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News Highlights:

The world's second and Asia's first ground control facility for an advanced physics detector that was sent into space last year to gather data about the origin of the universe was inaugurated in Taiwan – to enable tiny generators to collect and store kinetic energy in batteries that can power light-emitting diodes (LED) was reported as major breakthrough in nano electricity – a research team found in animal tests that mesenchymal stem cells helped to healing of wounds and the regeneration of blood vessels – the National Taiwan Normal University invented method for a rapid screening for diabetes by measuring acetone levels in breath – a research team of the National Yang Ming University identified a compound that can efficiently control the development of cancer cells without damaging normal cells – the National Cheng Kung University made a breakthrough in semiconductor packaging by developing a new material (using a mix of tin, zinc, silver, aluminum and gallium) that is believed to be more stable and cost-effective than existing materials – researchers from Taiwan, the USA and China have jointly developed the world's smallest semiconductor laser device – a biotech company introduced a herbal medicine for the treatment of cancer-related fatigue (CRF), touting it as the first drug ever developed specifically for that purpose – the Taipei Veterans General Hospital used a new device to cure a patient suffering from mesenteric artery thrombosis (MAT)

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1. Control center for space research to open in Taiwan

(Central News Agency, 01 07 2012)

A ground control center for an advanced particle physics detector that was sent into space last year to gather data about the origin of the universe will be inaugurated in Taiwan on July 3, a military researcher said. "It will be the world's second and Asia's first ground control facility for the space device, known in academic circles as Alpha Magnetic Spectrometer-02 (AMS-02)," said Jinchi Hao, a project director at the military-run Chungshan Institute of Science and Technology (CSIST). The state-of-the-art detector, which was designed and built by elite scientists from 16 countries including Taiwan, was taken to the International Space Station in May 2011 by the U.S. space shuttle Endeavour on its final flight. It is designed mainly to detect charged particles in cosmic rays to find anti-matter, dark matter and missing matter in the hope of answering questions about the "big bang" and the formation of the universe, according to Jinchi. "To date, the detector has transmitted 18 billion pieces of data back to the project's headquarters at the European Organization for Nuclear Research in Geneva," Jinchi said, adding that the data could shed light on the origin of the universe. Currently, experts at the Geneva station are working in shifts around the clock, with the U.S. NASA Space Center in Houston providing backup support. To reduce the Geneva staff's workload and allow even more comprehensive monitoring, the project's top leader Samuel C.C. Ting proposed the establishment of a similar ground station in Asia, to be dubbed "Payload Operations Control Center." Ting is a Chinese-American Nobel laureate in physics and a member of Taiwan's top research institute Academia Sinica. Other countries expressed strong interest in hosting the new facility because it would allow the host country to play a more important role in the joint project and facilitate bilateral or multilateral technological exchanges, Jinchi said. However, Taiwan was selected because it has been participating in the project for more than 10 years and has won much acclaim for its contributions in developing the device's electronics system that plays a crucial role in the project, he added. "The establishment of the center is a new milestone in our participation in international space research programs," Jinchi said. The new payload control center will be located in the CSIST's Lungyuan Research Park in Lungtan, Taoyuan County, in northern Taiwan. Initially, the center will not be able to communicate directly with the International Space Station, Jinchi said. "But we expect to gain direct access to the space station soon, with NASA's authorization," he added. NASA personnel have said the facility is comparable to the one in Geneva, according to Yeh Fen, a manager at the Lungyuan park's innovation incubating center, who is responsible for establishing the AMS-02 ground control station in the park. The center has passed various tests by NASA inspectors, including Internet connectivity and information security checks, he said. The payload control center, about the size of an average classroom, will be staffed by 12 scientists who will monitor the AMS-02's "health" in real time via computers, Yeh said. Initially, they will work shifts from 6 a.m. to 2 p.m. while the Geneva staff will take the remaining shifts. In the long term, Yeh said, the Taiwan center will expand its capacity to accommodate three work shifts in case of any emergencies at the Geneva center. The AMS-02 project, launched by the U.S. Department of Energy in 1999 in collaboration with 15 other countries, is scheduled to run for 15 years. CSIST officials said technologies used in the AMS-02 construction can be applied to the development of missiles, other weapons systems and unmanned aerial vehicles. Meanwhile, the officials said, the institute's outstanding contribution to the detector's electronics system has drawn the attention of other participating countries, some of which have initiated proposals for technological collaboration. For instance, an Italian research institute is interested in working with the CSIST on the development of a solar panel control system, the officials said.

