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**Science, Technology and Education News from Taiwan
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IMD Scientific and Technological Subindex		WEF Innovation and Sophistication Factors			
Technological Infrastructure		Scientific Infrastructure		Innovation and Business Sophistication	
1 st	Hong Kong	1 st	US	1 st	Switzerland
2 nd	US	2 nd	Japan	2 nd	Sweden
3 rd	Singapore	3 rd	Germany	3 rd	Japan
4 th	Denmark	4 th	Israel	6 th	US
5 th	Israel	5 th	Korea	10 th	Taiwan
6 th	Taiwan	7 th	Taiwan	11 th	Singapore
14 th	Korea	10 th	China	18 th	Korea
20 th	China	14 th	Singapore	25 th	Hong Kong
26 th	Japan	23 rd	Hong Kong	31 st	China

Source: The World Competitiveness Yearbook 2011 (IMD), The Global Competitiveness Report 2011~2012 (WEF)

Technology and innovation has been essential to Taiwan's global competitiveness. The island has risen to the forefront in the technological rankings conducted by the International Institute for Management Development (IMD) and the World Economic Forum (WEF), a feat reflecting Taiwan's crucial role in terms of technology R&D and innovation capability worldwide. In the WEF's Global Competitiveness Report 2011-2012, Taiwan ranked 13th worldwide and 4th in Asia. In terms of patents per one million population, Taiwan continued to

top the category of utility patents per million population, even surpassing the United States. Meanwhile, in the World Competitiveness Yearbook 2011 published by the IMD, Taiwan advanced from the 8th to 6th place among all 59 countries surveyed and ranked 3rd in Asia, scoring remarkable performance in terms of scientific infrastructure. In the index of patent productivity, Taiwan rose to the 1st place worldwide.

IMD Scientific and Technological Subindex:

Technological Infrastructure		Scientific Infrastructure	
Ranking	Country	Ranking	Country
1st	Hong Kong	1st	US
2nd	US	2nd	Japan
3rd	Singapore	3rd	Germany
4th	Denmark	4th	Israel
5th	Israel	5th	Korea
6th	Taiwan	7th	Taiwan
14th	Korea	10th	China
20th	China	14th	Singapore
26th	Japan	23rd	Hong Kong

WEF Innovation and Sophistication Factors:

Innovation and Business Sophistication	
Ranking	Country
1st	Switzerland
2nd	Sweden
3rd	Japan
6th	US
10th	Taiwan
11th	Singapore
18th	Korea
25th	Hong Kong
31st	China

Source: The World Competitiveness Yearbook 2011 (IMD), The Global Competitiveness Report 2011-2012(WEF)

The next two years will be the turning point for Taiwan's science and technology development, and it is the only window of opportunity left for such development, according to Science Minister Cyrus Chu. The National Science Council will organize a national science and technology conference in December to develop a strategy on how to promote a scientific and technological upgrade in Taiwan. The agenda of the conference will cover how to maintain Taiwan's position in academic research on the international stage, how to ensure that Taiwan's information technology sector keeps making progress, and how to integrate Taiwan's academic research sector with the business sector. The planned national conference, which is held every four years to outline science and technology development projects for the country, will also touch on issues concerning Taiwan's intellectual property right protection, sustainable development and the science and technology brain drain.

40th International Exhibition of Inventions of Geneva (18-22 April): Taiwan won 8 special prizes (+2 from 2011), 45 gold (+3), 52 silver and 25 bronze medals. Taiwan presented 125 works at the exhibition, which showcased over 1'000 inventions of 789 exhibitors from 46 countries. The Taiwan Invention Association attributed the brilliant achievements of the Taiwanese inventors to increasing attention paid by the government to vocational education.



