

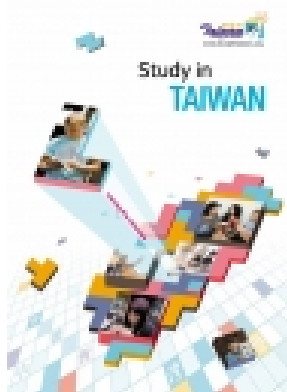


30 June 2012

**Science, Technology and Education News from Taiwan  
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**“Incredible Green Contest”**

Acer Foundation kicked off the first annual Green Contest 2012 to promote better and greener living environment. The Green Contest competition is open to students at all level worldwide to create innovative and sustainable solutions. Finalist teams will be selected to compete for Grand Prize of US\$ 60,000 and provided with complementary trip to Taipei for Computex 2013. The deadline to submit an entry is 30 September 2012. Submitted entries will be evaluated by a panel of experts based on essential factors of earth friendliness, reality friendliness and innovation friendliness. Details of the contest can be downloaded from: <http://greencontest.acerfoundation.org.tw>



“2012 Study in Taiwan” for downloads:

<http://www.studyintaiwan.org/en/index.html>

<http://www.studyintaiwan.org/en/publications.html>

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- **Learning Chinese in Taiwan**

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### 1. Taiwan, Canada to collaborate on vaccine development

(Central News Agency, 01 06 2012)

Taiwan and Canada will cooperate on the development of new vaccines, with a specific target of completing first-phase clinical trials within five years, Taiwanese officials said during a recent conference on the partnership in Canada. Kuo Ming-liang, director-general of the Department of Life Science under Taiwan's National Science Council, who led the Taiwanese delegation to the conference, said that under the partnership, the two countries will develop vaccines, one to two of which they hope will be suitable for clinical trials in three years. The two-day conference, co-organized by the council, Taiwan's Industrial Technology Research Institute (ITRI) and the National Research Council Canada (NRC), opened in Ottawa and continued in Montreal the following day. Speaking at the opening ceremony of the conference, David Lee, Taiwan's representative to Canada, said Taiwan has been working closely with Canada in the scientific field over the past decade, collaborating in over 40 projects. Kuo said Taiwan and Canada each have advantages in developing vaccines against new infectious diseases and can complement each other, especially in the area of vaccine adjuvant, a substance that is added to vaccines to increase the body's immune response to the vaccine. Roman Szumski, vice president of life sciences at the NRC, said there is great potential if Taiwan and Canada work together on biological products using the ITRI's platforms and the NRC's technologies.

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### 2. Exhibition showcases university tech inventions

(Central News Agency, 03 06 2012)

Shoe pads that monitor a person's walking patterns, an improved automatic singing skills rating system and a nasal gadget that filters the air breathed in through the nose are among the inventions being shown at an exhibition in Taipei. The exhibition, held from May 30 to July 31 at the National Taipei University of Technology, displays 20 patented inventions by the university's faculty and students. Among the exhibited items are shoe pads with sensors that record the distribution of the center of gravity of its users and the stress they place on the shoes while walking. The shoe pads, invented by mechanical engineering professor Huang Jung-tang and his team, allow users to monitor their walking through mobile phones, which send an alarm to the users when they are in danger of tripping, said the university. Huang said the shoes can not only be used to prevent elders from tripping, but to correct the users' walking postures and inform them of the types of shoes that would cause them to lose balance or apply force in the wrong way. He estimated that the shoe pads could be available to consumers within half a year, at the earliest. Also on display is an automatic karaoke rating system that rates singing skills not only by volume, but also rhythm and pitch. Members of the team, led by electronic engineering professor Tsai Wei-ho, said many traditional karaoke rating systems rate singing skills by volume, but they believe their system can produce "a more accurate rating." The exhibition also features a nasal mechanism that aims to serve the same function as a filtering mask to block air-borne particles while ensuring an unobstructed flow of air into the nose. Another product, a light emitting diode (LED) lamp, emits both bright and soft light. The university said the two products are a result of university-industry cooperation and they are scheduled to be promoted in China, India, Indonesia and Vietnam. Tseng Pai-yu, an official from the university's Office of Research and Development, said in a statement that the university cooperated with companies to develop 478 technologies and products last year, the most of any university in Taiwan.