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aSOC&ID=201207010018
<http://www.taiwantoday.tw/ct.asp?xItem=193047&ctNode=445>

2. Academician calls for think tank on sustainability science

(Central News Agency, 02 07 2012)

A former Academia Sinica vice president called for the establishment of a think tank on sustainability science that can integrate research in various fields and propose solutions for the government. Liu Chao-han said Academia Sinica should establish the think tank, adding that the most-needed research areas for Taiwan include disaster prevention, food safety, renewable resources and the humanities in the wake of environmental change. Taiwan is an island that is relatively young in geological terms, which makes it most suitable for conducting research into geographic environments and ecological systems. He also said at the 30th convocation of the country's top research institution that it is suitable for studies into humanity and society, and economics and politics. For his part, Academia Sinica President Chi-Huey Wong said the institution has already started studies on sustainability science and will work with the International Council for Science on related research.

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aLIV&ID=201207020029

3. Ma stresses value of fundamental research

(Taiwan Today, 03 07 2012)

Basic research is of great importance to both the public and private sectors in Taiwan and the basis of the nation's long-term growth and development, ROC President Ma Ying-jeou said July 2. The president made the remarks at the



opening ceremony of Taipei-based Academia Sinica's biennial Convocation of Academicians. Academia Sinica is Taiwan's highest research institute. "The Ministry of Economic Affairs has proposed 10 research plans to support the development of Taiwan's fundamental science," Ma said. "The Ministry of Education, Board of Science and Technology, and National Science Council are also cooperating to subsidize over the next three years more than 100 doctorate and postdoctorate researchers to study in high technology fields at prestigious universities abroad in hopes of encouraging more Taiwan students to study overseas," he continued. "C. C. Leung, the co-founder and vice chairman of Quanta Computer Inc., has also donated NT\$570 million (US\$19 million) to National Taiwan University to assist in developing Physics of the Universe." Ma pointed out that "people in today's society are faced with challenges ranging from financial and economic difficulties to climate change. The recent euro debt crisis has led to global economic turmoil, and the impact on Taiwan—with more than 70 percent of its gross domestic product relying on exports—should not be underestimated; therefore, cross-field studies are of urgent need to build up energies to tackle the issues." The president added that although the value of basic research may not be immediately apparent, it is indispensable for truly understanding a subject and the only way to achieve fundamental breakthroughs. Ma said Taiwan was ranked 13 out of 146 countries and territories worldwide, topping all Asian economies, in the latest Knowledge Economy Index released by the World Bank in June. "The government will up efforts to strive for more technology budgets and seek ways to continue development in the sector to maintain Taiwan's competitive advantage."

<http://www.taiwantoday.tw/ct.asp?xItem=193002&ctNode=445>

4. New optical profiler can help companies save millions: researcher

(Central News Agency, 03 07 2012)

A newly developed multifunctional thin film optical profiler for electronic devices can help companies save millions of Taiwan dollars per year once it is commercialized, the Taiwanese research team leader said. Lee Cheng-chung, dean of National Central University's College of Science, said the three-in-one thin film optical profiler was made public in 2011 and his team is now seeking partnerships with domestic and foreign companies to bring it to market. The research team is applying for patents in Taiwan, United States and Japan, Lee said. The new profiler is capable of detecting optical film thickness, reflective index, and surface profile in consumer electronics, while existing devices are equipped with only one or two functions, Lee said. In addition, the optical film profiler can be used before or after film coating, and unlike older models, can be operated in an environment exposed to vibrations such as from people walking around the office, he said. Lee said cameras, video recorders and even satellites contain optical components that use thin film, which needs to be measured and monitored to ensure the products' quality. A price has not yet been decided for the thin film profiler but will be cheaper than existing models, Lee said. Companies usually spend millions of dollars to purchase a range of equipment for the profiling process, which is not only uneconomical but also time consuming, he said. The research was published in the international scientific journal *Optics Letter* on Aug. 15 last year and the device was showcased at the Photonics Festival in Taipei last month.

