



31 July 2013

**Science, Technology and Education News from Taiwan
Number 07 — July 2013**

Future Ministry of Science and Technology

The cabinet has embarked on an organization re-engineering work in order to streamline the government's organization. The National Science Council (NSC) will be merged with the National Science and Technology Center for Disaster Reduction and the Atomic Energy Council's nuclear safety control mission. The to-be-established Ministry of Science and Technology will bear responsibility for the promotion of scientific and technological development, mid-stream basic academic research, and applied research. It will chiefly consist of eight departments, namely a General Planning Department, Natural Science and Sustainability R&D Department, Engineering Technology R&D Department, Life Science R&D Department, Humanities and Social Sciences R&D Department, Science Department, and Industry-Academic and Science Park Department, as well as four grade three agencies: Office of Nuclear Safety, Northern Taiwan Science Park Administration, Southern Taiwan Science Park Administration, and Central Science Park Administration.

The latest White Paper on Science and Technology (2011-2014) formulates eight development strategies addressing such aspects as academic research, the economy, human welfare, and the environment, and seeks to achieve the vision of transforming Taiwan into an "innovative global pioneer in green energy technology and intelligent living" by 2020. Beyond continuing to rely on the strengths of the information and communications industry, the island will leverage the strengths of its ICT and industry to establish innovative applications services spanning different industries and develop diversified intelligent industries focusing on such areas as cloud computing, smart electric vehicles, and smart green architecture.

In the area of academic research, strategies will include the training of outstanding manpower in order to link Taiwan with global innovation networks and achieve world-class research quality. In the area of economic development, strategies will include strengthening of design and innovation, establishment of ties to emerging knowledge industries, meeting citizens' living needs, and reinforcing the nation's economic strength. In the area of *citizens' welfare*, strategies will include enhancement of disaster mitigation technologies and technologies for living, boosting citizens' safety, and improving quality of life by combining S&T development with the humanities to establish an aesthetic economy. In the area of environmental development, strategies will include the establishment of an environment promoting the synergy in the application of scientific research results, the revitalization of local resources, sufficient attention to environmental conservation, and fulfillment of Taiwan's responsibilities as a global citizen.

Contents

1.	ITRI launches high-tech venture club	2
2.	Taiwan, Czech Republic sign R&D accord	2
3.	Taiwan, Singapore collaborating on coral research	2
4.	ITRI establishes second presence in Europe with office to spur R&D	3
5.	ITRI inaugurates office in the Netherlands	3
6.	Taiwan, Germany to cooperate in biotechnology	3
7.	NTU team rewrites physics texts on heat transmission	4
8.	TEXONO researchers refute dark matter data	4
9.	Taiwan continues strong run at R&D 100 Awards	5
10.	NTHU bioreactor aims to generate gold from bacteria	5
11.	IPO touts cloud computing patent portfolio strategy	5
12.	SMART opens new Taiwan R&D center	6
13.	Taiwan team discovers South China Sea volcanoes	6
14.	Taiwan launches laser technology incubation facility	7
15.	Taiwan scientist makes advances in transgenic pigs	7
16.	Da Yeh University forges ahead in medical device R&D	7
17.	New imaging helps cancer treatment: TMU	8
18.	NSC names recipients of national research grants	8
19.	Taiwan team makes breakthrough in stem cell research	8
20.	New telescope camera puts universe in close-up	9
21.	Local researchers develop miniature monitoring device	9



1. ITRI launches high-tech venture club

(Taiwan Today, 01 07 2013)

Hsinchu County-based Industrial Technology Research Institute inaugurated its TechVenture Club June 27, a key ROC government policy initiative aimed at spurring high-tech startups Taiwanwide. "The platform will promote creativity and innovation through initiating and promoting discussions and exchanges among the public and private sectors," ITRI Chairman Tsai Ching-yen said. "We expect the club to play an important role in identifying new businesses with high potential and helping grow them into major global players in their respective fields of operation." Taiwan's current business climate, Tsai said, is not on par with those in other Asian countries or the U.S. when it comes to promoting entrepreneurship and new investment. "Innovation-based startups require capital, talent, technical know-how and a flexible business model that can move with the market. "The ITRI is committed to assisting new homegrown high-tech players tap public and private resources, including canvassing corporate sponsorship and media support, as well as developing marketing strategies," Tsai said. "By linking businesses to established players with global operation experience, the club will serve as an incubator and help put new firms on the growth fast track." Established in July 1973, ITRI is widely credited for building Taiwan into a global high-tech powerhouse, especially in the semiconductor sector. To date, the state-backed organization has accumulated nearly 19,000 patents, helped set up 225 businesses and produced more than 70 CEOs for high-tec.



<http://www.taiwantoday.tw/ct.asp?xItem=206871&ctNode=445>

2. Taiwan, Czech Republic sign R&D accord

(Taiwan Today, 01 07 2013)

A mission to the EU led by ROC Ministry of Economic Affairs Deputy Minister Woody Tyzz-jjun Duh signed cooperative research and development agreements with the Czech Republic and the Netherlands, the MOEA announced June 30 at the end of a nine-day trip.