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### 3. Taiwan approves setup of carbon nanotube company

(Central News Agency, 04 06 2012)

The Cabinet-level National Science Council has approved the establishment of a company to produce carbon nanotubes in Hsinchu Science Park in northern Taiwan. The council on May 31 approved the NT\$200 million (US\$6.6 million) investment proposal to set up the company, which will be a joint venture between local investors and Japanese technology groups. The investment was made in light of the expanding market for carbon nanotubes, which are tiny hollow cylinders of carbon that are ultra thin and more than 100 times stronger than steel. According to studies by nanotechnology researchers, global carbon nanotube output could reach US\$1 billion in 2014 and US\$4 billion in 2017. The company will specialize in the manufacture of single- and multi-walled carbon nanotubes, which can be used in touch panels or in the manufacture of batteries, for example, to greatly improve the functions and quality of a product, according to a statement by the council. The investment was one of five ventures approved by the council last week, including one by Hiwin Mikrosystem Corp. to set up a branch in the Central Taiwan Science Park in Taichung that specializes in producing key components for sophisticated machinery. Hiwin's investment proposal, worth NT\$3 billion, aims to reduce local companies' production costs and their dependence on imported components to ultimately sharpen the competitive edge of high-end machinery makers, the council said.

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#### **4. Gene therapy potential approach to killing cancer cells: study**

(Central News Agency, 06 06 2012)

Gene therapy has been proven effective in inhibiting breast tumor growth in mice, marking a new pathway for cancer treatment, a Taiwanese researcher involved in the study said. VISA-Claudin4-BikDD gene therapy can fight cancer by killing cancer stem cells while leaving normal cells intact, said Hung Mien-chie, a researcher at China Medical University Hospital in Taichung, central Taiwan. Cancer stem cells are major therapeutic barriers in modern treatment because they are often resistant to chemotherapy and radiotherapy, said Hung, who is also a professor at the University of Texas MD Anderson Cancer Center. "We can find a way to beat cancer if we know how to effectively kill cancer stem cells," he said at a press conference held by the National Science Council, a financial supporter of the long-term project. Using mice as a model for the study, Hung's team first induced breast cancer in the subjects and then applied the novel gene therapy developed by MD Anderson. The therapy, including a targeting agent and a gene known to kill cancer cells, was delivered intravenously into the mice. In less than two months, results show, the gene therapy could significantly reduce tumor volume as well as help increase the effectiveness of traditional chemotherapy, Hung said. Describing the findings as "exciting," he said the next step will be to launch clinical trials within two years so that the effects can be tested on humans. The study was published in the Sept. 13 edition of the peer-reviewed *Cancer Cell*.

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#### **5. Researchers claim new therapy targets breast cancer cells**

(Taipei Times, 07 06 2012)

A collaborative medical research team has developed a targeted gene therapy that kills breast cancer stem cells, reducing the chances of recurrence and also increasing the effectiveness of some types of chemotherapy, a Taiwanese researcher involved in the study said yesterday. The scientists developed an innovative delivery system (C-VISA) of delivering the BikDD — a modified gene that triggers cell suicide — directly to the breast cancer cell or other targeted cancer cells, to eliminate the cancer cells without harming healthy cells, said Hung Mien-chi, a chair professor at China Medical University Hospital's Center for Molecular Medicine and professor at the University of Texas MD Anderson Cancer Center's Department of Molecular and Cellular Oncology. "We can find a way to beat cancer if we know how to kill cancer stem cells," he told a press conference held by the National Science Council, a financial supporter of the long-term project. Hung said chemotherapy and radiotherapy kill non-cancerous cells along with cancer cells, causing harmful side effects. A major obstacle of cancer treatment is that cancer stem cells are often resistant to chemotherapy and radiotherapy, causing difficulties in curing patients from relapsed cancer, he said. Using "firing missiles" as a figure of speech, Hung said the team developed a missile launching system that can accurately fire at "the target" (cancer cells) they aim for, and the "missile" includes a targeting agent and the bomb (BikDD) — wrapped in fatty balls called liposomes, delivered through intravenous injections. The target therapy method proved very effective in eliminating pancreatic cancer cells in mice, as well as killing breast cancer stem cells, Hung said. The combination of VISA-Claudin4-BikDD target therapy (for reducing breast cancer stem cells) with chemotherapy drugs such as lapatinib in lab experiments have also shown increased effectiveness in treating certain types of breast cancer, Hung added. He said the next step would be to launch clinical trials within two years so that the effects can be tested on humans.