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5. Taiwan's ITRI cleans up at R&D 100 Awards

(Taiwan Today, 04 07 2012)

Hsinchu-based Industrial Technology Research Institute claimed six top-spot finishes at the prestigious R&D 100 Awards, trailing only Oak Ridge National Laboratory of the U.S., according to the ROC Ministry of Economic Affairs July 3. The state-backed research body's winning entries encompass categories such as electrical devices, electronic instrumentation, energy technologies, materials sciences, and thin-film and vacuum technologies. ITRI's winning inventions include a clamp-on voltage and current meter, which improves power usage management, and lignin-based polymer technology for producing plastic containers free of hazardous chemical compounds as Bisphenol A. Taipei-headquartered Institute for Information Industry also received an award for its radio-frequency identification technology of metallic objects. "These awards represent a vote of confidence in ROC government efforts to develop national competitiveness centered on technology and innovation, the major drivers of Taiwan's industrial development and economic growth," said Deputy MOEA Minister Woody Tyzz-jiun Duh. Various MOEA-sponsored research programs have yielded 1,505 patents at home and abroad in 2011, Duh said, with 1,177 employed by the private sector for commercial applications. These projects have generated Taiwan private investment of NT\$41.4 billion (US\$1.39 billion), output of NT\$70 billion and over 8,000 job opportunities nationwide, he added. The awards, organized by U.S.-based R&D Magazine, are presented to the 100 makers of the year's most technologically significant new products. This latest winners of the so-called Oscars of innovation were selected from over 1,000 entries worldwide

<http://www.taiwantoday.tw/ct.asp?xItem=193042&ctNode=445>



6. Taiwan team makes breakthrough in nano energy research

(Central News Agency, 04 07 2012)

A new type of nanotechnology developed by a research team at National Tsing Hua University (NTHU) makes it possible to produce electricity by storing energy created by movement, the university said. The research project was based on the dissertation of a doctoral student Chen Chih-yen, with supervision by Chou Li-jen, a professor at the university's Department of Materials Science and Engineering. Chen's research represents a major breakthrough in nano electricity, as it enables tiny generators to collect and store kinetic energy in batteries that can power light-emitting diodes (LEDs), the university said. The nanogenerator concept was first proposed by a leading nanowire technology research team led by Zhong Lin Wang, a professor at Georgia Institute of Technology School of Materials Science and Engineering in the United States, NTHU said. During an academic exchange at Georgia Tech last year, Chen made a nanogenerator of Gallium Nitride Nanowires and linked it to an LED, the Taiwan university said. Nano electricity is unaffected by gravity and can create a self-sustaining electricity system by receiving energy from the natural environment, according to Chen. Chen said he hopes to apply the concept to generate electricity from clothing during normal movements by the wearer and to work on other projects to help solve the world's energy crisis. Chen's research paper made the June cover of the international scientific journal ACS Nano and was published on its website May 18.

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aECO&ID=201207040044

7. Local researchers aid in Higgs boson search

(China Post, 05 07 2012)

A particle "consistent with" the Higgs boson has been discovered by an international research team including members from National Central University and National Taiwan University, and the research team will continue its study to determine whether the particle can be formally identified as the Higgs boson, an elementary particle that gives mass to other elementary particles such as quarks and electrons through the Higgs mechanism, the National Central University (NCU) said yesterday. A Taiwanese team composed of physics professors of the two local universities has been with the Compact Muon Solenoid (CMS) research program under the international Large Hadron Collider (LHC) project for 13 years, and has been responsible for undertaking physics analysis, the NCU said. NCU noted that at a total cost of around NT\$300 billion, the Large Hadron Collider (LHC) is a gigantic scientific instrument near Geneva, where it spans the border between Switzerland and France about 100 meters underground. It is a particle accelerator used by physicists to study the smallest known particles and is expected to address some of the most fundamental questions of physics, advancing the understanding of the deepest laws of nature. Two beams of subatomic particles called "hadrons" travel in opposite directions inside the circular accelerator, gaining energy with every lap. Physicists use the LHC to recreate the conditions just after the Big Bang by colliding the two beams head-on at extraordinary velocity. Teams of physicists from around the world then analyze the particles created in the collisions using special detectors in a number of experiments dedicated to the LHC, according to NCU.

