neurological diseases.

INTERNATIONAL INTELLIGENT ROBOTICS AND AUTOMATION CENTER OPENS

The opening ceremony of the NTU International Center of Excellence on Intelligent Robotics and Automation Research (NTU-iCeIRA) was held at the Center for Condensed Matter Sciences on May



4. Fittingly, a robot that resembled Einstein at 27 presided over the event as the master of ceremonies, while the educational and entertainment robot RenQ served as an usher for the event's honored guests.

In addressing the audience, President Si-chen Lee noted that the second phase of the Aim for the Top University Project commenced last year, and that, although the Ministry of Education did not set any targets for the project, NTU itself has set the goal of entering the ranks of the world's top 50 universities. President Lee also expressed his gratitude to the National Science Council's (NSC) International Research-intensive Centers of Excellence (IRICE) program for creating the opportunity to use an institution-to-institution approach to rapidly enhance NTU's standing. He said that the NTU-iCeIRA plays an important role because it was established in cooperation with three major French institutions—the French National Center for Scientific Research (CNRS), the French National Institute for

Research in Computer Science and Control (INRIA), and Pierre and Marie Curie University (UPMC). He concluded that there were three important points in establishing the center: first, cooperating with the European Union; second, cooperating with the three French institutions; and third, creating a close alliance with industry.

Taiwan's Vice President Vincent Siew stated that the establishment of the NTU-iCeIRA is not simply a major event for NTU, it provides



great inspiration for Taiwan's multinational enterprises. He added that everyone knows that Taiwan's enterprises need to upgrade and transform, that they must make improvements in many industrial technologies. He also pointed out that robotics and automation are vital and necessary technologies for the survival of Taiwan's industry.

The CNRS is the main representative of the French parties in this cooperation project. The directors of the three French institutions, in accordance with



NSC regulations, signed letters of commitment pledging to join the NSC and NTU with each providing one-third of the funds to support the operation of the international NTU-iCeIRA for five years.

Also during the ceremony, it was announced that 25 enterprises and institutions in Taiwan will sign memoranda of understanding with the NTU-iCeIRA. These include such major Taiwanese and international companies as Foxconn Technology Group, National Instruments Corp., and Shanghai Commercial and Savings Bank. With the support of these major enterprises, it is expected that the NTU-iCeIRA will make a powerful comprehensive impact in speeding up the development of Taiwan's robotics and automation



technology research standards and assist industry in transforming and upgrading to raise our international competitiveness.



Cool Off With an NTU Popsicle or Ice Cream Sandwich This Summer

The NTU Experimental Farm has been a respected maker of delicious food products for years. The list of its products includes frozen treats, breads, cakes, dairy products, meat products, vegetables, healthy teas, natural gelatins, and fruit juices. These products have been enjoyed by both students and neighborhood residents for decades. Yet, among all of these tasty foods, when summer pushes up the mercury, it is the cool and refreshing popsicles and ice cream sandwiches that beat the heat.

NTU's frozen treats have been sold for over half a century. Around 1965, the Experimental Farm's Animal Husbandry Section began using its self-produced fresh NTU Milk to make popsicles and ice cream sandwiches. In the early years, the equipment for making the popsicles was rather primitive: one saltwater vat and popsicle molds to be filled by hand, from which the popsicles were removed by hand after they were frozen.

As the treats drew an enthusiastic fan base of students and members of the public, the Technical Subsection of the Experimental Farm's Management Section took over production. This led to the purchase of new equipment, and the packaging gained a greater sense of design as well. Though the production processes and packaging may have changed,

the recipes for the popsicles and ice cream sandwiches have remained the same for 60 years.

At present, the popsicles are offered in red bean and peanut flavors, and sell for just NT\$10 each. The ice cream sandwiches are milk-flavored ice cream squeezed between two soda crackers, and go for NT\$15 each.