"The Czech Republic has an outstanding R&D basis in the fields of precision engineering, biomedical sciences and nanotechnology, making it an excellent match for Taiwan's manufacturers," Duh said. The mission signed a bilateral R&D and innovation memorandum of cooperation with Czech Republic June 24 to establish an innovation platform aimed to jointly explore the EU market. The Taiwan mission included representatives from the Industrial Technology Research Institute, Institute for Information Industry, Metal Industries Research and Development Centre, and Chung-hua Institution for Economic Research. A cooperative accord signed during the trip between ITRI and the Penrose program of the Netherlands Organization for Applied Scientific Research, Holland's largest research body, was the first such agreement between Taiwan and a major European R&D body as equal partners of an innovation and R&D research alliance, the MOEA said. "Taiwan and the Netherlands have produced integrated R&D strategic cooperative structures in the two years since they signed a memorandum of cooperation. The next stage is to cooperate on the EU's Horizon 2020 program," Duh said. Horizon 2020 is a plan to combine European research and innovation funding. During the trip, Taiwan also made important breakthroughs in establishing partnership with Germany's largest applied research body, the Fraunhofer Society, and metal producer Heraeus Holding GmbH, paving the way for expanding substantial cooperation between Taiwan research bodies and their foreign counterparts.

<http://www.taiwantoday.tw/ct.asp?xItem=206872&ctNode=421>

3. Taiwan, Singapore collaborating on coral research

(Taipei Times, 03 07 2013)

Taiwan is working with Singapore on a research program to investigate environmental changes in the South China Sea region by analyzing coral exoskeletons, the National Museum of Marine Biology and Aquarium said. A research team from the Earth Observatory of Singapore, which is run by Nanyang Technological University, has been stationed at the museum in Pingtung County since May and has recently completed its research, the museum said. With the assistance of the museum's researchers, the team took Porites coral exoskeleton samples from the waters off Kenting National Park for an international research program initiated by the Singaporean institute, it said. Fan Tung-yun, a researcher at the museum who took part in the research, said that coral exoskeletons are one of the natural recorders of environmental changes and can therefore help scientists picture how human activity is affecting marine environments. By analyzing the coral, scientists can find out about environmental changes in the area from which the coral is sampled, which in this case are the waters south of Taiwan and in the South China Sea, Fan said. Minor elements and isotopes in coral have been used as a source



of data on water vapor transport, ocean circulation and global climate change. Over the past month, the museum and the Singaporean team acquired samples from coral formations up to 3m tall. Because coral grows by only 1cm a year, the samples are expected to bring to light environmental changes in marine areas south of Taiwan's Hengchun Peninsula over the past 300 years, Fan said. Next year, the museum and the Singaporean researchers plan to head to the Pratas Islands, also known as the Dongsha Islands, to drill for more samples. "Data from those samples should be more interesting," because the area is further away from human activity, he said.

<http://www.taipeitimes.com/News/taiwan/archives/2013/07/03/2003566246>

4. ITRI establishes second presence in Europe with office to spur R&D

(The China Post, 05 07 2013)

In a bid to strengthen innovation-oriented R&D cooperation between Taiwan and the Netherlands, Taiwan's Industrial Technology Research Institute (ITRI) has announced the establishment of the Eindhoven-HTC Office. The office, which is ITRI's second in Europe, will formally commence operations at High Tech Campus Eindhoven on June 28. ITRI previously opened an office in Germany. Frank Chen, the general director of ITRI International Center and the managing director of ITRI's Eindhoven-HTC Office, stated that the emphasis of the office will mainly be on developing and maintaining an innovation-oriented R&D network and partnership with the Netherlands, while assisting Taiwan's industrial, academic, and research communities in forging multi-disciplinary and complementary R&D cooperation initiatives with counterparts in the Netherlands. The office will initially focus on three areas, namely high-tech systems and materials, health and life sciences, and green energy sources. In addition, the PENROSE Project will also be an important cooperative mission, helping Taiwan's 3D printing industry and factories enter the EU market, thereby developing high value-added markets throughout the globe and international collaborative opportunities. Vice Economics Minister Duh Tyzz-jiun and Lin Chiun-neng, director of the Economic Ministry's Department of Industrial Technology, are currently visiting Europe and attended the opening of ITRI's Eindhoven-HTC Office and the ceremony marking the establishment of the 3D printing technology international alliance. Duh expressed hope that the innovation-oriented R&D cooperation mechanism between Taiwan and the Netherlands will foster the exchange of innovative technology and lead to the development of business opportunities. This will not only build momentum for related cooperation between Taiwan and Europe and enhance the partnership between Taiwan and the EU, he said, but also expand Taiwan's cooperative foundation in Europe with respect to trade, innovative R&D, and research.