<http://www.chinapost.com.tw/taiwan/national/national-news/2012/07/05/346589/Local-researchers.htm>

8. European Research Council promotes billion-euro grant in Taiwan

(Central News Agency, 08 07 2012)

An official from the European Research Council arrived in Taiwan on 8 July to promote a billion-euro funding program for research as part of the council's global mission to invest in the best talent in frontier research. The program will make available grants totaling 1.8 billion euros (US\$2.2 billion) for any individuals, including early-career and senior researchers, from around the world in all disciplines, said Donald Dingwell, secretary-general of the council. The secretary-general described Taiwan as one of the first places to come to in Asia because of its high academic standing. "Taiwan is known, in these 50 years, as a research powerhouse of Asia," said Dingwell, who has also visited Hong Kong, South Korea and Japan on his Asia trip to promote the grants. Beginning July 10, researchers in any field will be able to apply for up to 3.5 million euros per grant from the council, an independent body in the European Union established in 2007 to fund frontier research. There are no geographical quotas or restrictions on the nationality of the grantees. The only requirement is that 50 percent of their research must be carried out in Europe. The success rate has been around 12 percent since the funding began in 2007, said Dingwell. Over this period, the council has received fewer than 10 applications from Taiwan, "far too few for the talent that Taiwan has," he said. The proposed budget for the council for the 2014-2020 period will almost double to 15 billion euros from 7.5 billion euros for the 2007-2013 period, Dingwell added. He said the increase is partly attributed to the belief of the European Commission that "somehow, having the best researchers in Europe will allow us to grow faster out of our financial problems." Dingwell said he is planning to visit Taiwan again next year, as well as China, Singapore and various other countries, as part of a two-year international campaign to attract more research proposals from outside Europe. The



global mission, which began in February has taken Dingwell to the United States, Canada, South Africa, South America and Asia. During his three-day stay in Taiwan, Dingwell will meet with researchers, university representatives and officials to raise awareness about the council's funding schemes.

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<http://www.taiwantoday.tw/ct.asp?xItem=194069&ctNode=427>

9. NTHU Professors Apply Big Bang Theory to 3D Atomic Tomography

(MEPO Forum, 15 07 2012)

Inspired by the Big Bang Theory, a pair of professors from National Tsing Hua University (NTHU) and the University of Antwerp have developed a new route to atomic-resolution electron tomography. Fu-rong Chen of NTHU's department of engineering and system science and Dirk VAN DYCK were seeking to understand and control the features and functions of protein and other materials. To this end it is crucial to analyze their 3D atomic structure, Chen said, adding that although it was possible to analyze atomic structure using classical electron tomographic methods, the resultant images are 2D and the actual 3D structure of the atoms within a material cannot be interpreted directly. "To use the 2D images taken by classical electron tomographic methods to produce a 3D image, you need to take many shots from more than a hundred angles, but you still cannot achieve the level of atomic resolution," CHEN said. It takes the selection of about 37,000 proteins from 3,000 images and the use of 7,000 PC clusters for 200 days to calculate the 3D structure of a virus using the classical method of cryoelectron tomography, he added. However, inspired by Big Bang Theory and the Hubble expansion — which says the universe expanded from a single point of origin, meaning that the distance between galaxies and the origin are linearly proportional to the speed at which they move away from the origin — Chen and Van Dyck developed a similar calculation to image the structural arrangement of atoms. By sending out electron waves from only one viewing direction and calculating the different angles and phases of waves when they reach the image platform after hitting the atoms, the new method is able to calculate the precise location of the atom in its 3D structure faster and easier than classical methods, he said. The method is likely to have a revolutionary effect on analyzing atomic structures in material and protein in the future, Chen said, adding that it would greatly reduce the time needed to reconstruct the atomic structure of proteins. Their breakthrough was published in last month's issue of *Nature*.

