



31 July 2010

**Science, Technology and Education News from Taiwan
Number 07 – July 2010**

Recent experiments led by a group of international researchers from 32 countries showed that the size of a proton is 4 % smaller than what was long believed. Yi-We Liu, an associate professor with the National Tsing Hua University (NTHU) Physics Department is one of the main scientists who contributed to develop the laser system to probe the proton radius. Most of the experiments were carried out at the Paul Scherrer Institute in Switzerland.

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aECO&ID=201007130001

A flexible pay scheme for university faculty and public research institution staff will be put into effect to facilitate recruitment of outstanding scholars from abroad and retain Taiwan's best instructors. The "creating top-notch universities" program is to allow 5-10 Taiwanese universities to rank among the world's top 200 in the next five years.

http://www.taiwannews.com.tw/etn/news_content.php?id=1309985&lang=eng_news&cate_rss=news_Politics_TAIWAN

<http://www.taiwantoday.tw/ct.asp?xItem=109410&ctNode=445>

The quality of Taiwan's research papers has been improving in recent years, with the number of these cited in journal articles on engineering ranked 9th, material science 10th and information science-related papers 11th in the world. The number of these published in journals increased from 537 in 1981 to more than 24'000 in 2009, with an average annual increase of over 12 %. In 2009, the number of Taiwanese theses published ranked 16th, while the number of these cited ranked 19th.

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aALL&ID=201007140035

Arthur Carty, director of the Waterloo Institute for Nanotechnology at the University of Waterloo (Canada) said that the success and degree of sophistication of Taiwan's science and technology development is much better than the credit it receives. Taiwan has almost all the elements of a technologically advanced country, incl fine universities, innovation and leading companies, he said. Taiwan's decision to focus on computer and information technology development 20 years ago has turned out to be a brilliant policy as a number of its companies have had global success. Investment in nanotechnology will also pay off in the future.

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?ID=201007240011&Type=aSOC

The number of foreign students at Taiwan's top academic institutions is regarded as too low. The proportion had risen to 1.5 % out of 1.37 million students at 164 universities, colleges and institutes from 1.3 % over the past two years, but it should reach 2 % or even 2.5 % during the next two years.

Highlights of major news from the scientific world in Taiwan in July 2010:

Two Taiwan hospitals are about to start with human clinical trials on a locally developed enterovirus (EV71) vaccine – playing the ocarina can be effective in treating patients with breathing problems – a night vision system and a collision avoidance device developed by the Chung Shan Institute of Science and Technology are expected to be put on the market in two years – the government is stepping up efforts to develop vaccines against grouper viruses – two students won an award for developing a chip that is able to detect epileptic seizures in mice before full-blown attacks occur – a new device helps people traveling abroad control the electrical devices in their home remotely – FlexUPD, one of ITRI's three winning innovations at the R&D 100 Awards, enables panel makers to use their existing manufacturing process to produce flexible displays – a research team used pig embryonic stem cells to produce nerve cells for successful treatment of Parkinson's disease in lab rats - a student of National Cheng kung University won the top prize at an international student research competition sponsored by the US Association for Computing Machinery with his research involving droplet routing algorithms for digital microfluidic biochips – the Institute of Nuclear Energy Research developed its own version of a key agent used in brain blood flow imaging that will make such imaging cheaper and more accessible in Taiwan – the National Taiwan University found that insulin glargine, given to diabetes patients, does not increase the risk of cancer among users, as a European study has suggested – the National Science Council is giving away NT\$ 50 mio. per year to establish collaborative research centers in Taiwan – researchers identified incompatible genes in three closely related yeast species, a finding that provides insight into the evolutionary process of distinct species – researchers found a way to "customize" treatments for individual hepatitis B patients by predicting the activity of the virus – an international research team led by a Taiwanese scholar developed a new method to more clearly map large cosmic structures that could help scientists unlock the mystery of "dark energy" -