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1. Academia Sinica Presents New Technology for High Speed Transport Communications

(MEPO Forum, 05 04 2012)

The quality of mobile communication services on board high-speed transport vehicles could be improved. A research team at Academia Sinica just completed the development of a communication system for mobile phone users on high-speed rail trains. The system considers the time difference between the timing of the train head's and the tail's passing through the border of the signal scopes of the two nearest stations to solve the problem and facilitate smooth mobile communications including cellular phone communication and mobile internet communication. Postdoctoral Research Fellow at Research Center for Information Technology Innovation, Academia Sinica Cheng-Wei LEE indicated, the difficulty for achieving smooth communication on board high-speed rail is caused by the power insufficiency of the communication devices that leads to the fact that the high-speed train has passed by before the first station refers its connection to the device to the second station. According to Lee's analysis, in a case of a train between one to four hundred meters long with a speed about 450 km/h, it only takes between 0.8 to 3.2 seconds from its head's passing through the border between two station's signal scopes to its tail's passing through. That means, in order to maintain the connection of the mobile communications, the connection reference between the two stations has to be done within such a short period. The team innovates a globally novel solution to the problem. By equipping the train with two antennae on the head side and the tail side that can access the network of the stations, the "intranet" connecting the stations could reduce the time difference of the connection reference and keep up with the high speed of trains. With the services, both the mobile phone communications and the mobile internet communications will be available aboard. Applications for patents on the technology have been filed respectively in Taiwan, the U.S. and China.

<http://web1.nsc.gov.tw/techwp.aspx?id=1010329005&ctunit=208&ctnode=287&mp=7>

2. Breakthrough in nerve mapping gives hope for neurologists

(Central News Agency, 30 03 2012)

A breakthrough in the mapping of monkey nerve fibers might lead to early diagnosis and improved treatment for neurological diseases in humans, according to Taiwanese research published on 31 March. "The structure of nerve fibers, we have found, follows a checker-board pattern," said Tseng Wen-yih, a biomedical expert from National Taiwan University, at a press conference held to announce the publication of the findings in a peer-reviewed journal. Neurological disorders such as schizophrenia, hyperactive disorder, autism, dementia and epilepsy can be triggered when a deviation occurs in the brain's "wiring system," he said. Unlike the common portrayal of brain nerve fibers as branches of a tree that spread in every direction, Tseng said his team found that fiber bundles constitute an orderly three-dimensional grid that more resembles intricately woven cloth. "The findings took us by surprise," Tseng told reporters. "We have uncovered a clear blueprint of brain fibers." Tseng and a group of scientists from around the world, including some from Harvard University, have been working together for years to uncover fiber trajectories, and their latest findings were published in the journal *Science* on March 30. The study was based on the brains of monkeys from six different species, but current magnetic resonance imaging (MRI) technology needs improvement to fully sketch out the fiber pathways of living humans, Tseng said. Nevertheless, the discovery could yield many applications, including the understanding and prevention of neurological disorders in humans. Taking autism as an example, Tseng said that the fiber bundles in sufferers in areas of cognition and language processing seem abnormal. If a more sophisticated MRI machine could be designed, doctors would be able to diagnose patients more quickly and precisely, he added. The blueprint could also serve as a guideline for the assessment of drug efficiency on patients, he added. Tseng said he is in negotiations with local hospitals to take his findings to the stage of clinical trials. Describing the discovery as "revolutionary," Yang Pan-chyr, dean of National Taiwan University's College of Medicine, said scientists could work on the findings and further explain how the brain works.

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3. Taiwanese researchers unveil structure of special enzyme

(Central News Agency, 06 04 2012)

A research team at National Tsing Hua University in Hsinchu has unveiled the structure of an enzyme that could be instrumental in developing cash crops or clinical drugs, the National Science Council, which funded the project, said. It is the first time that the structure of the enzyme -- a membrane protein called H⁺-translocating pyrophosphatases -- was identified, the team said, with no other researchers in Taiwan succeeding ever before in developing such insight into this or other kinds of membrane proteins. Professor Pan Rong-long, a co-leader of the team, said the protein affects plants' growth rate and the ability to resist salt, drought and freezing conditions, meaning the research could prove helpful in developing economic crops. Pan said he used mung beans produced locally as the source of the enzyme for the research project, which has been ongoing for 25 years. According to professor Sun Yuh-ju, another



co-leader of the team, membrane proteins, including the one studied and reported in the March 29 issue of Nature magazine, account for 30 percent of all proteins in a cell, but the structures of only 1 percent of them had been solved. Decoding the structure will not only offer potential benefits in the agriculture sector but also prove helpful in designing drugs, according to the team. Pathogens such as tetanus and periodontal bacteria contain these enzymes on their surface, and more than 50 percent of them can be used as pharmaceutical targets of clinical drugs, the team noted.