<http://mepopedia.com/forum/read.php?160,24123>

10. Taiwanese team announces breakthrough in stem cell research

(Central News Agency, 16 07 2012)

A research team from Taipei Veterans General Hospital and National Yang Ming University announced a breakthrough in the cultivation of stem cells that will provide a better source of such cells for disease treatment. The use of mesenchymal stem cells, which can be obtained from bone marrow, is less controversial than the use of embryonic stem cells, said Hung Shih-chieh, the professor leading the team. The team found in animal tests that mesenchymal stem cells helped the healing of wounds and the regeneration of blood vessels. The tests also show that mesenchymal stem cells are helpful in treating poor circulation, which is often found in diabetic patients, as well as in repairing broken bones and damaged joints, Hung said. The findings, along with the results of other studies, suggest that mesenchymal stem cells can be used in the treatment of blood clots in peripheral arteries and in cases of bone marrow transplant rejection. In addition, Hung said, they found that under hypoxic conditions, the culture of mesenchymal stem cells can obtain better results. At an oxygen level of 1 to 2 percent, the amount of mesenchymal stem cells yielded after 60 days of culture is 100 to 1,000 times the results under the normal oxygen level of 21 percent, Hung said. He noted that the new cells bear an 80 to 90 percent similarity to embryonic stem cells and have two genetic expressions -- Oct4 and Nanog -- of embryonic stem cells. Oct4 and Nanog are both factors involved in the self-renewal of embryonic stem cells and the team found that the two factors also play the same role in mesenchymal stem cells. The results of the research, of which Tsai Chih-chien -- a researcher at the university's Institute of Clinical Medicine -- is the first author, were published in the journal *Molecular Cell* and online July 12.

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11. Taiwan researchers develop stress-releasing lactic fermented drink

(Central News Agency, 18 07 2012)

A Taiwanese research team said that it has developed a lactic fermented drink containing a high level of gamma-aminobutyric acid (GABA) that can be used as a stress-releasing food supplement. Tsai Guo-jane, a professor of food science at National Taiwan Ocean University, said her research team successfully developed the drink in a project last year. Researchers bred lactic acid bacteria enriched with GABA with rice residues of *Cordyceps militaris* -- also known as caterpillar fungus -- and lactic acid bacteria isolated from intestines of fish, Tsai said. GABA



is an amino acid that helps promote normal brain function by blocking stress-related messages from reaching receptor sites in the central nervous system. Tsai said the rice residues, on which cordyceps militaris is grown for commercial use, are normally dumped as waste after the fungus is harvested. Based on the concept of recycling, the research team ground the used rice with water before adding lactic acid bacteria from fish intestines into the solution, she said, noting that two days of fermentation resulted in a GABA-rich lactic acid bacteria. Due to GABA's ability to lower blood pressure and calm nervous tension, the team made a fermented drink with the GABA-rich lactic acid bacteria, Tsai said, adding animal trials have proven the new drink's function as a natural tranquilizer. When GABA-rich lactic acid bacteria is used in a beverage, it can supplement the amino acids that human bodies need," Tsai said. In the future, she hopes that the drink can be used in the production of anti-depression food supplements, she added. The research team will formally released the research results at the Bio Taiwan 2012 exhibition.

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12. Research team unveils air substance density device

(Taipei Times, 19 07 2012)

A research team from National Taiwan Normal University (NTNU) unveiled a quantitative detection technique that can instantly determine the density of various substances in the air by analyzing the changes in frequency when air is blown through a tiny whistle. Lin Cheng-huang, a professor at the university's department of chemistry, said that with the new detection method invented by his research team, rapid screening for diabetes by measuring acetone levels in breath could become possible in the near future. The research project, funded by the National Science Council, is the first in the world to use the analysis of sound frequency to determine gas composition and its density, Lin said, adding that the new technique obviates the need for a calibration curve to determine the quantity of substances, as is used in the most common techniques currently available. Compared with current common techniques for gas detection through chemical principles, the new technique's detection -principle comes from physics — by applying a specially designed whistle after the process of gas chromatography (separation of the different components in the gas) and analyzing the various sound frequencies created as the substances are blown through the whistle, Lin said. Lin said the team was cooperating with other research teams, especially on the development of a household medical device to detect acetone levels in a person's breath — which is likely to be a fast screening method for diabetic ketoacidosis. Most people dislike intrusive methods such as blood tests, so if the device proved effective in further experiments, it could potentially reduce the need for such tests, Lin said. By blowing air into the device and waiting for a few minutes for the analysis, users can easily detect acetone levels in their breath, he said. Lin added that the team hopes to make the device easy to operate and available in the handy size of an iPad, so that it can be used for daily health monitoring.