<http://www.chinapost.com.tw/taiwan/business/2013/07/05/382866/ITRI-establishes.htm>

5. ITRI inaugurates office in the Netherlands

(Taiwan Today, 05 07 2013)

Hsinchu County-based Industrial Technology Research Institute's newly inaugurated Dutch office will help strengthen cooperation between Taiwan and the Netherlands across a broad spectrum of key R&D areas, according to ITRI July 5. "The office is responsible for promoting collaboration and networking between ITRI entities and their Dutch partners," said Frank L. Chen, managing director of the ITRI Netherlands office. "It will also initiate cross-disciplinary research programs, especially in the fields of green energy, health and life sciences, as well as high-tech systems and materials." Commencing operations June 28 from High Tech Campus Eindhoven, the facility is ITRI's second in Europe after Berlin, Germany. Chen said the facility is expected to play a key role in fast-tracking implementation of the Penrose Shared Research Program, a milestone initiative between ITRI and TNO, a leading force in Dutch applied scientific research. Launched by the TNO April 10 at Hannover Messe, one of the world's top trade fairs for industrial technology, the project provides participants with access to a unique innovation system for promoting the adoption of industrial additive manufacturing, or 3D printing. Sources familiar with the matter describe additive manufacturing, or the production of 3-D objects from a digital model by layering materials, as the third industrial revolution. Joining the project as a co-founder June 28, the ITRI said the three-year initiative will see research efforts focused on developing high-tech spare parts, embedded electronics and human-related elements. "The program expands important collaboration between industrial partners in Taiwan and Europe while capitalizing on the complementary knowledge bases and experiences of ITRI and TNO," ITRI Vice President Chang Shuo-hung said. Arnold Stokking, managing director at TNO, said partnering with ITRI provides a strong foundation for the project and reinforces the relationship between the institutes.

<http://www.taiwantoday.tw/ct.asp?xItem=207008&ctNode=445>

6. Taiwan, Germany to cooperate in biotechnology

(Central News Agency, 08 07 2013)

Officials from Taiwan's Council of Agriculture (COA) and the world's fourth-largest supplier of poultry vaccines signed in Taipei on Monday a memorandum of understanding (MOU) on cooperation in developing biotechnology.



Huang Chin-cheng, director general of the Pingtung Agricultural Biotechnology Park under the COA, signed the agreement with Bruno Kaesler, managing director of Lohmann Animal Health GmbH & Co. KG, in the presence of COA head Chen Bao-ji and Vice Premier Mao Chi-kuo. The German company intends to invest a minimum of 10 million euros (US\$12.82 million) in setting up an Asian center in Taiwan during the second half of the year. Based on international forecasts for technology growth, Taiwan's biotechnology sector has the potential to outperform the country's dominant information and communications technology sector in three to eight years. The total market value of the 71 listed and emerging firms in the biotechnology sector increased by NT\$200 billion (US\$6.76 billion) last year, even though their combined sales only rose NT\$20 billion. Many international venture capital firms have started establishing partnerships with local companies in the sector, and world-class biotech enterprises are mulling over investing in Taiwan.

<http://focustaiwan.tw/news/aeco/201307080020.aspx>

7. NTU team rewrites physics texts on heat transmission

(Taiwan Today, 08 07 2013)

A team at National Taiwan University has made a fundamental discovery in the physics of heat transmission along nanowires, in which almost no energy is lost, a finding that could revolutionize the computer and cell phone industry.

Hsiao Tzu-kan, a 27-year-old research assistant in NTU's Center for Condensed Matter Sciences, made such a contribution to the research team's effort he was given top billing in the paper published June 30 in prestigious international journal Nature Nanotechnology, ahead of NTU professors and senior researchers. "This discovery could solve the heat dissipation problem for computers and other electronic devices," said NTU President Yang Pan-chyr. "Nanotubes can be used instead of electric fans. NTU has applied to patent this technology." The team found ballistic thermal conduction by phonons at room temperature along silicon-germanium nanowires, which would enable wave engineering of phonons and help realize heat waveguides. Heat is usually transported by phonon waves, via a succession of collisions in which large amounts of energy are dissipated, causing electronic devices to heat up. Ballistic transport has been observed before, but typically only in substances cooled to close to absolute zero, making them commercially impractical. The team put Hsiao's name first on the paper in recognition of his hard work. He spent over a year teasing out more than 100 nanowires, each 8.3 micrometers long, which had to be hooked using a robotic arm under an electron microscope. Just one nanowire took a whole afternoon to tease out, Hsiao said. Yang heaped praise on the young researcher, "An NTU graduate student has performed better than PhD students from top-flight international universities." Hsiao has a master's degree in Applied Physics from NTU, and has won a scholarship to study for a PhD at Cambridge University in the U.K. Team leader Chang Chih-wei said the discovery has "limitless potential." Most energy sources transform heat into electricity, but this discovery means that much more of the waste heat can be converted.