<http://www.taipeitimes.com/News/taiwan/archives/2012/06/07/2003534735>

#### **6. Antidepressant drug found to slow tumor growth in mice**

(Central News Agency, 07 06 2012)

Taiwanese researchers have found that the antidepressant Mirtazapine can significantly slow tumor growth and extend the lives of mice with colorectal cancer. The study found that mice with colorectal cancer that were given Mirtazapine lived an additional 67 days on average, while those that were not given the drug lived an average of 43 days, Fang Chun-kai, director of the Department of Psychiatry and Suicide Prevention Center at the Mackay Memorial Hospital, said. The time that it took for the tumor to grow to 400 cubic millimeters was also almost doubled to 41 days for mice given the drug, up from 22 days for untreated mice, said Fang, who led the research. Although it would be difficult to carry out human trials and the study has shown that Mirtazapine does not cure cancer in mice, "at least it can help cancer patients currently taking this drug to feel more at ease," said the doctor at a press conference. Fang said he was motivated to carry out the study after discovering that many cancer patients who have been referred to him for depression treatment have shown not only progress in their mental health but a delay in their cancer recurrence. John J.J. Hwang, a biomedical imaging and radiological sciences professor from National Yang-Ming University who conducted the research with Fang, said the drug could achieve the same results on mice with other types of cancer. "The drug improves the immune system and raises the serotonin levels in mice and lowers the tumor necrosis factor that causes cell death in their tumors," said Hwang, adding that these are all relevant to



other types of cancer." The earlier the drug is given to the mice, the better its effects on improving their immune systems," said Fang. Citing a study conducted by his hospital last year, Fang said that around 25 percent of cancer patients develop depression, adding that he hopes more studies can bring light to the emotions of cancer patients and cancer prognosis. The results of the findings will be published in the U.S. scientific journal Public Library of Science ONE journal this month, said Fang.

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<http://www.taipeitimes.com/News/taiwan/archives/2012/06/08/2003534817>

## **7. Two Studies from the Institute of Plant and Microbial Biology, Academia Sinica Published in "PNAS" Show How Plants Respond to Changing Environments**

(Academia Sinica Newsletter, 29 05 2012)

The laboratories of Dr. Shih-Long TU and Dr. Paul VERSLUES, both Assistant Research Fellows at the Institute of Plant and Microbial Biology, have recently reported new mechanisms by which plants detect and adapt to changes in light and water abundance, two key environmental factors controlling plant growth. Both studies were published in the *Proceedings of the National Academy of Sciences of the United States of America (PNAS)* in May. Light, water and appropriate temperature are basic requirements for plant growth. The prospect of global climate changes impacting light, temperature and precipitation patterns have made plant environment-interaction an important topic in plant science worldwide. The Institute of Plant and Microbial Biology ( IPMB ) has several research groups focused on plant response to changing environments with the goal of understanding how changing environments affect plant growth. In the present studies, Dr. Shih-Long TU reported that a new enzyme named phycourobilin synthase (PUBS) can synthesize an alternative chromophore (a compound that absorbs light) to regulate phytochrome (a photoreceptor which binds the chromophore to sense light) activity. The group of Dr. Paul VERSLUES reported variation in levels of proline, a stress-protective compound, and production of a non-functional RNA encoding the proline synthesis enzyme P5CS1 that are associated with adaptation to different environments. Light is the most important energy source for photosynthetic organisms. Phytochromes are the main photoreceptors that detect light and mediate changes in plant growth to match light conditions. Phytochromes require a chromophore cofactor to fully function. In most plants, phytychromobilin synthase (HY2) is a key enzyme producing the chromophore for phytochromes. However in the moss *Physcomitrella patens*, Dr. TU's laboratory identified a new second enzyme they named PUBS that can synthesize an alternative chromophore to regulate phytochrome activity. PUBS can only be found in green algae, mosses, and lycophytes, suggesting that this enzyme was important evolutionarily for green plants to adapt to light-rich environments. Dr. TU's team further identified phytochrome-regulated genes in *Physcomitrella*. These results reveal that moss phytochromes efficiently re-program gene expression for phototrophic growth in the light. This approach allows, for the first time, a global view of phytochrome-mediated gene regulation in nonvascular plants. These new findings can be applied to agriculture, to modulate crop growth and development using light. The laboratory of Dr. Paul VERSLUES is interested in plant responses to limited water supply during drought. Many plants accumulate large quantities of proline during drought; however, the adaptive value of proline has remained unclear. The model plant *Arabidopsis thaliana* is distributed across a wide geographic and climate range and differences between *Arabidopsis* types can be used to discover factors, such as proline, needed for adaptation to different environments. The VERSLUES laboratory, along with collaborators at the University of Texas found that different types of *Arabidopsis* varied ten-fold in drought-responsive proline accumulation. Some of this variation was accounted for by high levels of a non-functional RNA produced by the gene encoding the proline synthesis enzyme  $\gamma$ -pyrroline-5-carboxylate synthetase1 (P5CS1). *Arabidopsis* types having high levels of the non-functional P5CS1 RNA shared the same set of genetic changes that promoted alternative RNA splicing of P5CS1. These data demonstrated a novel source of RNA splicing variation in plants and correlation of P5CS1 variation with climate data indicated a role of P5CS1 and proline synthesis in adaptation to environments differing in water availability and temperature. The results have implications in drought-adaptation and in how proline metabolism may be best targeted in biotechnology efforts to improve drought tolerance of crop plants.