Mr. Yang, a fourth-year student of the Department of Electrical Engineering, says that during the summer after he gets out of class he likes to go to the Experimental Farm's exhibition and retail outlet to buy a popsicle to cool off. He especially enjoys the red bean popsicles because he gets a mouthful of beans in every bite and the ingredients are heartier than those in popsicles bought elsewhere. Mr. Lin, who lives near NTU, says he loves to buy NTU popsicles during his evening walks around campus in the summer. He says that NTU popsicles have a good texture, and at just NT\$10 each they are a great deal. Mr. Lin adds that seeing NTU's name on the store's sign puts him at ease, so he does not have to worry about food sanitation.

For students interested in learning about the magic behind NTU's frozen treats, the College of Bioresources and Agriculture offers the internship course Hands-on Experience of Modern Agriculture, in which students are trained how to manufacture the popsicles and ice cream sandwiches.



Renowned Australian Population and Migration Expert Speaks at Conference



Prof. Nora Lan-hung Chiang (left) takes part in the population conference with international population studies experts Graeme Hugo (center) and Monica Das Gupta (right).

As we enter an era of very low fertility rates, population movements will have a far-reaching impact on the makeup of Taiwan's population. The national government's relaxation of international business immigration and establishment of the National Immigration Agency in recent years is evidence of the increasing importance of international mobility and the flow of international labor in Taiwan. In recent years, Taiwan has been facing a number of emerging international mobility issues, including a major influx of low-skilled international labor and, after the 1990s, of marriage immigrants, as well as a brain drain created by a deepening integration with China's economy.

Trends of international mobility and the entrance of a diversity of ethnic groups have transformed Taiwan's population, and ethnicity and mobility have become emerging issues for population research in Taiwan. In light of these developments, the Population and Gender Studies Center (PGSC) obtained funding from the National Science Council to invite renowned Australian population studies expert Prof. Graeme Hugo to Taiwan to participate in an academic conference, present a public lecture, and engage in exchanges with major academic institutions from April 24 to 27. Prof. Hugo not only held discussions with local and international experts addressing

the above issues but offered suggestions on the government's immigration policies and related actions.

Prof. Hugo teaches geographical and environmental studies at the University of Adelaide and is director of the Australian Population and Migration Research Centre. He was an Australian Research Council (ARC) Federation Fellow from 2002 to 2007 and is an ARC Australian Professorial Fellow for the period of 2009 to 2013. Prof. Hugo is also chair of the Advisory Committee on Demography and Livability of Australia's Department of Sustainability, Environment, Water, Population, and Communities.

To date, Prof. Hugo has authored over 300 books, articles in academic journals, and book chapters, as well as numerous conference papers and reports. He is international editor and consultant for the *Journal of Population Studies* (Taiwan Social Sciences Citation Index), which is published jointly by the PGSC and Population Association of Taiwan. Prof. Hugo is a longtime observer of population and mobility issues and in recent years has conducted probing research on Australia's immigrant population and returning immigrants in Asia. He is a world-

renowned scholar in the field of population and migration studies.

Prof. Hugo lectured on "Vietnamese Marriage Migration to Taiwan and Korea" for the course Population Issues and Research on April 25. At the 2012 Annual Conference of the Population Association of Taiwan on April 27, Prof. Hugo delivered the keynote speech, "Internal and International Migration in Asia and the Pacific: Exploring the Linkages." During the conference, Prof. Hugo held academic discussions and exchanges with local and international scholars and graduate students.

Population Association of Taiwan Director Jack Ching-syang Yue speaks during the population conference.



Australian Doctor of Physical Therapy Speaks at Annual Conference



Physical therapy education has evolved rapidly over the last decade in Western society, and Doctor of Physical Therapy (DPT) programs are now offered through 95% of the physical therapy programs in the United States. The University of Melbourne inaugurated its DPT program in 2011. Physical therapy education worldwide is moving

towards higher level degree programs with more emphasis on quality of clinical education and training.