<http://www.taiwantoday.tw/ct.asp?xItem=207059&ctNode=445>

<http://www.taipeitimes.com/News/taiwan/archives/2013/07/07/2003566547>

8. TEXONO researchers refute dark matter data

(Taiwan Today, 10 07 2013)

Experiments conducted by an international team of scientists led by Taipei City-based Academia Sinica refute evidence of the existence of so-called dark matter in a region indicated in earlier research, the research institute said July 9. The Taiwan Experiment On Neutrino collaboration led by Academia Sinica's Institute of Physics recently reported that data produced by the U.S. government-supported Coherent Germanium Neutrino Telescope experiment in 2011 was flawed. TEXONO findings were reported in the June 25 issue of the prestigious journal Physical Review Letters. Physicists and cosmologists widely assume that in order to explain certain astrophysical observations, 95 percent of the energy density of the universe energy consists of so-called dark energy and dark matter. Evidence in support of this theory is sparse. CoGeNT reported data that could be interpreted as evidence for the detection of dark matter, a finding requiring verification, Academia Sinica said. In their experiments, TEXONO used advanced low-energy germanium detectors at the low-background facilities of the Kuosheng Reactor Neutrino Laboratory in northern Taiwan. They devised novel calibration schemes and data analysis techniques to enhance experimental sensitivity, Academia Sinica said. TEXONO investigation results indicate deficiencies in CoGeNT's data analysis procedures. The team's major technical advance concerns techniques for measuring the effectiveness of techniques for screening out background events. TEXONO was established by research institutes in India, Taiwan, Turkey and mainland China with the aim of conducting research in neutrino physics. The group pioneered techniques on the study of dark matter and strives to advance detector performance and physics sensitivities via hardware upgrades and background reduction. The Kuosheng facility was commissioned in 2000, and a dark matter research program was launched in 2004. Since 2009, the collaboration has been working with scientists at Tsinghua University in mainland China to undertake the first dark matter



experiment at an underground Laboratory in Sichuan. The facility is the world's deepest operating underground laboratory, providing excellent shielding against cosmic rays.

<http://www.taiwantoday.tw/ct.asp?xItem=207131&ctNode=445>

9. Taiwan continues strong run at R&D 100 Awards

(Taiwan Today, 10 07 2013)

Taiwan claimed six top-spot finishes in the latest R&D 100 Awards, a result demonstrating the country's outstanding scientific and technology strength, according to the ROC Ministry of Economic Affairs July 9. "Research and innovation are important drivers of industrial and economic growth, as well as key for increasing national competitiveness," said Lin Chiun-neng, director-general of the MOEA Department of Industrial Technology. "This year's result shows the government is leaving no stone unturned in helping local research institutions develop advanced technologies, create innovative products and promote emerging industries through effective implementation of state-backed science and technology projects." Lin made the remarks during a news conference in Taipei City commending the winners: Industrial Technology Research Institute, Institute for Information Industry and Metal Industries Research and Development Centre. Hsinchu-based ITRI's winning inventions include iAT, an electrical mobile device using motion-detection technology to control a virtual screen; Buty Fix, a technology that boosts the efficiency of biomass energy; and FluxMerge, a system for optimizing motors used in stairlifts. Taipei's III was recognized for BestLink, a device boosting wireless communication efficiency with search and rescue as well as civil security applications; and CraneAbide, a container terminal operation system employing ZigBee wireless communication technology for better dock operation efficiency. Kaohsiung-headquartered MIRDC won with its Coin Type Motor, a brushless direct current engine 25 percent smaller than its competitors with 1.875 times the output. Lin said the results also demonstrate that MOEA-sponsored science and technology projects are bringing home the bacon, with researchers filing 2,451 patent applications at home and abroad last year. Of the 1,740 granted, 754 new technologies were transferred to 964 companies for an investment of NT\$38.6 billion (US\$1.28 billion). This created NT\$88.4 billion in value-added output and 9,381 jobs, he added. According to Lin, Taiwan research institutions partner with the world's most prestigious R&D outfits, including NASA research centers, Toyota Research Institute of North America and Oxford Instruments Omicron NanoScience. The R&D 100 Awards, organized by U.S.-based R&D Magazine, are presented to the 100 makers of the year's most technologically significant new products. The latest winners of the so-called Oscars of innovation were selected from over 1,000 entries worldwide.

<http://www.taiwantoday.tw/ct.asp?xItem=207125&ctNode=445>

10. NTHU bioreactor aims to generate gold from bacteria

(Taiwan Today, 11 07 2013)

A project by Taiwan's National Tsing Hua University, backed by the ROC National Science Council, that cultivates high-quality, naturally occurring astaxanthin has taken a big step toward mass production, the NSC announced July 10. The project, Economic Scale Production of Astaxanthin by Genetically Engineered Local Bacteria, seeks to produce large volumes of the compound using a bioreactor, in an attempt to capture a market potentially worth NT\$50 billion (US\$1.66 billion). Astaxanthin is a naturally occurring carotene, found in algae, yeasts and shells of crustaceans. It is responsible for the pink color of cooked shrimp and contains important antioxidant and bioactive properties, said project leader Lai Yiu-kay, professor of NTHU's Institute of Biotechnology. At present, most astaxanthin is chemically synthesized, costs up to US\$7,500 per kilogram, and is only suitable for adding to animal feed, rather than for human consumption, Lai said. Commercial production mostly comes from algae and bacteria, severely limiting production volumes and hence pushing up the price. Extraction from algae or yeast faces problems of cost, purification, other technical obstacles and the presence of isomers, he added. After more than a year of intensive research, the NTHU project has established a small scale bioreactor to produce natural astaxanthin, with its purity above international standards. The reactor produces a dense bacterial growth and has the potential to expand for large-scale production. Additional aspects of the project are controls and testing for harmful byproducts to satisfy strict safety requirements. To ensure smooth future commercial implementation, the project team has applied to patent the technology, laid out production plans and conducted a close analysis of the international market, Lai said. The NSC said it expects the global demand for astaxanthin-based health supplements and medicinal products to develop rapidly, and earlier market research reports indicate the market size could reach NT\$50 billion within 10 years.