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4. Two Endemic Scleractinia Species Discovered in Taiwan

(MEPO Forum, 10 04 2012)

Academia Sinica's Biodiversity Research Center announced an exhilarating news on April 6 that after spending twenty years on the investigation, Research Fellow Chaolun Allen CHEN had identified and confirmed two endemic species of stony corals (Scleractinia) in Taiwan. On the same day, these two species were officially named "Pseudosiderastrea formosa" and "Polycyanthus chiashanensis," and these findings had also attracted high attention of the international scholastic communities on coral studies. CHEN indicated, the discovery of these two species is highly significant to Taiwan's biological studies. Pseudosiderastrea formosa is observed only in three areas: Chi-hui and Lan-yu (Orchid Island) in Taitung and Kenting. It is the second officially named pseudosiderastrea in the world, while the first discovery and naming of Pseudosiderastrea in 1935 was already 77 years ago. Polycyanthus chiashanensis is also significant, for it is the species that inhabits the most shallow waters among the other described Polycyanthus and it is only found in Chai-shan in Kaohsiung. The discovery has been published in *Zoological Studies* and attracted a lot of international attention among the coral investigators. Besides of the excitement about the new discovery of the endemic species, conservation groups raise worries about it as well. Taiwan Environmental Information Center said, the habitats where these stony corals were found were facing issues of coastal development. The groups urged the government to submit application to International Union for Conservation of Nature and Natural Resources (IUCN) and include them in the red list of endangered species. They also urged Council of Agriculture to include them in the list of Taiwan's First Level Protected Animal.

<http://web1.nsc.gov.tw/techwp.aspx?id=1010406001&ctunit=208&ctnode=287&mp=7>

5. New color-active rose developed in Taiwan

(Central News Agency, 11 04 2012)

A new species of rose whose petals can change color in sunlight has been cultivated at a rose garden in Changhua County and has the potential for enormous business opportunities, a university in Tainan said.

The new species, which is awaiting verification by National Cheng Kung University (NCKU), was bred by experts at the rose garden two years ago. NCKU officials said that when the bud starts to open, the edge of the petals gradually turn from light pink to neon pink, appearing as a color progression. In addition, after the flower opens fully, the color becomes much deeper as it is exposed to stronger sunlight, the university officials said.

After the verification is completed, the university will register the new species with the Council of Agriculture.



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6. Taiwan unveils first outdoor testing system for solar power products

(Central News Agency, 11 04 2012)

Taiwan launched its first outdoor testing system for photovoltaic products Wednesday, part of efforts to help the local industry to better develop and improve products so that they can be certified by international institutes. The huge photovoltaic testing platform established at National Pingtung University of Science and Technology allows testing of solar power products in terms of outdoor performance and safety, and helps to provide a complete and thorough quality inspection, said Shyu Jyuo-min, president of the Industrial Technology Research Institute, which collaborated with the university in implementing the project. Photovoltaic businesses often need objective figures from a third-party notarial institution to use as reference for the quality of their products, Shyu said at the platform's launch ceremony. A laboratory at the institute has already earned approval in several categories from the International Electrotechnic Commission, a global certification body, Shyu went on. Further, it also cooperates with international certification institutes in Germany, the United States and Japan in offering "single testing, multiple certifications" to the local





photovoltaic sector, he said. Testing in the natural environment, along with globally recognized certification, will be helpful for the local industry's international competitiveness, as 95 percent of Taiwan's photovoltaic batteries and modules are manufactured for export, said Wang Yunn-ming, deputy director-general of the Energy Bureau under the Ministry of Economic Affairs. The improved testing platform is also aimed at helping manufacturers detect problems in their products as early as possible, thus lowering their production costs and certification failure rates, Wang added. Tai Chang-hsien, vice president of the university, said the establishment the testing system is expected to boost the university's research and development momentum. Taiwan rose to become the world's second-largest solar-power battery maker in 2010, with a market share of 17 percent, according to the 2011 Taiwan International Photovoltaic Forum, which cited statistics from PHOTON International magazine and Taiwan's data service consultancy, the Industrial Economics and Knowledge Center.