Contents

1.	Taiwan-made enterovirus vaccine could be ready by early 2011	3
2.	Ocarina may help respiratory therapy	3
3.	CSIST-developed vehicle safety systems to hit market	3
4.	COA stepping up efforts to develop vaccines against grouper viruses	3
5.	Students win award for developing seizure-detecting chip	4
6.	Taiwanese professor receives U.S. presidential chemistry award	4
7.	College students invent remote electricity saving system	4
8.	Taiwan, India to collaborate on earthquake research	5
9.	Taiwan ranks sixth on global green technology competitiveness	5
10.	Local research body wins global R&D awards	5
11.	Stem cell breakthrough could help Parkinson's sufferers	6
12.	Taiwan student wins international computing machinery contest	6
13.	Taiwan succeeds in producing agent for brain blood flow imaging	6
14.	Taiwan study finds insulin glargine does not cause cancer	6
15.	Scientists reach hybrid sterility breakthrough	7
16.	Taiwan researchers find way to predict hepatitis B virus activity	7
17.	Taiwan researchers find way to predict hepatitis B virus activity	7
18.	Fruit flies may aid human research	8
19.	Local astronomer takes step toward unlocking 'dark energy' mystery	8
20.	Taiwan researchers find firm link between nicotine and breast cancer	8



1. Taiwan-made enterovirus vaccine could be ready by early 2011

(Central News Agency, 01 07 2010)

Taiwan's drive to prevent outbreaks of severe enterovirus will see a breakthrough in September with the start of human clinical trials of a locally developed vaccine against the deadliest type of the virus, EV71, to be carried out at National Taiwan University Hospital and Taipei Veterans General Hospital. The vaccine was developed with EV71-B4 subtype samples provided by the National Health Research Institute (NHRI) that were produced into a "seed stock" to form the basis for the vaccine.

Full article:

<http://www.taiwanheadlines.gov.tw/ct.asp?xItem=195173&CfNode=9>

2. Ocarina may help respiratory therapy

(Liberty Times, 02 07 2010)

Pioneering physician Dr. Yang Chia-fu of the Department of Thoracic Medicine at Kaohsiung Minsheng Hospital has issued the first research results in Taiwan indicating that playing the ocarina (a clay flute) can be effective in treating patients with breathing problems. Not only did blood oxygen saturation levels return to 90% of normal in the study patients, they also were able to greatly decrease the time they had to use breathing machines.

Full article:

<http://www.taiwanheadlines.gov.tw/ct.asp?xItem=195232&CfNode=9>

3. CSIST-developed vehicle safety systems to hit market

(Central News Agency, 04 07 2010)

A night vision system and a collision avoidance device developed by a research institute under the Ministry of National Defense's Armaments Bureau to enhance vehicle safety are expected to be put on the market in two years. The Chung Shan Institute of Science and Technology (CSIST) has been conducting the Economics Ministry's Technology Development Program to develop national defense industry-derived products and help traditional industries to upgrade technologically. Among the most notable devices the CSIST has created are top-end metal and ceramic brake discs and pads developed based on the technologies used for indigenous defense fighter (IDF) brake discs, replacing asbestos brake pads and linings. Asbestos is a recognized human carcinogen and also hurts the environment. The CSIST began developing key technologies for vehicle safety in 1995, including an automotive collision avoidance radar system, a night vision system and an auxiliary airbag system.

If the night vision system, originally designed for military use, is converted into a system for civilian vehicles, it will increase driver perception and seeing distance in darkness through the use of an LCD screen in the vehicle. CSIST is developing an in-wheel motor that can reduce fuel consumption by up to 50 %, with plans to put it on the market within five years.

Full article:

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aECO&ID=201007040016

4. COA stepping up efforts to develop vaccines against grouper viruses

(Central News Agency, 05 07 2010)

The government is stepping up efforts to develop vaccines against two viruses that have plagued local grouper farmers for nearly a decade. The Fisheries Administration has appropriated NT\$10.43 mio. to promote developing the vaccines, and National Taiwan Ocean University has also been given NT\$10.5 mio. to conduct research on the viruses and aquacultural technology. Local grouper farmers have been troubled by the indovirus and nervous necrosis virus for quite a long time.