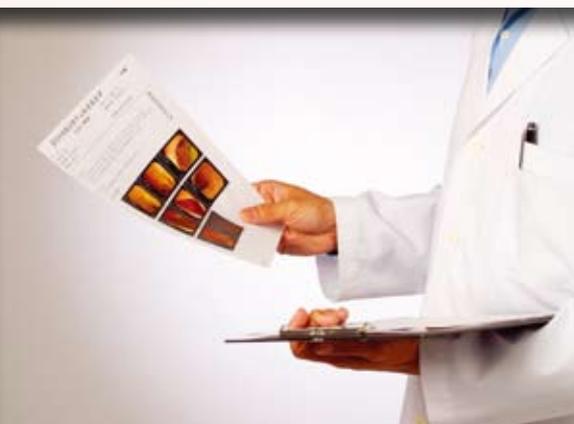
The Taiwan Physical Therapy Association (PTAROC) held its 37th annual conference at NTU's School and Graduate Institute of Physical Therapy (NTU-PT) in March. Dr. Suh-fang Jeng, the chairperson of NTU-PT and president of PTAROC, invited Dr. Gillian Webb, the Asia Western Pacific Region (AWP) chairperson of the World Confederation of Physical Therapy (WCPT) and associate professor at the University of Melbourne, to be the keynote speaker. The conference also provided an opportunity to promote the 5th AWP Regional Congress and 12th Asian Confederation of Physical Therapy (ACPT) Congress, which will be held jointly in Taiwan, September 5-8, 2013.

Dr. Webb gave two presentations during the conference: "Trends in Physiotherapy Education and Practice Globally" and "How to Set-up a Proper Clinical Education Program in Physiotherapy." Her insightful presentations provided valuable recommendations concerning the improvement of physical therapy

education and drew an enthusiastic response from the over 450 physical therapists in attendance.

Dr. Webb quoted Liam J. Donaldson: "Health care in the 21st century will require a new kind of health professional: someone who is equipped to transcend the traditional practitioner-patient relationship to reach a new level of partnership with patients; someone who can lead, manage and work effectively in a team and organizational environment; someone who can practice safe high quality care but also constantly see and create the opportunities for improvement." She added, "All health professionals should be educated to mobilize knowledge and to engage in critical reasoning and ethical conduct so they are competent to participate in patient- and population-centered health systems as members of locally responsive and globally connected teams."

Dr. Webb explained that the purpose of having a higher level physical therapy clinical education program is to train specialist physical therapists who can: 1) be self directed, autonomous practitioners who can work independently or in teams, 2) have skills in clinical reasoning and decision making, and 3) base their work on the best available evidence. She also listed her expectations of all practicing physical therapists: 1) we need to be accountable to our patients, our communities, our profession, and funding bodies, 2) we need to be advocates for our patients, our communities, and the health outcomes of the country, and 3) we will need to be lifelong learners committed to our ongoing professional development and that of our colleagues.



NTU Law Team Stands Out Again at WTO Moot Court Competition



The College of Law's Moot Court Team again demonstrated its world-class prowess at another European Law Students' Association Moot Court Competition. This time it was at the Asia-Pacific Regional Round of the 10th WTO ELSA Moot Court Competition (EMC2), held in Jakarta, Indonesia, March 2-7. Not only did the NTU team come in as runner-up, it also claimed the prize for the Best Overall Written Submission. The team's second-place finish earned it an invitation to the prestigious Final Oral Round of the 10th WTO EMC2, held in Montpellier, France, in May.

The Asia-Pacific Regional Round drew 13 teams this year. Countries with teams at the competition included New Zealand, Japan, India, the Philippines, Indonesia, China and Vietnam. The NTU team was one of two teams representing Taiwan. The regional round's winner, the Jindal Global Law School from India, and third-place team, Ateneo de Manila Law School from the Philippines, joined NTU in moving on to the final round in France. Other regional rounds were held in Europe and the Americas.