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7. Taiwan launches value-added metallic R&D center

(Taiwan Today, 11 04 2012)

Taiwan's largest steel-maker, China Steel Corp., opened an R&D center for value-added metallic products in Kaohsiung City, as part of an effort to increase the competitiveness of the local metal industry. Constructed in collaboration with government-funded Metal Industries Research and Development Center, the facility is expected to focus on research projects that will upgrade the metal processing technologies of local companies while also spurring them to develop products with higher value, according to China Steel. The opening ceremony was attended by Tsou Juo-chi, chairman of China Steel, Huang Chi-chuan, chairman of the MIRDC, and Wu Ming-ji, director-general of the Department of Industrial Technology under the Ministry of Economic Affairs. "MIRDC and China Steel have been important contributors to the steel industry in last few years," Wu said. "Since 2005 they have spent NT\$770 million (US\$26 million) on joint research projects and helping their partners develop high-end steel products." Industry estimates suggest that these collaborative investments have resulted in NT\$35 billion in increased revenues for the steel industry, Wu added. After the inauguration ceremony, China Steel officials said that during the first stage of operations the new facility would focus on producing advanced motors, improving thermal pressing procedures and exploring more alloy applications. Taiwan's high-end metal production value is expected to jump from NT\$10 billion in 2011 to NT\$150 billion in 2020, according to China Steel.

<http://www.taiwantoday.tw/ct.asp?xItem=189086&ctNode=445>

8. Positive results reported in early tests of brain cancer drug

(Central News Agency, 13 04 2012)

A medical research team has completed animal testing on a drug against an aggressive type of brain tumor and found that the average life expectancy of mice doubled after they were treated with the drug, the leader of the research team said. Harn Horng-jyh, a professor at China Medical University, said his team is working with a biotechnology company to develop a drug against glioblastoma multiforme, which is an aggressive malignant primary brain tumor. The treatment of this kind of tumor usually involves surgery, radiotherapy and chemotherapy, but the drug is aimed at providing an alternative, Harn said. Lin Shinn-zong, chairman of the Taiwan Neurosurgical Society, said that type of tumor is fast growing and has a high recurrence rate. It can grow to 16 times its size in just one month, and the life expectancy of patients, who are often not diagnosed until the late stages, is 12-18 months on average, he said. Harn said a steady release of the drug into the tumors inhibited their growth in mice. Around 35 percent of the mice in the test lived for up to 250 days after one treatment and no side effects were seen during the experiment, Harn said. The main ingredient of the drug is z-butylidenephthalide, a natural compound that can be extracted from the Chinese medicinal herb *Angelica sinensis*. Taiwan records around 400 new brain tumor cases every year, 60 percent of which are malignant, according to Lin. The five-year survival rate of patients with malignant brain tumors is only 3.4 percent, he said.

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9. First liver transplant using laparoscopy performed in Taiwan

(Central News Agency, 13 04 2012)

Far Eastern Memorial Hospital announced that it used laparoscopy to perform part of a liver transplant, the first time the minimally invasive approach had been used for such a case in Taiwan. Chen Kuo-hsin, director of General Surgery of the New Taipei hospital, said the donor of the liver was left with an incision of only about 7.5 centimeters on her abdomen, roughly one-fourth the size needed during conventional surgery. Chen said laparoscopic surgery



had matured in recent years but was still mainly used in Taiwan to remove tumors. The use of the modern surgical technique to remove liver tissue from a live donor during a transplant was not only a first in Taiwan but remains uncommon around the world, according to Chen. Conventional surgery was used to transplant the liver tissue into the patient, a 55-year-old man and a hepatitis B carrier surnamed Hu. He was found to have a 3-cm tumor in his liver last May and had part of his liver removed, but he was advised to have a liver transplant when he suffered a relapse six months later. Although both his wife and daughter wanted to donate their livers to save him, it was decided that the 22-year-old daughter would be the donor. The surgery was performed at the end of March, with both the daughter and her father being operated on. The two were discharged recently. Chen said laparoscopic surgery's main advantages are that it limits post-operative pain felt by patients and reduces the odds of infection after surgery because of the small incision made. The operation left the daughter with an incision of only 7.5 cm, compared with a 30-cm scar she would have had if she had undergone conventional surgery, Chen said. At a news conference at the hospital Friday, Hu and his wife said they were satisfied with the results of the surgery. At first, they said, they were worried that their daughter would be left with a big scar on her abdomen, which might make it harder for her to get married. But Hu said it was fortunate that the hospital decided to use laparoscopic surgery to remove liver tissue from his daughter after a careful assessment.