Full article:

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aALL&ID=201007050042



5. Students win award for developing seizure-detecting chip

(Central News Agency, 06 07 2010)

Two students from National Cheng Kung University in Tainan won an award for developing a chip that is able to detect epileptic seizures in mice before full-blown attacks occur. Their device is only one of 110 works honored at a national advanced system-on-chip design contest for college students held at Tsing Hua University in Hsinchu. Liao Yi-cheng and Chen Yi-jun inserted a chip into the brain of mice to monitor their brain waves through a wireless transmission module. By comparing their normal brain waves with those when epilepsy occurs, the device can detect seizures at an early stage, allowing more time to respond. The two students said they hope their device can be further improved for use with humans. The contest, divided into integrated circuit design, computer-aided integrated circuit design and embedded software design, attracted 2,507 students in 1,149 teams.

Full article:

<http://www.taiwanheadlines.gov.tw/ct.asp?xItem=195675&CtNode=9>

6. Taiwanese professor receives U.S. presidential chemistry award

(Central News Agency, 07 07 2010)

Taiwan-native James C. Liao, a professor of chemical and biomolecular engineering at the University of California, Los Angeles (UCLA), has been awarded a prestigious chemistry prize in the U.S. for synthesizing fuels from carbon dioxide. The development, which won the 2010 Presidential Green Chemistry Challenge Award from the U.S. Environmental Protection Agency (EPA), has tremendous potential for cutting carbon emissions and saving fossil fuels, according to James Liao.

Full article:

http://www.etaiwannews.com/etn/news_content.php?id=1310947&lang=eng_news&cate_img=49.jpg&cate_rss=news_Society_TAIWAN

7. College students invent remote electricity saving system

(Liberty Times, 07 07 2010)

A new device will help people traveling abroad control the electrical devices in their homes remotely, saving money on electricity bills. Students at the Tajen University have used new "embedded system" technology along with intelligent cell phone messaging equipment to produce an energy-saving system, which is calculated to be able to save 20-30% of one's electric bill. The savings could reach 40% once the intelligent house and intelligent office concepts go into wider usage. Professor Wu Chao-hsiang of the university's Department of Information Engineering says that the energy-saving system is a result of an 8-month research effort by two of the school's seniors. They participated in the Ministry of Education's "2009 National University Embedded Systems Design Challenge", taking home third place in the applied innovation category amid stiff competition from teams from well-known universities.

At present, the energy-saving devices on the market are aimed at a single appliance or device. Controlling and monitoring all the energy consumption in homes would require costly rewiring. Lead project researcher Li Chun says that this new design, however, applies wireless sensing modules linked to Google's Android operating platform, available for free. It can control the lights, electric fans, and air conditioners in a home, and shut off lights and air conditioning in areas with less activity. This remote-controlled system requires no digging or pipes, making it a low-cost as well as expandable one that is likely to catch on soon. The system is gauged to be able to help the university's own intelligent room save up to 20% on its electricity bills. Another 10% in savings can be reached if energy-saving light bulbs and green architecture design are used inside the building, Li says, adding that the school will do so in other buildings on campus.

Full article:

<http://www.taiwanheadlines.gov.tw/ct.asp?xItem=195758&CtNode=9>



8. Taiwan, India to collaborate on earthquake research

(Central News Agency, 07 07 2010)

Taiwan and India are to cooperate in research on earthquakes and climate change. "Seismologists and geoscientists from the two countries are scheduled to meet in Taipei in January 2011 to work out possible joint research projects in relevant fields," said Chang Yen-hui, head of the science and technology division at the Taipei Economic and Cultural Center in New Delhi.

Full article:

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aEDU&ID=201007070019

9. Taiwan ranks sixth on global green technology competitiveness

(Central News Agency, 07 07 2010)

Taiwan's green technology capability, which includes the island's solar-cell battery industry, ranks 6th among 58 nations in the IMD survey. It evaluated green technology developments in the countries surveyed for the first time. It rated Germany, Japan and Austria as the top three in this category. Taiwan scored 6.7 out of 10 in the green technology category of the survey, second only to Japan, which ranks second in the world, in Asia. It beat out other Asian neighbors including Singapore (14), South Korea (15) and Hong Kong (31). Taiwan's light-emitting diodes industry has a global market share of 25 %, second only to Japan, and that its solar cell battery industry has the fourth biggest slice of the global market. The ROC government has initiated the National Science Technology Program on Energy and the Dawning Green Energy Industry Program, the CEPD said. It added that over the next few years, the government is expected to invest a total of over NT\$50 bio. in the two initiatives.