The College of Law's Asian Center for WTO and International Health Law and Policy has been active in the EMC2 as both a host and competitor. It hosted the Asia-Pacific Regional Round here at NTU for five consecutive years, starting in 2006 and played host to the Final Oral Round in 2009.

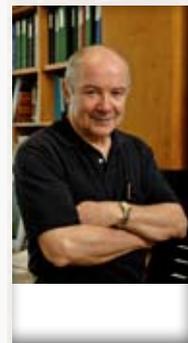
Competing in the event since 2005, the center's teams have racked up a series of impressive performances. In 2006, after taking first place in the regional round, the team took place fifth in the finals. It came in second in both the regional round and finals in 2008. The team again won its regional round in 2009 and earned second place in the final round in 2011. Team members have also won a number of individual awards.



Nobel Laureate in Chemistry Returns to NTU to Lecture



This year, the 1988 Nobel laureate in Chemistry, Prof. Johann Deisenhofer, visited NTU for the third time. In early May, Prof. Deisenhofer presented two lectures and participated in one forum at NTU.



Prof. Deisenhofer was awarded the Nobel Prize in Chemistry

along with Hartmut Michel and Robert Huber for their determination of the first crystal structure of an integral membrane protein, which is vital to photosynthesis. Following his participation in the Maestro Lectures on the Structure and Function of Membrane Proteins during NTU's 80th anniversary in 2008, Prof. Deisenhofer graciously accepted the invitation to be an NTU distinguished research chair professor and sit on the advisory panel of the Membrane Protein Structure and Function Core Laboratory and Research Groups.

He lectured on "Perspectives in Computational Biology and Bioinformatics" and "Structural Biology: Challenges and Prospects." The forum addressed the current state of and outlook for biotechnology research and development in Taiwan.

Chemist Builds Intricate Nanomolecular Models with Beads



(left) An enormous light-emitting sculpture of an extended metal atom chain decorates the Department of Chemistry Building.

(right) A child is enthralled by the beauty of Prof. Bih-yaw Jin's intricate bead models of nanomolecules.

Prof. Bih-yaw Jin of the Department of Chemistry's Center for Theoretical Science and Center for Quantum Science and Engineering has devised a fun way to combine chemistry, geometry and art—he strings beads together to construct intricate and accurate three-dimensional models of nanomolecules.

Yet, Prof. Jin is not simply playing with arts and crafts or pursuing a hobby to pass the time, he gains insight into the mathematical and scientific principles underpinning molecular structure through this endeavor. He says his bead models are not only aesthetically pleasing, but inspire him scientifically, as

well, by helping him more clearly understand molecular structure and chemical bonds.

The scientist/artist has even co-authored a journal article entitled "Molecular Modeling of Fullerenes with Beads" (*J. Chem. Edu.* 2012, 89 (3), 414–416), which appeared in the *Journal of Chemical Education* in January. And, he runs a blog on Blogspot called The Beaded Molecules, where he posts colorful photographs of his models along with detailed descriptions in English.

Most of the models Prof. Jin builds are of fullerenes and graphenes, including carbon 60,

carbon 70, and other closed cage-like fullerenes. Other structures include helically coiled carbon nanotubes, gyroid carbon nanotubes, and trefoil knot carbon nanotubes. Beads can also be used to construct such microstructures as alkane molecules, extended metal atom chains, Platonic shapes and Sierpinski triangles.

In early May, Prof. Jin experienced a rare pleasure. While the 2011 Nobel laureate in Chemistry, Dan Shechtman, was in town for an international quasicrystal conference, Prof. Jin presented him with a bead model of a high-genus fullerene.

INSIGHT Center's UXLab Makes Users Part of the R&D Process

The interdisciplinary team of innovative researchers at the INSIGHT Center (the Center of Innovation and Synergy for Intelligent Home and Living Technology) have set up the User Experience Lab (UXLab) to let users be part of the research and development process.

The UXLab is divided by a one-way mirror to provide separate spaces for an observation room and testing room. This permits product developers and researchers to observe users in the process of using products without disturbing them.