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10. Taiwan's first Minnan Culture Research Center set up at NCKU

(NCKU News, 13 04 2012)

Taiwan's first Research Center on Minnan culture set up recently by National Cheng Kung University (NCKU), southern Taiwan, aims to organize a transnational research team that will conduct interdisciplinary research on Minnan culture, President Hwung-Hweng Hwung of NCKU said at the opening ceremony on April 9th. According to President Hwung, NCKU, located at Tainan, a city rich with Taiwan's history, the essence of Minnan tradition plays a key role in integrating the resources regarding Minnan or southern Fujian culture. Hwung expected the center to be developed into an international research center when experts around the world gather to engage in interdisciplinary studies. Secretary-General Du Yang, on behalf of Chao-Shiuan Liu, president of the General Association of Chinese Culture (GACC), hailed the establishment of the center. Yang said the 2012 World Minnan Culture Festival aiming to integrate the characteristics of Minnan culture collected from the world will be held by GACC and NCKU at the end of April. Minnan culture originated from South Fujian and developed in Taiwan where the core values of Chinese culture have been preserved and the essence of Minnan culture is expected to be maintained by the establishment of the center, added Hsiao-Tse Hsu, Professor of Taiwan Research Institute, Xiamen University who has conducted Taiwan Studies for more than 30 years. The missions of the center include setting up Minnan literature database, exploring research topics of the Minnan culture, cultivating young scholars to conduct Minnan culture studies, and promoting Minnan culture courses.

<http://web1.nsc.gov.tw/techwp.aspx?id=1010414006&ctunit=208&ctnode=287&mp=7>

11. Emergency Water Purifier Unveiled

(Central News Agency, 13 04 2012)

The Water Resources Agency on April 13 unveiled an emergency water purification system that can turn dirty water into drinking water and help ease water shortages in areas hit by disasters. The system, created by the agency in collaboration with the Industrial Technology Research Institute, can be assembled in 20 minutes and produce as much as 15 cubic meters of clean drinking water each day, enough to meet the needs of 5,000 people, the agency said. The system is named Q Water because it produces quality water quickly and in abundant quantities, the agency said. The water agency will also work with the institute to come up ways to generate or store power with solar-powered, wind-powered or pedal-powered generators to ensure that the purifier can continue to work if a disaster area is hit by a power outage.

<http://web1.nsc.gov.tw/techwp.aspx?id=1010414007&ctunit=208&ctnode=287&mp=7>

12. Taiwan unveils new vaccine against infectious respiratory virus

(Central News Agency, 18 04 2012)

The Institute for Biotechnology and Medicine Industry said it has developed a safer and more convenient vaccine against human respiratory syncytial virus (RSV), which causes tens of millions of infections worldwide every year. Researchers have tested the vaccine on animals and hope that more tests required by the Current Good Manufacturing Practice regulations, enforced by the U.S. Food and Drug Administration, will be completed in 2013.



They can then apply for the first phase of clinic trials in the U.S. on the vaccine against the virus that often attacks the respiratory tracts of children and the elderly, the institute said. The institute is collaborating with the National Health Research Institutes and local biotech firm TWi Biotechnology in the research. Some 160,000 people worldwide die every year of severe diseases caused by the virus, including pneumonia, according to the institute. The research team led by Chow Yen-hung, an assistant research fellow at the National Institute of Infectious Diseases and Vaccinology, developed the vaccine using adenoviruses as vectors and cutting off the nucleotide sequence that triggers side effects. The process is a pioneering technique that is ahead of all pharmaceutical companies around the world, the institute stated. Most RSV vaccines on the market have potential for negative side effects such as lung infections, according to the institute. The Taiwan-developed vaccine not only reduces the side effects but has also proved effective in pre-clinical animal experiments, it noted. The project is part of a program operating for the last two years that brings together academics and the biotech industry to boost the commercialization of scientific findings.