Full article:

<http://www.taiwantoday.tw/ct.asp?xItem=109934&ctNode=445>

10. Local research body wins global R&D awards

(Taiwan Today, 12 07 2010)

The FlexUPD, one of the ITRI's three winning innovations at the R&D 100 Awards, enables panel makers to use their existing manufacturing process to produce flexible displays. The state-backed Industrial Technology Research Institute has won the R&D 100 Awards for the third time in a row. Dubbed "the Oscars of Innovation" by the global R&D community, the annual R&D 100 Awards are presented by the U.S.-based Research and Development Magazine to the 100 most technologically significant new products of the year. These are selected from over 1,000 entries from around the world. ITRI walked away with three awards this year in the categories of materials, electronic devices and electronic equipment.

Containing no halogens, phosphorus or sulfur, the environmentally friendly REDDEX is a fire-resistant material that reduces fire spread and releases non-toxic steam when it is burned. The insulation material has been successfully used in coatings, thin films, hoses, panels and fabrics.

The i2/3DW is a next-generation three-dimensional display technology that allows users to watch 3D movies and images with the naked eye. It can also display 2D video content.

The FlexUPD is a de-bonding layer that enables producers of liquid crystal display panels to take advantage of their existing manufacturing processes to cross over into flexible display production for applications in e-readers and various small-to-medium display products.

The ITRI has been a regular winner in global R&D competitions in recent years. The research entity won the R&D 100 Awards in 2008 and 2007 for its on-chip alternating current light-emitting diode lighting technology and high safety lithium battery material, respectively. Its paper-thin flexible loudspeaker "fleXpeaker" was a winner of the Wall Street Journal's 2009 global Technology Innovations Awards.

Full article:

<http://www.taiwantoday.tw/ct.asp?xItem=110193&ctNode=445>



11. Stem cell breakthrough could help Parkinson's sufferers

(China Times, 13 07 2010)

A research team from the Council of Agriculture has used pig embryonic stem cells to produce nerve cells for successful treatment of Parkinson's disease in lab rats. The results of the team's breakthrough—the first of its kind in the world—have been published in the international peer-reviewed journal Cellular Reprogramming. The COA's Livestock Research Institute is one of the very few organizations in the world doing research on pig embryonic stem cells. In recent years, it has developed a unique technique for controlling stem cell growth factor, and for inducing stem cell differentiation into nerve cells.

Full article:

<http://www.taiwantoday.tw/ct.asp?xItem=110322&ctNode=445>

12. Taiwan student wins international computing machinery contest

(Central News Agency, 14 07 2010)

Huang Tsung-wei from National Cheng Kung University won the top prize at an international student research competition sponsored by the U.S. Association for Computing Machinery (ACM) with his research involving droplet routing algorithms for digital microfluidic biochips. According to Cheng Kung University, Huang's research explores a method used to process biochips on a nanoscale. The process allows manufacturers to accurately complete all necessary biochemical reactions, achieve optimal detection and elevate the effectiveness of microfluidic chip detection. Digital microfluidic biochips is a newly developed technology of miniaturized biochemical reactions that can be applied in environmental detection, biomedical detection or air quality detection, the school said. Huang, the only undergraduate student in the competition, was chosen from hundreds of contestants, most of whom were master's or doctoral candidates from top universities. He has published three papers in international conferences, including the 2009 IEEE International Conference on Computer Design, the 2009 ACM/IEEE International Conference on Computer-Aided Design, and the 2010 ACM International Symposium on Physical Design and he is the youngest Taiwanese student ever to have a research paper published at an IEEE conference.