<http://www.taiwantoday.tw/ct.asp?xItem=207178&ctNode=445>

11. IPO touts cloud computing patent portfolio strategy

(Taiwan Today, 12 07 2013)

Taiwan public and private sector efforts promoting cloud computing technology are paying dividends, with the



number of related patent applications rising steadily in recent years, according to the Intellectual Property Office July 11. "Cloud computing introduced a new era of competition based on software and system application services, with sector developments playing a key role in fostering industrial competitiveness nationwide," an IPO official said. "Successful patent portfolio management will help further strengthen Taiwan's competitive edge in this emerging sector." With an established supply chain covering hardware manufacture, services management, software applications and system integration, Taiwan stands poised to become a key player in the global market. IPO statistics revealed that the number of patent applications totaled 2,322 over the past five years. "Growth has been particularly significant since 2010, registering triple digits for three years in a row," the official said. A total of 67 percent of the cases were filed by private companies, 18 percent by individuals, 11 percent by academic institutions and 4 percent by research organizations. Cases relating to software and devices accounted for 40 percent of filings, while e-commerce and data transmission made up 18 percent and 13 percent, respectively. Hon Hai Precision Ind. Co. Ltd. is the leading corporate applicant with more than 100 filings. Other front-running firms and organizations include Acer Inc., Chunghwa Telecom Co. Ltd., HTC Corp., Industrial Technology Research Institute and Winstron Corp. Cloud computing is a key sector targeted by the ROC government for strategic promotion. In 2010, the Ministry of Economic Affairs set up a promotion office coordinating public-private initiatives, with a Cabinet-level task force overseeing project implementation. The government expects that by 2015, the office will entice 50 major corporations to establish data centers in Taiwan, creating output of NT\$100 billion (US\$3.33 billion) in hardware, software and related services, among other goals.

<http://www.taiwantoday.tw/ct.asp?xItem=207189&ctNode=445>

12. SMART opens new Taiwan R&D center

(Taiwan Today, 12 07 2013)

SMART Modular Technologies launched its new R&D facility at the Taipei Far Eastern Telecom Park in New Taipei City's Banqiao District July 11, the Ministry of Economic Affairs said. SMART is a leading designer and manufacturer of subsystems for industrial computers used in the fields of telecommunications, defense and aviation. They include DRAM and SRAM memory modules, flash memory cards and other memory storage devices as well as TFT touch screens, the MOEA said. The California-based company was the world's fifth-biggest maker of memory modules in 2010, the New Taipei City Government noted. SMART's new Taiwan base, it added, will strengthen the company's position in the Greater China market. It can take advantage of opportunities to collaborate with its business neighbors, expand its cooperative relations with local OEM manufacturers and form joint R&D partnerships. At the July 11 ceremony in celebration of the launch of the new R&D center, SMART praised Taiwan for its outstanding R&D talents and makers of solid-state hard disk control systems. Further, the convenience of New Taipei as Taiwan's transport hub will decrease the turnover of personnel and cost of business dealings with other companies. It is for such reasons, SMART said, that upon careful consideration, the company selected New Taipei as their first Greater China base for designing advanced memory storage devices. SMART said it expects to hire 20 Taiwan engineers and to invest NT\$180 million (US\$6 million) to develop eMMC, MCP/POP, iSSD and other new products to be used in a number of high-tech applications in the biomedicine, automotive and other industries.

<http://www.taiwantoday.tw/ct.asp?xItem=207218&ctNode=445>

13. Taiwan team discovers South China Sea volcanoes

(Taiwan Today, 12 07 2013)

An oceanic research team comprising leading Taiwan academics has identified eight undersea volcanoes within a radius of 10 kilometers in the South China Sea, according to the National Science Council July 11. The discovery was made during two fortnightlong voyages aboard the 2,700-ton Ocean Researcher V—Taiwan's largest locally designed and built marine studies vessel. Headed by Lee Chao-shing, an applied geosciences professor at National Taiwan Ocean University and Gong Gwo-ching, director of Taiwan Ocean Research Institute under the National Applied Research Laboratories, the team's other members include professors from National Chung Hsin University, National Sun Yat-sen University, National Taiwan Normal University, and National Taiwan University, as well as researchers from Academia Sinica and the ROC Ministry of the Interior. Undersea fissures near Huangyan Island indicate extremely active plate movements, spurring a series of eruptions taking place in the region more than 20 million years ago, TORI Director Gong said. "The presence of volcanoes has changed our knowledge of the islet and opens the door for more research on marine geology in the area to better understand the types and distribution of underwater mineral resources." Another project undertaken during the voyages was the study of currents 4,000 meters below sea level. Multibeam echo sounders placed at a depth of 4,330 meters recorded valuable data that will be used for detailed analysis in Taiwan. In addition, the team launched Taiwan's first weather buoy in the South China Sea. The device, expected to provide information on atmospheric pressure, sea temperature, sunshine duration, and wind direction and speed, is positioned 4.5 kilometers west of Taiping Islands



at a depth of 822 meters. The voyages were conducted May 16 to June 17 under the protection of ROC navy and Coast Guard Administration vessels.