<http://www.taipeitimes.com/News/taiwan/archives/2012/07/19/2003538122>

13. National Yang Ming University Researchers Identify Compound That Inhibits Cancer Development without Damaging Normal Cells

(MEPO Forum, 23 07 2012)

NYMU Spotlight (2012/07/20) & tophealth.com (2012/07/19)

A research team at National Yang Ming University led by Professor Zee-Fen Chang at the Institute of Biochemistry and Molecular Biology has made a significant breakthrough in fundamental medicine. The team has identified a compound that can efficiently control the development of cancer cells without damaging normal cells. Chemotherapy is the most widely adopted cancer treatment. Doxorubicin is an widely used antineoplastic drug that targets multiple types of cancer. It can cause severe damage to DNA and kill cells, but the effect comes commonly to both cancer cells and normal cells, and in order to efficiently kill the cancer cells, high-dose and intensive medication is required, so the drug's strong side effects, such as vomiting, nausea, inflammation, hair loss, and even cumulative damage to heart, bring limit to the medication. According to Chang, during DNA repair, there is a requirement for dideoxy nucleotide; by analyzing the metabolism difference of the dideoxy nucleotide between DNA-damaged cancer cells and normal cells, the research team finds increasing expression of ribonucleotide reductase (RNR) in the cancer cells' repair along with the effect of thymidylate kinase (TMPK) that is found to be bound with the supply of enough and balanced volume of four types of RNR that help with repair, for the team finds that the reduction of TMPK's activity causes imbalance among the four types of RNR and leads to incomplete DNA repair and cell apoptosis. On the other hand, the team finds decreasing RNR expression in damaged normal cells, i.e., even under the circumstance of decreasing TMPK, the four types of RNR keeps balanced until the DNA repair is complete, while the cells stay sleep, not apoptosis. Chang stressed, upon the basis of the findings, the team targets TMPK and develops one inhibitor that suppresses TMPK with a luminescent rapid screening system. The inhibitor can selectively reduce the growth of adenosine triphosphate (dTTP) and, together with low-dose doxorubicin, efficiently kills cancer cells while do no harm to the normal cells.



The findings have been published in *Cancer Cell*, July 10.

<http://web1.nsc.gov.tw/techwp.aspx?id=1010723001&ctunit=208&ctnode=287&mp=7>

14. Hydrogen scooters ready for mass production: MOEA

(China Post, 28 07 2012)

The Ministry of Economic Affairs (MOEA) announced its safety and reliability standard for hydrogen fuel cell motorcycles. Scooters produced by some manufacturers have passed the standard and ready for mass production, according to the MOEA. MOEA Deputy Minister Tu Tzu-chun stated that the standard of hydrogen fuel cell motorcycles is included in the ongoing cross-strait integration of standards. The ministry is also working on a global standard for such vehicles, paving the way for future exports of hydrogen fuel cell motorcycles. Some 30 hydrogen fuel cell scooters have completed the on-road test drive of 120,000 kilometers in cities, mountainous and seaside areas, which is the first on-road test for such vehicles in the world, stated National Taiwan University of Science and Technology President Chen Shi-Shuenn. The distance is equal to three times the circumference of the Earth. According to Tu, these scooters produce just heat, water, and electricity but no carbon dioxide. Division Director of the Bureau of Standards Hsieh Han-chang (謝翰璋) stated that the scooters in exhibition use low-pressure storage canisters, which are safer than high-pressure versions. To make the hydrogen inside stable, the manufacturer uses newly developed catalysts, which is an important technological advancement. The scooter manufacturer aims to incorporate convenience stores, gas stations and scooter shops to provide service for exchanging old storage canisters for new ones. In this way, the government does not need to provide relative infrastructure for such vehicles. The storage canisters are approximately 4.4 kilograms each, lighter than the Lithium battery used by other battery electric vehicles. The highest speed for the scooter is 70 kilometers per hour, according to Hsieh. He expected that when loaded with two canisters — 90 grams of hydrogen gas — the scooter can go as far as 50 kilometers. Customers can purchase 90 grams of hydrogen gas for NT\$30. For every NT\$100 spent, a regular scooter can run for 100 kilometers, while a Lithium battery electric vehicle can run for 150 to 170 kilometers, and a hydrogen fuel cell scooter can run for 260 kilometers, said the division director. As for concerns that the fuel cell scooter is still expensive, Tu said higher prices are natural when new products are first launched. According to Hsieh, the manufacturer promises that by 2015 if the number of people purchasing these scooters can reach 100,000, the company will be able to sell the scooter for NT\$70,000 each. Market :The manufacturer targets markets in Taiwan, southeast mainland China and Southeast Asia, where the portion of people using motorcycles is substantial. Currently, the government only subsidizes battery electric vehicles using Lithium batteries. Commenting on the subsidy, Hsieh stated that the hydrogen fuel cell scooter can be popular in the market even without a government subsidy because of the cheaper price of hydrogen gas.