Full article:

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aALL&ID=201007140035

13. Taiwan succeeds in producing agent for brain blood flow imaging

(Central News Agency, 19 07 2010)

The state-run Institute of Nuclear Energy Research (INER) has successfully developed its own version of a key agent used in brain blood flow imaging that will make such imaging cheaper and more accessible in Taiwan. The institute's ECD (ethyl cysteinyl dimer) Kit, approved by the Department of Health (DOH) in February, is an agent used to help evaluate regional blood flow, or perfusion, in brains of adult patients with pathological changes in the central nervous system. It is "the agent of choice" for brain perfusion scans of stroke patients using single photon emission computed tomography (SPECT) to check for blood deficiency in the brain. It has also been applied to the evaluation of epilepsy and degenerative brain disease.

Full article:

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?ID=201007190036&Type=aLIV

<http://www.taiwanheadlines.gov.tw/ct.asp?xItem=197315&CfNode=9>

14. Taiwan study finds insulin glargine does not cause cancer

(Central News Agency, 19 07 2010)

A newly-released study by professors from National Taiwan University (NTU) found that insulin glargine, given to diabetes patients to help control their blood-sugar level, does not increase the risk of cancer among users, as a European study has suggested. The study, done by Chuang Li-min of the NTU College of Medicine and Lai Mei-shu of the NTU College of Public Health and released at the annual meeting of the American Diabetes Association in late June, found that the incidence of cancer was 13.3 per 1,000 users of insulin glargine and 16.4 per 1,000 users of



intermediate-long acting insulin in Taiwan. As a result, neither glargine nor intermediate-long acting insulin could be linked to cancer incidence or death from cancer, the study concluded.

Full article:

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?ID=201007190040&Type=aLIV

15. Taiwan to establish collaborative research centers

(China Times, 19 07 2010)

National Science Council is giving away NT\$50 million per year to establish collaborative research centers in Taiwan. The government will provide the nation's research institutions with extra funding to form joint projects with some of the world's leading research centers, according to a plan unveiled by the Cabinet-level National Science Council. The program will induce world-class research institutes and laboratories to establish branches in Taiwan, through which the nation's researchers will be able to exchange ideas with top scholars in their fields. Operation fees for the centers will be borne equally by the NSC, the university that brings up the proposal and the invited foreign institute. Each school whose project is accepted will receive up to NT\$50 million per year, for a period of between three and five years. The deadline for receiving proposals from local universities is 31 Aug.

Full article:

<http://www.taiwantoday.tw/ct.asp?xItem=111168&ctNode=445>

16. Scientists reach hybrid sterility breakthrough

(China Post, 22 07 2010)

A team of Taiwanese researchers has identified incompatible genes in three closely related yeast species, a finding that provides insight into the evolutionary process of distinct species, Academia Sinica research team leader Leu Jun-yi said. The study could help researchers better understand why hybrids generally die or are incapable of reproduction, such as most mules. It could also lead to progress in the battle against aging and hereditary diseases in humans, Leu, assistant research fellow in the Institute of Molecular Biology at Taiwan's top research institute. Leu and his team had previously found that one form of genetic incompatibility, known as a "nuclear-mitochondrial" mismatch or "cytonuclear incompatibility," led to sterility between two yeast species. But in this latest study, Leu wanted to find out if cytonuclear incompatibility is a common cause of reproductive isolation in yeasts in general. They found two genes — MRS1 and AIM22 — responsible for the phenomenon, and also discovered that incompatibility occurred at different times in the different lineages over the course of yeast evolution, strong evidence supporting the speciation gene hypothesis. Speciation describes the process for the creation of new species in which one type of organism evolves — most of the time by environmental factors — into two or more different species, Leu said, adding that a speciation gene is one that is involved in such a process.

The article, titled "Multiple Molecular Mechanisms Cause Reproductive Isolation between Three Yeast Species," was published online in PLoS Biology on 20 July 2010.