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13. Taiwan unveils new technology for LED lighting units

(Central News Agency, 19 04 2012)

A group of scientists at Taiwan's National Central University has developed a new packaging technology that addresses the color variations of LED lighting to make it more suitable for indoor use. Lee Cheng-chung, dean of the university's College of Science, said although LED lighting is becoming increasingly common because of its high performance, long life and low pollution, it is mostly used outdoors rather than indoors because its color variations may be visually uncomfortable. In some cases, LED lighting can produce light of high color temperature that can have negative effects on human health, said Sun Ching-chen, director of the university's Department of Optics and Photonics. Sun said his team has designed a packaging structure with a silicone lens covering a phosphor dome that decreases the color variations. The achievement has been published in the Optics Express journal issued by the Optical Society of America. The team has also applied for patent rights for the technology in Taiwan, China and the United States, Sun said.

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aLIV&ID=201204190024

14. NTUH develops kidney transplant testing machine

(Taiwan News, 20 04 2012)

The National Taiwan University Hospital (NTUH) is developing a kidney transplant testing machine which will tell whether the transplant has achieved its functions. Dr. Chou Nai-kuan, director of Surgical ICU of NTUH, made the announcement at the annual convention of the American Institute of Ultrasound in Medicine in Phoenix, Arizona recently. Dr. Chou, together with Professor Shyu Jeou-Jong, Professor Shou Yio-hua and Professor Wang Shuo-meng of National Taiwan University, presented four research reports at the meeting on the new development. The four papers are Renal Hemodynamic Study of Dopamine Infusion with Power Doppler Ultrasonography in a Canine Model; Renal Hemodynamic Study of Hydronephrosis with Power Doppler Ultrasonography in Canine Model; Quantification of Renal Perfusion Changes with the Dynamic Power Doppler Vascular Index in an Allograft with Hydronephrosis; Qualification of Renal Perfusion Changes with the Dynamic Power Doppler Vascular Index in an Acute Rejection Allograft. The four studies were footed by the National Taiwan University. The researchers tried to employ Doppler Ultrasonography to monitor the blood flow of the transplanted organ to determine the success of the operation. The project, started ten years ago, underwent human test since 2008 over 300 patients after success in animal test. Dr. Chou said NTUH is applying for patent in the United States. He hopes the new instrument will also be used in all other organ transplants in the near future. Though organ transplant has been a medical breakthrough in the past years, Dr. Chou said, it still has inherent risks, as donor organs often caused legal and ethic controversies. Infection is another problem, he added. He cited the transplant incident at the NTUH last year as a case in point. The oversight in the reviewing procedures had cost the hospital moral censure from the authorities though no legal action was taken. The head of NTUH's transplant screening committee also resigned to take responsibility. Dr. Chou subsequently took over his job. Since the 2011 incident, Dr. Chou said, the NTUH has stepped up its transplant reviewing procedures, not relying only on oral communications but with technological and information confirmations to ensure the quality of the donor organ.

http://www.taiwannews.com.tw/etn/news_content.php?id=1899610



15. Research Result of the Cooperation between National Taiwan University and Harvard University – Revealing the Myth of Brain Function: the MRI Technique

(MEPO Forum, 20 04 2012)