<http://web1.nsc.gov.tw/techwp.aspx?id=1010606002&ctunit=208&ctnode=287&mp=7>

## **8. Taiwanese academician wins international recognition**

(Central News Agency, 12 06 2012)

A Taiwanese researcher from Academia Sinica, the country's highest academic institution, has been granted an award by a prestigious American organization for his contribution in transdisciplinary education and research. Ovid J.L. Tzeng, a former minister of culture, was named as the recipient of this year's Academy Gold Medal of Honor awarded by the non-profit Academy of Transdisciplinary Learning and Advanced Studies (TheATLAS). The annual award "recognizes unusual accomplishment in transdisciplinary education and research, public service, and other



allied pursuits beneficial to design and process science," according to TheATLAS website. Tzeng accepted the award at TheATLAS 2012 Biennial Meeting at Asia University in Taichung City, central Taiwan, which started June 5. TheATLAS was founded in 2000 to promote transdisciplinary education and research. It hosts regular meetings for international experts to discuss global issues and support social, environmental, economical and ethical sustainable development throughout the world. Former president of Academia Sinica Yuan T. Lee was the 2007 recipient of the gold medal award.

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## 9. US\$5 million scholarship program unveiled for doctoral students

(Central News Agency, 14 06 2012)

The government will allocate NT\$150 million (US\$5 million) in scholarship funds over a three-year period for more than 100 nationals to pursue post graduate study or research at top universities around the world, Education Minister Chiang Wei-Ling said. The scholarship program, to be implemented 2013-2015, will be jointly funded by the Ministry of Education, National Science Council, Board of Science and Technology, and Academia Sinica as part of the government's effort to cultivate intellectuals, Chiang said. The government agencies will specify schools within the ranks of the top 30 in the world and research fields based on Taiwan's needs, he said. The scholarships will be offered to the applicants after they are accepted for Ph.D. study or postdoctoral research at the select prestigious universities or institutions overseas, the minister said. More information about the scholarship program and the application process will be published in December, Chiang said.

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## 10. Taiwan to send scholars abroad for overseas training

(Taiwan Today, 15 06 2012)

Academia Sinica, the Board of Science and Technology, Ministry of Education, and National Science Council will cooperate in sending outstanding students abroad during the next three to four years, according to the MOE June 14. "Between 2013 and 2016, we will invest NT\$150 million (US\$5 million) for 116 local scholars to study at the world's top 30 universities or to conduct postdoctorate research at renowned international research institutions," MOE Minister Chiang Wei-ling said. "Details of the project will be announced in December," Chiang said, adding that the aim of the project is to give local students exposure to overseas research methods and practices. Wong Chi-huey, head of Taiwan's highest research institute Academia Sinica, said many fellow academicians are concerned about the decrease in the number of Taiwanese students and scholars at top educational institutions in Europe and the U.S. "We are willing to help provide more opportunities for brilliant students to enter top international research environments," Wong stressed, adding that the issue will be studied in more detail in a series of meetings starting July 1. "Currently, the NSC is in talks with Japan's Institute of Physical and Chemical Research, better known as RIKEN, Germany's Julich Research Center, and U.S. National Institutes of Health, regarding training mechanisms for Taiwan's postdocs," said NSC Minister Cyrus C. Y. Chu. The proposed project is different from the current program of public scholarships for overseas studies, in that it aims to fill gaps in Taiwan's research industry, whereas the present program encourages students to study whatever fields they are most interested in, Chiang said. According to statistics released by the MOE, outgoing students to the U.S. reached a peak of 37,581 in 1993. By 2009, the number had fallen to 26,685.