<http://www.chinapost.com.tw/taiwan/national/national-news/2012/07/28/349116/Hydrogen-scooters.htm>

15. Taiwanese school develops new semiconductor packaging material

(Central News Agency, 30 07 2012)

National Cheng Kung University has made a breakthrough in semiconductor packaging by developing a new material that is believed to be more stable and cost-effective than existing materials, the Tainan-based school said. The research team, headed by professor Lin Kwang-lung, used a mix of tin, zinc, silver, aluminum and gallium to make the new material. Currently available materials are generally composed of silver, tin and copper. Lin, a professor with the school's Department of Materials Science and Engineering, said the cost of the material commonly used in the industry at present has risen dramatically because of soaring copper prices. The newly developed material, which is weighted toward metals that are relatively cheaper, is about 15 percent less expensive than what is available on the market, Lin said. He added that the new material has obtained patents in Taiwan, Japan and the United States and is ready for mass production. The school said it hoped to work with manufacturers to develop commercial applications for the new product.

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aECO&ID=201207300033

16. Multinational team develops world's smallest semiconductor laser

(Central News Agency, 30 07 2012)

Researchers from Taiwan, the United States and China have jointly developed the world's smallest semiconductor laser device, an achievement that could pave the way for breakthroughs in optical computing, researchers said. The nanolaser device, which is 30 nanometers wide and invisible to the naked eye, "can operate below the 3-D diffraction limit," Shangjr Gwo, a physics professor from Taiwan's National Tsing Hua University, said at a press conference in Taipei. The device has been miniaturized so that it can now resemble the size of transistors in integrated circuits but with the potential of being over 1,000 times faster than transistors, said Gwo. The miniaturization of semiconductor



lasers could help the development of faster, low-power photon electronics such as optical computers, communication systems and microscopes for studying diseases, said Gwo. "The 21st century is the century of light," Gwo added. However, he noted that it could still be years before the technology can be applied to electronic products, and said that problems such as the current high power consumption of the laser device have yet to be overcome. The team of researchers combined their years of work on an atomically smooth epitaxial silver film and an indium gallium nitride (InGaN) core that acts as gain medium to develop the device. The team consists of 15 researchers and Ph.D. students, eight of whom are from National Tsing Hua University, and the research was funded by Taiwan's National Science Council. Other members are from Taiwan's National Chiao Tung University, the University of Texas at Austin and China's Institute of Physics, Chinese Academy of Sciences. The results of the study were published in the July 27 issue of Science magazine in the United States.

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aALL&ID=201207300014

17. Taiwan-led team discovers water pressure can induce quakes

(Central News Agency, 31 07 2012)

A Taiwan-led research team has discovered that high water pressure can induce earthquake-causing rock failures, paving the way for future studies on the cause of earthquakes. The team of Taiwanese, American and Japanese researchers discovered that underground fluid flows, when blocked by impermeable zones in the earth, could create bursts and cracks of 2-5 cm, which the team terms "isotropic events." The researchers made their discovery after examining the Chelungpu Fault in central Taiwan, which ruptured during the magnitude 7.6 earthquake in Taiwan in 1999, known in Taiwan as the 921 quake. In 2006, the team drilled a hole that penetrated the fault and installed a seven-level seismometer that collects data from depths of about 950 to 1,300 meters. Ma Kuo-fong, a National Central University professor who led the research, said many scientists believe that water pressure is related to the occurrences of quakes, but there has been no direct evidence discovered in the past to prove this theory. "It is the first time that such a phenomenon has been directly observed," the earth science professor said at a press conference at the National Science Council, which co-funded the research. She said the team has observed many "isotropic events" in a fluid-rich zone directly below the impermeable zone of the fault. The data shows that only seismic waves, but no shear waves, were recorded, meaning that the bursts are not caused by the shifting of faults but more likely caused by fluid or gas explosions, said Ma. She said no research to date has been able to predict an earthquake or downsize the scale of one, but added that the results of her team's research could shed light in that direction. She also said the research results could be used to assess the risk of carbon capture and underground storage in the future. This is a process that contains carbon emissions and injects them deep into the earth's crust so that they do not contribute to air pollution and global warming. The research has been published in the July 27 issue of Science magazine in the United States.