<http://www.taiwantoday.tw/ct.asp?xItem=207221&ctNode=445>

14. Taiwan launches laser technology incubation facility

(Taiwan Today, 18 07 2013)

A laser technology incubation center was inaugurated July 17 in Tainan City, further underscoring ROC government efforts to establish Southern Taiwan as a national hub for the industry. "The facility is a key plank in our policy of building an industrial cluster stretching from Chiayi County to Pingtung County," Minister of Economic Affairs Chang Chia-juch said. By assisting firms with business incubation, small-scale production, system integration and talent training, the center will help develop Taiwan into a major player in the global supply chain, he added. Situated in the South Campus of state-run Industrial Technology Research Institute, the center is funded by the Ministry of Economic Affairs and utilizes ITRI-provided equipment and technology. Seven local firms have already pledged to set up shop, including Control Technology Co. Ltd., Gallant Precision Machining Co. Ltd. and Uni-Via Technology Inc. According to Chang, lasers have a wide variety of multindustry applications, including agriculture, manufacturing, medical treatment, national defense and scientific research. "Southern Taiwan is already home to many key sectors such as biomedicine, industrial materials, metal and precision machinery," he said. "The facility will leverage the country's technological assets and help local firms maintain a competitive edge." Sources familiar with the matter said the center's first stage of operation will focus on developing additive layer manufacturing, femtosecond lasers, as well as core components and optical circuit modules for laser processing. Chang said the MOEA has earmarked NT\$150 million (US\$5 million) per year for sector promotion, and expects public-private effort to help create 10 startups and raise the sector's annual output from the current NT\$4 billion to NT\$80 billion in eight years. ITRI statistics estimate local demand for laser processing equipment at between NT\$30 billion and NT\$35 billion, with the output of sectors using such equipment at 10 times the amount.

<http://www.taiwantoday.tw/ct.asp?xItem=207476&CtNode=419>

15. Taiwan scientist makes advances in transgenic pigs

(United Daily News, 22 07 2013)

Tunghai University professor Cheng Teng-kuei, known as Taiwan's cattle cloning pioneer, is working on splicing genes from cellulose-digesting microbes in termite guts into pigs to create wood-eating, environmentally friendly hogs, THU announced July 19. Cheng said his team at Taichung-based THU has isolated five termite gut bacteria enzymes and has been conducting experiments on rats. The first litters of transgenic rats carrying the enzymes were already born last month, an encouraging first step toward creating transgenic pigs. Previously, Cheng created the world's first grass-eating swine by splicing genes from cow stomach microbes into hogs. This time Cheng said his inspiration came from a tree trunk on campus that had been hollowed by termites. Cheng led a cross-departmental team to discover that termites have a microbe in their gut which produces an enzyme able to break down cellulose, the main component of wood. Once the gene is successfully spliced into pigs, Cheng said, the genetically modified hogs will be able to consume wood waste instead of feed corn, producing much cleaner, less smelly excrement. This can save costs and reduce pollution. These second-generation environmentally friendly hogs are just one project of THU's Global Research and Education on Environment and Society program, launched last year, THU president Tang Ming-er said. The program, with NT\$50 million (US\$1.67 million) in annual funding, involves 25 departments and 250 researchers at the school. Its six main project areas are environmental governance, longterm care, green aggregates, green energy, green laws and sustainable environment.

<http://www.taiwantoday.tw/ct.asp?xItem=207623&ctNode=445>

16. Da Yeh University forges ahead in medical device R&D

(Taiwan Today, 23 07 2013)

Da Yeh University in central Taiwan's Changhua County unveiled results of its design and materials program for medical devices July 22, underscoring the leading-edge R&D capabilities of Taiwan's academic sector. A research team led by Lai Feng-min, director of DYU's Bachelor Program in Design and Materials for Medical Equipment and Devices, developed a light-weight, low-cost hearing aid made of nanocarbide. "Compared with traditional products, the new device can filter high-pitch background noise and provide greatly improved sound effects. They also come in at a competitive price of under NT\$10,000 (US\$333)," Lai said. According to the researcher, DYU has transferred its hearing aid know-how to Taichung City-based Merry Electronics Co. Ltd., which is expected to market the product by the end of next year. Lai and his team also cooperated with Taichung Veterans General Hospital in developing a mobility device employing fiberglass and high-density foam that commands a higher level of comfort, durability and fixity. The team has obtained a patent for the device, with the technology transferred to Changhua-based Chia Cherne Co. Ltd. for commercialization. Using discarded egg and oyster shells, a team led by



Ho Wen-fu, associate professor from DYU Department of Materials Science and Engineering, developed a material possessing a similar composite and structure to human bones. Ho said the new material can be used in the production of bone grafts, as well as fillings or coating for dental implants. DYU President Wu Dong-sing said Taiwan's medical device market is estimated at NT\$80 billion a year, with demand mostly met by imports from Europe and the U.S. "But most of these products are expensive and fail to meet the ergonomic needs of local patients," he said. Wu said DYU launched Taiwan's first undergraduate program focusing on materials and medical devices earlier this year to cultivate homegrown talent and promote R&D. "There is a great deal of interest already in this line of study," Wu said, adding that 18 local firms have inked letters of intent with the school for private-academic sector collaboration.