<http://www.taiwantoday.tw/ct.asp?xItem=192273&ctNode=445>

## 11. Taiwan wins 40 gold medals at largest invention fair in U.S.

(Central News Agency, 16 06 2012)

A Taiwanese delegation won 40 gold medals and seven special prizes at the Invention and New Product Exposition (INPEX) held in the U.S. city of Pittsburgh. Taiwan won 40 golds, 28 silvers and seven special awards at the fair, and received an Ambassador Award for excellent performances and active participation in the fair over the years. The country submitted 89 inventions to America's largest invention fair this year, but it was an invention by a National Chin-Yi University of Technology (NCUT) research team that stood out from the rest to clinch the INPEX Grand Prix-1st Runner Up prize and Best Invention of the Far East award. An energy-saving device invented by NCUT's Institute of Innovation Technology and Information Management research team led by Weng Kuo-liang, an associate professor, is the first from Taiwan to win the runner up award. The team's two-way energy conversion device caught the judges' attention for its ability to save energy in air conditioners and heaters by increasing humidity. The device can help conserve 10 percent of energy in air conditioners, which it does so by boosting humidity during the shut-down procedure, said Weng. Normally, air conditioners extract humidity, which wastes energy and dehydrates



the human body, Weng explained. In addition, Weng said, the device can give energy savings of around 20 to 30 percent in heaters by keeping the air from becoming too dry in winter. The design concept of the device is to create a more comfortable living by using low energy, Weng added. Weng said it took the team around two years to develop the product and estimated that the device will go into mass production later this year.

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## 12. Taiwanese institute develops low radiation 3D CT scanner

(Central News Agency, 18 06 2012)

Taiwan's Industrial Technology Research Institute announced it has developed a high-end computerized tomography (CT) scan that lowers radiation risks for patients. The locally developed cone-beam 3D CT scanner, which is used in dental imaging and brain scans, exposes patients to around 35 percent fewer X-ray dosages than traditional CT scans, according to the nonprofit research and development organization. The new scanner is also equipped with a precision adjustment system that enables better imaging, which significantly reduces the need for repeated scans, the institute said. At present, dental clinics in Taiwan are equipped with imported cone-beam 3D CT scanners, which are often expensive and are less precise than the one developed by the institution, researchers said. The technology used in the new CT scan can also be used to develop a breast imaging system that is able to distinguish between cancerous cells and normal ones, they added.

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## 13. Taiwan-made supercomputer ranks among world's top 500

(Central News Agency, 20 06 2012)

A new supercomputer developed by Taiwan's National Center for High-performance Computing was recently listed among the top 500 super systems in the world, affirming Taiwan's strength in cluster computing research, the center said. Taiwan's largest self-made cloud-computing system -- Formosa 5 -- was ranked 232nd in the world on the TOP500 list announced at the International Supercomputing Conference in Germany on June 18. The main feature of the system is a graphic processing unit (GPU) cluster that allows it to carry out several simultaneous calculations quickly and accurately, the center said. Formosa 5 is set to be released in late July for use in the public, private and academic sectors, the center said. The system can be used in areas such as meteorology research and pharmaceutical invention, it said. The center also expects animation companies to adopt the system, which it said will enhance the image quality of their productions. It is not the first time that the center's Formosa series has made it into the world's top 500. In November 2011, Formosa 4 was ranked 234th on TOP500 supercomputer list released at the SC11 Conference in Seattle.