How to prevent the neuro-related mental diseases? How to solve the myth of brain function? These have always been the big challenges in the medical area. There are approximately 1,000 billion nerve cells in a human brain, and each neuron connects to on another by extending with its long neuro fibers. Thus, How these nerve cells connect to one another and how they deliver the accurate signals by the highly complicated network? Are there any cures for the neuro-related mental diseases by accessing the correct methods? Professor Wen-Yih TSENG of NTUCM-COEBM (Center for Optoelectronic Biomedicine, National Taiwan University College of Medicine) and Professor Van Jay WEDEEN of Harvard Medical School have just published their new research result in the latest scientific journal, *Science*, to present their discovery of the three-dimensional structure of the nero network in hopes they can solve the myths of brain function. By using the innovative technique of MRI (magnetic resonance imaging), Professor TSENG and his research team from NTU Medical School have discovered that the nero fibers of a monkey's brain are constituted by a simple three-dimensional structure, which looks like a chessboard. This three-dimensional structure happens to be a balance in an organic object. It was a breakthrough and also a surprise to discover that the structure of nero fibers is the simple geometric structure, following the axial system in the human body, which is rare to be seen for scientists. The discovery also points out how the brain function tells the accurate sense of location in a certain space. Such a simple three-dimensional structure has just been discovered for the very first time in human history because the conventional methods focused on the observation of partial neuro fibers, which are not sufficient for the complete structure. Professor TSENG and his research team developed the innovative technique, Diffusion Spectrum Imaging (DSI), to detect the direction and the length of each nero fiber in order to reconstruct the structure of nero fibers. Since the technology is not highly advanced to receive the accurate images from a human brain, the NTU research team operated the experiment on monkeys' brains instead to do the high-definition Diffusion Spectrum Imaging, and this is how they discovered the three-dimensional structure of brain function. The research result shows that the three-dimensional structure exists among four different species of monkeys. And according to the subsequent research, the three-dimensional structure also can be found in human brain. The discovery of the network structure of brain function helps understanding the development and the evolution of the brain network. First of all, it is very likely that neuro fibers develop their won chessboard network, following the extension of the body axial. And then, the nerve cells deliver the signals to the distant cells through this network. Therefore, the signals can be accurately delivered to the correspondent nerve cells in the distance for sure. Currently, the scientists have been practicing this structure of brain network to analyze and to diagnose mental diseases in hopes they can solve the long-existing myths. The research result of neuro science has already shown that some of the mental diseases could be resulted from the malfunction or the disconnection of nerve cells; thus, the three-dimensional structure is very likely to be viewed as the biologic footnote of mental diseases. In other words, the doctors can diagnose the mental disease and to check the effect of medicine treatment by observing the changes of the three-dimensional structure before it is too late to go through any treatment.

<http://web1.nsc.gov.tw/techwp.aspx?id=1010417003&ctunit=208&ctnode=287&mp=7>

16. IBM launches joint research with Taiwan institutions

(Central News Agency, 22 04 2012)

U.S.-based IBM announced in Taipei a joint research project on an integrated circuit design with Taiwan's Academia Sinica and National Taiwan University with the aim of applying the technology in the field of medicine. The goal of the open collaborative research project is to develop a type of integrated circuit called optimized field programmable gate arrays (FPGA) and to use it in cancer radiotherapy and tumor detection, according to IBM Taiwan. With the use of such technology, hopefully the course of cancer treatment will be shortened, IBM Taiwan said. The company said the research team will integrate solutions and resources from IBM Research Austin, one of the company's nine global research laboratories, and IBM's Power Systems research centers. The research team will also work with MD Anderson Cancer Center in the U.S., it said. Wang Po-hsia, an executive at IBM's Power Systems research centers, said intelligent computing is a very important part of workload optimization and the FPGA can help achieve rapid computation in different industries.

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aALL&ID=201204250043

17. Taiwan information institute reviews R&D efforts

(Taiwan Today, 26 04 2012)

Taiwan's Institute for Information Industry reviewed its technological research efforts over the past year and laid out its mission for the next at a news conference April. President Lee Chih-kung of the nonprofit, government-sponsored



**TRADE OFFICE OF SWISS INDUSTRIES
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institute noted that throughout its history the organization has been a staunch supporter of the information industry. "For the past year, our two major goals have been to help the nation's hardware manufacturers provide more value-added services, and to promote more technology use in the service sector," he said. Hsinchu-headquartered Promise Technology Inc., for example, has acquired cloud-computing software from the institute. The software allows companies to significantly lower costs in data storage, file management and intranet traffic loads, according to institute officials. Several other computing server makers are expecting similar technology transfers, the officials added. The institute has also turned out an Internet security application that can detect and respond to viruses and Trojan invasions in real time. The code for this software has been transferred to Trend Micro Inc., a global antivirus high-tech company based in Taiwan, officials noted. As global competition in the information sector grows ever intense, the institute will also redouble its efforts to generate innovative products, Lee said. "The CyberTrust Technology Institute and Cloud System Software Institute were added to the organization at the beginning of the year, to show our commitment to provide the latest and more advanced technologies. "We will continue leveraging our expertise in the field while helping the industry tap into rising businesses such as energy conservation, commercial operation management and senior health care around the world," Lee said.

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