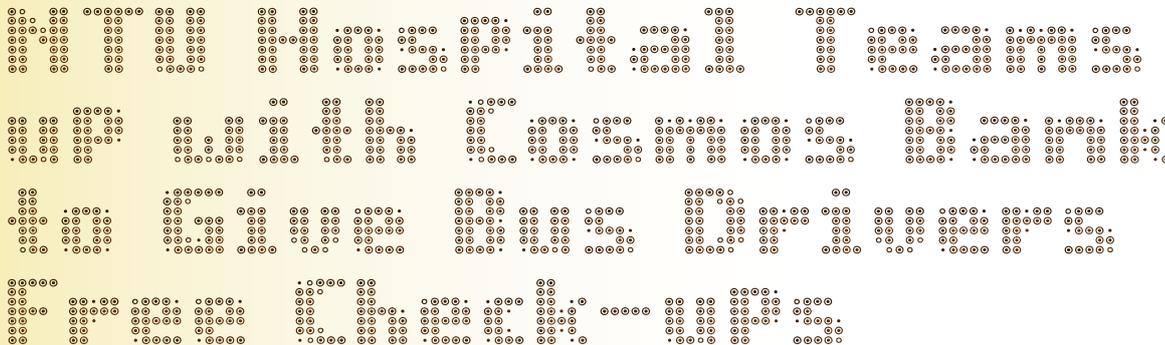


The lab is equipped with a wide range of devices that ensure investigators will be able to capture large volumes of accurate data. One such device is a high-speed eye tracker that allows researchers to understand the relations between actions and cognitive processing by recording and analyzing eye movement.

The UXLab also employs powerful software that allows researchers to carry out probing experiments. FaceReader automatically detects and analyses facial expressions to provide objective data concerning a subject's emotions. Morae is usability software that analyses human-machine interaction. The lab also uses Observer and Experiment Builder.

Besides its own research projects, the UXLab also works with industry to help product developers design the products of the future as well as improve the usability of existing products.

NTU at a Glance



NTU Hospital and Cosmos Bank joined hands to provide free health checkups to bus drivers and passengers at Taipei West Bus Station Terminal A on April 10 and Terminal B on April 11. The partners believe it is important to take healthcare into the community.



The bus drivers rolling in and out of the station 24 hours a day often work consecutive day and night shifts to provide round-the-clock bus service. This is toilsome work that can have a deleterious impact on the drivers' health and in turn lead to safety problems. Moreover, the drivers' irregular schedules make it difficult for them to find time to visit the hospital.

The check-ups measured height, weight, waist girth, blood pressure and blood-sugar levels. They also offered free cancer screenings. People 30 years old or older who smoked cigarettes or chewed betel nut (or have quit betel nut) were offered oral cancer screenings once every two years. People aged 50 to 69 were offered fecal occult blood tests. Women 45 to 69 years old and women 40 to 44 years old with a family history of breast cancer were offered mammograms, for which they were required to make appointments with NTU Hospital.





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佛學概論



Sharing Knowledge with the World Through OpenCourseWare

The OpenCourseWare (OCW) movement is a trend that has spread around the world over the last decade. OCW exploits the power of the Internet by allowing universities to share course materials with the public at large. NTU has begun its own OCW initiative to fulfill its social responsibility by sharing its abundant academic resources more widely.

In order to compile a comprehensive selection of high-quality OCW courses, the university has called on each department to produce videos of courses highlighting its strengths. These include required courses, general education courses as well as specially-design course modules.

Though the course videos are the most important part of OCW, NTU also requires professors to supply class syllabi, lecture notes, educational activities, required reading lists and homework guidance. The university's OCW courses are made available through a Creative Commons license.

Since formally introducing its OCW initiative in August 2011, NTU has compiled a selection of 78 courses. The university is working to accomplish its goal of providing at least 30 new OCW courses each semester.

NTU's OCW website is located at <http://ocw.aca.ntu.edu.tw/ntu-ocw/>.



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