<http://www.taiwantoday.tw/ct.asp?xItem=207656&ctNode=445>

17. New imaging helps cancer treatment: TMU

(The China Post, 23 07 2013)

A cancer drug's effectiveness can now be determined by a new technique that lets doctors see images of the treatments process going on inside a patient, Taipei Medical University (TMU) announced. Using this technique, doctors can visualize and quantify whether a cancer drug is attacking more tumor cells or healthy cells, according to the Society of Nuclear Medicine and Molecular Imaging. The Molecular Imaging Technique gives doctors instant access to images of a patient's biological processes, whereas in the past doctors could only resort to slower processes such as analyzing blood or urine samples, said Taipei Medical University Clinical Research professor Chen Chen-yu. Now if a cancer kills more healthy cells than tumor cells, doctors can quickly switch medication to give patients a more effective treatment, said Chen. Normally after a patient receives therapeutic drugs, doctors can only see side effects such as hair loss, cracked lips and vomiting. However these symptoms are no indication of how effective the drug is at killing cancer cells, explained Chen. Tumor cells divide rapidly and cancer drugs aim to destroy cells with this characteristic; as a result the healthy cells can also be targeted, he added. Chen said that the new technique will effectively reduce the amount of ineffective drugs injected into a patient, thus decreasing the chances of them encountering side effects. Furthermore, the dosages of effective drugs can be increased to eradicate the cancerous cells faster. Clinical trials of the molecular imaging technique will begin at the end of the year, and the practice is expected to be in wide use in the next 10 years said Chen.

<http://www.chinapost.com.tw/taiwan/national/national-news/2013/07/23/384459/New-imaging.htm>

18. NSC names recipients of national research grants

(Taiwan Today, 25 07 2013)

Recipients of this year's ROC National Science Council R&D subsidies were announced July 24, further underscoring the government's commitment to strengthening collaboration between Taiwan's academic and private sectors. The first recipient, National Taiwan University and Taiwan Semiconductor Manufacturing Co. Ltd., proposes developing the 7 to 5 nanometer technology node. The other, National Cheng Kung University and Kaohsiung City-based China Steel Corp., proposes creating next-generation steel products, green manufacturing processes and innovative applications. Commencing Aug. 1, the NSC will subsidize each recipient to a maximum of NT\$80 million (US\$2.67 million) per annum over five years. The funding will be matched dollar for dollar by the recipients. According to an NSC official, the subsidies are helping sharpen the global technological competitiveness of Taiwan's private sector and sustaining national economic growth. "By channeling the R&D capabilities of the local academia into the business sector and initiating collaboration between the two, the subsidies will help develop key technological know-how for Taiwan's high-tech firms and strengthen patent strategies." The NTU-TSMC project, led by former NTU President Li Si-chen, focuses on developing advanced design algorithms and process automation. It will also fast-track TSMC efforts in migrating into 7-5 nm technology. "This project is set to assist the chipmaker maintain its competitive edge in nanotechnology and lay the foundation for Taiwan's semiconductor leadership in the following two decades," the official said. The NCKU-CSC collaboration will raise the state-run steel firm's percentage of high-quality products from 44.3 percent to 55 percent, and increase sector output from NT\$1.3 trillion to NT\$1.6 trillion by 2020. Taiwan's steel sector is a major national industry, with CSC playing a central role in sector development and employing more than 40,000 people.

<http://www.taiwantoday.tw/ct.asp?xItem=207748&ctNode=445>

19. Taiwan team makes breakthrough in stem cell research

(Taiwan Today, 30 07 2013)

A Taiwan research team has made an important breakthrough in stem cell research related to human autoimmune response, the ROC National Health Research Institutes said July 29. The findings, published in prestigious journal Stem Cell Reports July 25, can help development of drugs to combat diseases caused by overactive autoimmune systems, like lupus and rheumatoid arthritis, or insufficiently active immune systems, such as cancer. The team, led



by Betty Lin-ju Yen, an associate investigator at the Institute of Cellular and System Medicine of the NHRI, studied how hepacyte, or liver cell, growth factor (HGF) produced by multipotent mesenchymal stromal cells affected production of bone marrow-derived suppressor cells (MDSCs), the MOHW said. The MDSCs in turn control the production of effector and regulatory T-cells in the lymph system, which are responsible for attacking foreign bodies or cancerous cells under normal conditions. Autoimmune disease occurs when the T-cells of the human body's immune system attacks its own normal cells. The immune system is supposed to be playing the role of defensive cells, but when excessively stimulated, they overproduce inflammatory secretions that attack healthy tissue and organs, causing chronic inflammatory diseases that are hard to treat and control, the MOHW said. Mesenchymal stem cells have long been known to have an immunosuppressive regulatory function, but the mechanism was unknown. The team first discovered human mesenchymal stem cells can increase MDSC numbers, and then determined this was caused by the secretion of HGF by the stem cells. The MDSCs are strongly immunosuppressive, and can almost double the number of regulatory T-cells. The team followed up with in vivo experiments on mice, as mouse liver contains a lot of MDSCs. When the liver cell growth factor receptor was inhibited, the number of MDSCs fell considerably. Additionally, direct injection of HGF caused MDSC numbers to increase by about 30 percent. The results suggest that increasing the role of HGF or using mesenchymal stem cells to produce HGF could be effective in inhibiting or regulating the body's abnormal immune response, giving a new direction to the search for a cure to these diseases, the MOHW said. Follow-up experiments are required to determine the clinical usefulness of these applications.