Full article:

<http://www.chinapost.com.tw/taiwan/national/national-news/2010/07/22/265576/Scientists-reach.htm>

<http://www.taiwanheadlines.gov.tw/ct.asp?xItem=197420&CtNode=9>

17. Taiwan researchers find way to predict hepatitis B virus activity

(Central News Agency, 24 07 2010)

Taiwanese researchers have found a way to "customize" treatments for individual hepatitis B patients by predicting the activity of the virus, according to the head of the research team. The study, which analyzed cases of hepatitis B virus (HBV) infections reported in the past 17 years, found two intercellular mediators in the immune system that can "predict" HBV activity, said Wu Jia-feng, a pediatrician at National Taiwan University Hospital. In chronic HB patients, the team found, there is a higher concentration of the mediators -- known as interleukin-10 and interleukin-12 -- which trigger the HB antigen (HBeAg) earlier than in those with a lower concentration of the mediators. Wu explained that when a patient tests positive for HBeAg it means the virus is reproducing, while a negative result means the immune system has suppressed the hepatitis B virus. The goal of HB treatments has been to "turn the HBeAg negative," Wu said. Existing anti-viral drugs have not been very effective in the treatment of HB patients, as only 20 percent to 30



percent have shown signs of improvement after taking the drugs for one year, Wu said. The intercellular mediators could be a factor in the ineffectiveness of the drugs, he added. The study was published in the U.S.-based Gastroenterology journal in January.

Full article:

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aALL&ID=201007240018

18. Fruit flies may aid human research

(Central News Agency, 25 07 2010)

Taiwanese researchers at a biotechnology fair in Taipei have showcased the initial results of their efforts to map fruit flies' brains, which they said will pave the way for mapping the human brain to find treatments for diseases that cannot be cured today. Chiang Ann-shyn, director of National Tsing Hua University's Brain Research Center, in charge of the project, said the research team's technology allows 3D visualization of internal structures at cellular and sub-cellular levels, with high resolution and without tissue embedding and sectioning. The same concept can be applied to eventually mapping and understanding the human brain, Chiang said.

So far, the Chiang-led research team has achieved initial results in mapping a small part of a fruit fly's brain, which has 130,000 neurons, but a human brain is 100,000 times more complex than that of a fruit fly.

Chiang also envisions that in 10 years, medical doctors will be able to rely on a 3D visualization of every human organ to facilitate their treatment of diseases.

Full article:

<http://www.taipeitimes.com/News/taiwan/archives/2010/07/25/2003478800>

19. Local astronomer takes step toward unlocking 'dark energy' mystery

(Central News Agency, 26 07 2010)

An international research team led by a Taiwanese scholar has developed a new method to more clearly map large cosmic structures that could help scientists unlock the mystery of "dark energy," the matter believed to be drawing galaxies away from each other. The breakthrough enabled the team to "map hydrogen gas to greater cosmic distances than ever before, and showed that the techniques we developed can be used to map huge volumes of the universe in three dimensions and test the competing theories of dark energy," said team leader Chang Tzu-ching, who is currently based in California. Chang, a postdoctoral fellow with the Institute of Astronomy and Astrophysics at Academia Sinica (ASIAA), launched the project to find more accurate ways to map the foam-like structure formed by galaxies known as the "cosmic web."

In this new study, researchers instead used a technique called "intensity mapping" to measure aggregate radio emissions from many unresolved galaxies using the Robert C. Byrd Green Bank Telescope, enabling them to find and map the hydrogen gas in many galaxies at once.

The article entitled "Hydrogen 21-cm Intensity Mapping at Redshift 0.8" was published in the leading scientific journal "Nature" on 22 July.

Full article:

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?ID=201007260028&Type=aEDU

20. Taiwan researchers find firm link between nicotine and breast cancer

(Central News Agency, 28 07 2010)

There is no doubt that smoking or the inhalation of second-hand cigarette smoke can cause breast cancer, Taiwan researchers said, citing their recent findings in a study on smoking and breast cancer. The study found that a receptor, known as alpha 9 (a9), on breast tissue cells is very sensitive to nicotine.

The study will be published in the U.S. journal of the National Cancer Institute on 8 Sept.

Full article:

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aALL&ID=201007280026