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aSOC&ID=201207310026

18. Taiwan introduces herbal medicine for cancer-related fatigue

(Central News Agency, 31 07 2012)

A biotech company introduced a herbal medicine for the treatment of cancer-related fatigue (CRF), touting it as the first drug ever developed specifically for that purpose. The intravenous drug, made from a herb commonly used in Chinese medicine, can increase the chi energy of patients, said Chen Kuang-chi, chief executive officer of Maywufa Bio Pharmaceutical Group. The drug, recently approved by Taiwan's health authorities, is expected to provide relief for about 80 percent of cancer patients, he said at a press conference. "Astragalus membranaceus, or Huang Chi, is the number one energy booster in Chinese medicine," said Lee Kuo-hsiung, an academician of Academia Sinica, Taiwan's top research institute. The drug, however, does not come cheap. One gram of the powder, which makes two injections, costs NT\$25,000 (US\$840). The suggested dose for cancer patients is two to three injections per week, according to the developers. Lee, who came up with the idea of integrating Huang Chi into western medicine, said Taiwan has a great advantage in developing new drugs based on Chinese herbs. A large scale clinical trial of the new drug on stroke patients is underway, as the company is also trying its effectiveness on people suffering from other diseases, Chen said. Although most healthy people experience fatigue from time to time, CRF is said to be more severe. Causes of CRF include anemia, emotional distress, sleep disturbance and side effects of cancer treatments.

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aLIV&ID=201207310038

19. Device offers hope for sufferers of MAT

(Taipei Times, 31 07 2012)

AngioJet: Taipei Veterans General Hospital used the device to cure an 80-year-old woman who suffered from mesenteric artery thrombosis, which has a 70% fatality rate. Patients diagnosed with mesenteric artery thrombosis



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(MAT), a rare and acute abdominal condition that has a fatality rate of about 70 percent, could now be better treated through the application of AngioJet hydrodynamic suction thrombectomy (AngioJet), doctors said. Hsu Chiao-po of Taipei Veterans General Hospital's (TVGH) Department of Cardiovascular Surgery said an 80-year-old female patient from Hsinchu City was recently diagnosed with MAT after complaining about abdominal pain accompanied by bloody stools. The woman already suffered from chronic valvular heart disease, atrial fibrillation and liver cirrhosis, and had a history of liver tumors, Hsu said. Following her referral to the TVGH for emergency treatment, Hsu said a doctor from the Department of Digestive Surgery was disinclined to treat her conditions by removing her necrotic intestines caused by blood clots, considering the large scope of the resection and her low chance of survival after such surgery. Nor was the doctor willing to resort to the more traditional method of performing an embolectomy to restore blood flow, Hsu said, given the age of the patient and the high surgical risk. Carefully weighing the risks and benefits, the doctor subsequently advised the patient to undergo AngioJet therapy, Hsu said. AngioJet is designed to remove thrombus by streaming a high-pressure saline jet through a device based on the Bernoulli principle, a basic principle of fluid behavior, Hsu said. The method first delivers and disperses clot-dissolving drugs directly into the thrombus through a catheter, and then removes the clot fragments. He said that although an abdominal exploration operation conducted following the AngioJet and an intestinal vessel reconstruction found the woman's blood supply to her intestines still remained low, no further necrotic tissue was detected. After one week of post-operative therapy, the patient was found to have recovered well, with no blood in her stools or abdominal pain, Hsu said. "Patients with acute arterial occlusion require emergency management. They are advised to adopt the AngioJet after a thorough medical assessment to prevent blood clots from spreading further and damaging their vascular structure," Hsu said

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