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## 14. Quanta co-founder donates NT\$570 million to alma mater

(Central News Agency, 21 06 2012)

One of the co-founders of Quanta Computer Inc., C.C. Leung, donated an additional NT\$570 million (US\$19.06 million) to his alma mater, National Taiwan University(NTU), to expand a physics research institute he helped establish five years ago. The money will be used to set up a sustainability fund and build a new office building for the Leung Center for Cosmology and Particle Astrophysics, according to Pisin Chen, director of the center. *Full text of the article:*

[http://focustaiwan.tw/ShowNews/WebNews\\_Detail.aspx?Type=aALL&ID=201206210026](http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aALL&ID=201206210026)

## 15. Taiwanese University, AECOM join hands in disaster-prevention research

(Central News Agency, 25 06 2012)

National Cheng Kung University (NCKU) signed a Memorandum of Understanding (MOU) with AECOM, a U.S.-based technical services company, on cooperation in environmental and city development research in terms of disaster prevention. NCKU President Hwung-hweng Hwung said the partnership will benefit both parties as they share and develop research in the areas of construction services, the environment, water resources and city development. The MOU will contribute not only to the professional training of technical personnel but will also help with preventative measures against natural disasters such as typhoons, earthquakes, floods and landslides, Hwung said. NCKU is one of the country's top engineering universities and the partnership will give students more opportunities to gain hands-on experience, he added. For AECOM's part, working with NCKU will allow it to reinforce its research on water resources and other areas, said Tsen Chen-chien, a representative of the company. Building,



enhancing and sustaining the world's natural and social environments is the common goal shared by both NCKU and AECOM, Tsen added. With a staff of over 45,000, AECOM is a global provider of both technical and management support services to a broad range of markets. It serves clients in around 130 countries around the world and had revenue of US\$8.2 billion (NT\$245 billion) for the fiscal year that ended March 31, 2012.

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#### **16. Device aimed at allowing 'brain wave' communication unveiled**

(Central News Agency, 30 06 2012)

A research team at National Central University unveiled a device that it said could magnify brain waves to help physically challenged people communicate with others. Lee Po-lei, an associate professor at the university, said a brain wave is usually triggered 0.1 seconds after the eyes see an object. However, the signal is weak and can be easily disrupted by power sources or electromagnetic waves emitted by other devices such as cell phones, he said. Moreover, the scalp is not a "good conductor," Lee said. "But the research team put a small electrode on the head of the users to filter out unwanted signals and magnify the brain wave signal, which is sent out as from a base station," he said. "In this way, one could have remote control over equipment within a range of 100 meters." The technology could be used to help people whose range of motions is restricted due to diseases of the nervous system, strokes or spinal cord injuries, Lee said. It will allow signal exchanges by means of brain waves, which would take over the function of the hands, he added. The device could also be linked to a typewriter, mouse or key board to allow the physically challenged to communicate with others, Lee said. The device was one of the innovations unveiled by Taipei Veterans General Hospital and University System of Taiwan (UST), which comprises National Central University, National Tsing Hua University, National Chiao Tung University and National Yang Ming University.

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#### **17. NTU leukemia treatment center winning reputation**

(Central News Agency, 30 06 2012)

A leukemia treatment center run by National Taiwan University (NTU) has conducted over 100 bone marrow transplants over the past three years and has become one of the leading pioneers in the field, the school said. Since Taiwan's first bone marrow transplant in 1984, there have been some 1,200 others, with the Tai Cheng Stem Cell Therapy Center carrying out 120 in the past three years. Established in 2010, the center is the largest of its kind in Taiwan and treats only leukemia patients, said NTU President Lee Si-chen at a ceremony to mark the clinic's third anniversary. The center has served hundreds of patients and has built up a database of more than 1,400 cases so far, its statistics show. The annual number of patient visits averages 3,500, the figures show. Meanwhile, NTU has been working in collaboration with MD Anderson Cancer Center of Texas in the U.S., the world's top cancer research institute, since March, when they signed a memorandum of understanding, Lee said. He also noted that a new cancer hospital is scheduled to open in Taiwan next year, saying it will help meet the demand for cancer treatment in the country, he said. Hon Hai Group Chairman Terry Gou, who funded the leukemia clinic, said at the ceremony that it has established a good reputation in the field. Gou expressed gratitude to the doctors and nurses serving at the center and said he is gratified that patients now can have better medical treatment, compared with years ago when his younger brother was diagnosed with acute myeloid leukemia. The center was named after Tony Gou, who lost his battle with leukemia five years ago.

[http://focustaiwan.tw/ShowNews/WebNews\\_Detail.aspx?Type=aLIV&ID=201206300019](http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aLIV&ID=201206300019)