<http://www.taiwantoday.tw/ct.asp?xItem=207914&ctNode=445>

20. New telescope camera puts universe in close-up

(Taiwan Today, 31 07 2013)

The Hyper-Suprime Cam, jointly developed by scientists from Taiwan, Japan and the U.S., demonstrated its powerful optical observational technology by taking ultrahigh resolution images of the Andromeda galaxy, according to Taipei-based Academia Sinica July 31. "HSC represents a giant step into a new era of observational astronomy and will contribute to answering questions about the nature of dark energy and matter," said Wang Shiang-yu, deputy director of Academia Sinica's Institute of Astronomy and Astrophysics and leader of the HSC team. Wang made the remarks during a news conference at the institution in Taipei City. He was joined by ASIAA Director Paul Ho and Nagayoshi Ohashi, associate director of the Subaru Telescope of the National Astronomical Observatory of Japan, located at the Mauna Kea Observatory on Hawaii. A collaborative project of the ASIAA, NAOJ and Princeton University, the HSC began its observations June 11 of the Andromeda Galaxy 2.5 million light years away. "The stunning images of the galaxy, also known as M31, demonstrate HSC's ability to fulfill the astronomers' intention of producing a large-scale survey of the universe with the instrument's 8.2 meter mirror, 1.5 degree-wide field of view and sharp imaging," Wang said. The development of the filter exchange unit, a key camera component, was a significant part of ASIAA's work, according to Wang. "It took years of effort to successfully develop the FEU, turning a black-and-white camera into a colored one and maximizing HSC's observation power." Wang's team received the preliminary design concept from the NAOJ and worked with Chung Shan Institute of Science and Technology to perfect the system. With its faster survey speed and up to tenfold greater file size, with no loss of image quality, the HSC greatly facilitates the work of weak lensing, which relies on detection of a large number of sources to determine the degree of distortion in the lensed image. The HSC is expected to formally commence operation in 2014.

<http://www.taiwantoday.tw/ct.asp?xItem=207928&ctNode=445>

21. Local researchers develop miniature monitoring device

(Taiwan Today, 01 08 2013)

TINY SENSOR: A triaxial sensor placed in a tooth, with its own software, will be able to help monitor patients' everyday living habits, developers said.

Taiwanese researchers have developed a device — which is to be the subject of a debate at the International Symposium on Wearable Computers in **Switzerland** next month — that developers said could help monitor an individual's oral activities. Developed by the Ubcomp Lab, which is affiliated with National Taiwan University's information technology department, Chu Hao-hua, a professor at the university, and colleagues said that a miniature triaxial sensor inserted into a fake tooth could analyze all oral activities — chewing, speaking, swallowing and coughing — with up to 93.8 percent accuracy. Placed on a very small microchip along with an accelerator, the device has built-in software to identify each oral action and record the time it takes for a wearer to chew, drink, eat, cough or smoke a cigarette. "We also hope to include a Bluetooth device in the chip in the future, so that the device may be able to transmit the data to a smartphone for further analysis and understanding of a user's day-to-day living habits," Chu said. Chu said that he and his colleagues hoped to use the mouth as a means to understand all sorts of health problems. The team said that the greatest problem in developing the device is the power source. The team is considering viable micro-sized power sources and a team member told the New Scientist magazine in an



**TRADE OFFICE OF SWISS INDUSTRIES
(TOSI)**

瑞 士 商 務 辦 事 處

*Rm. 3101/31F, 333 Keelung Road, Sec. 1
Taipei 11012, Taiwan, R.O.C.
Tel. 886-2-2720 1001 Fax 886-2-2757
6984
e-mail address: tosi@swiss.org.tw
website: www.swiss.org.tw*

interview that the commercial potential of a micro-sized or wireless-capable device is limitless. Meanwhile, during a Bluetooth Special Interest Group meeting on Tuesday, which discussed the ways in which Bluetooth technology trends are being applied, companies displayed a portable radiation-detection device that is being developed. No larger than a human thumb, the sensory device — once placed in the target location — could transmit the data it gathered via Bluetooth directly to a smartphone, allowing for instantaneous and almost real-time monitoring of radiation levels. The same technology has also been used in blood pressure meters, which use nanosecond pulse near-field sensing technology and Bluetooth transmissions to show patients their blood pressure and heart rate, without the need for inflating a band around the arm to increase pressure on the blood vessels, as in traditional blood pressure meters.

<http://www.taipeitimes.com/News/taiwan/archives/2013/08/01/2003568676>