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The **Hsinchu Science Park's** total revenue is expected to top NT\$1.2 trillion in 2010 (+36 % from 2009) and NT\$ 1.38 trillion in 2011. The park is the main base of the island's semiconductor industry, which contributes some 70% of its total revenue. Optoelectronics and computers/peripherals are its second and third largest industries, respectively. With a space of 6.5 km², the park now accommodates 440 firms with a total employment of 132'160. Since manufacturing in the park cannot be further expanded due to limited land space available, sustained growth in the future will be pursued by converting the park into a research-oriented facility. The administration plans to set up the "silicon business center" (inspired by the Kyoto Research Park), scheduled for inauguration on 1 Jan, which will collaborate with an R&D center and innovation incubation center, to be built on an 8-hectare plot of land under the auspices of the "Si-Soft Program", overseen by National Chiao Tung University. 10 small-and medium-sized offices and 40 "mobile offices" will be available for lease. Parallel to the development of service-oriented operations, the park will give priority to the three emerging sectors of medical care, biotechnology, and green-energy in the admission of new entrants.

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

A student team from Taiwan triumphed at the supercomputing competition in New Orleans - Sludge produced in the water purification process can be recycled to make concrete mix – Taiwan and Canada pave the way for joint development of a wireless sensor network and also cooperate on cancer research – Researchers developed a nontoxic, magnetic drug nanocarrier which could help to treat prostate cancer – Taiwan developed the world's first phosphorless light-emitting diode lights – New breast cancer vaccine trials are set for Taiwan – the National Applied Research Laboratories developed the world's smallest memory chip – the Academia Sinica's Genomic Research Center made a breakthrough in the cancer research study of glycosphingolipids (GSLs) – Researchers unlocked secrets of fruit fly's brain – Taiwan joined a trial of new drug against oral cancer – a retired professor developed a voice recognition system that takes different languages into text.

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1. Taiwan team triumphs in supercomputing competition

(Taiwan Today, 02 12 2010)

A team of students from National Tsing Hua University recently won the student cluster competition at the 2010 International Conference for High Performance Computing, Networking, Storage and Analysis held in New Orleans. According to the National Center for High-Performance Computing, six NTHU Department of Computer Science students—Chen Yu-cheng, Ma Yi-man, Chen Yi-chun, Huang Zhen-wei, Xue Yu-jun and Liao Meng-kai—beat out seven other teams from the European Union, Russia and the United States to win the marathon competition lasting 46.5 hours. Partnered with the NCHC, Acer Inc. and Tatung Co., the NTHU team garnered the competition's highest aggregate score in the HPCC (high-performance computer clusters) benchmark, throughput and correctness of four real-world applications, and interviews. NCHC Director Chiang Kuo-ning said the supercomputing tournament has become a showcase for the competitiveness of countries in the field of information technology. The NTHU team began training at the center for the competition more than a year ago. Professor Chung Yeh-ching, who led the NTHU team, said the first stage of the competition saw each team turning out answers in the shortest possible period of time on the cluster computing machines it designed and installed, using application programs prescribed by the event organizers. The questions spanned topics from the evolution of the universe and pharmaceutical design to weather forecasting. According to Chung, the teams were neck and neck in scoring after the first stage, with the NTHU students eventually overwhelming the other competitors and pulling away from the pack in the code-breaking phase of the competition. He noted that the Taiwan students cracked over 57,000 of the 2 mio. codes, or more than the combined total of the seven other teams. Right after the final results of the competition were announced, representatives from Intel Corp. and Microsoft Corp. expressed interest in recruiting the six NTHU students. This marked the third time Taiwan has participated in the competition at the supercomputing conference and the first time it has emerged victorious.

<http://www.taiwantoday.tw/ct.asp?xItem=133212&ctNode=445>

2. Sludge reuse method wins international award

(Taiwan Today, 07 12 2010)

Research by National Taiwan University's Graduate Institute of Environmental Engineering and the Taipei Water Department to develop the world's first method of using sludge from water purification plants in concrete mix has won international recognition. The newly developed method received a top-five poster presentation award from the International Water Association. The method mixes sludge with a solidification agent, cement and other ingredients to produce a material that can replace 30 % of the fine-grain sandstone in concrete.

<http://www.taiwantoday.tw/ct.asp?xItem=134442&ctNode=445>

3. Taiwan and Canada sign communications technology MOU

(Central News Agency, 06 12 2010)

Taiwan and Canada signed a communications technology cooperation memorandum of understanding (MOU) in Ottawa to pave the way for the joint development of a wireless sensor network. The MOU was signed by Communications Research Centre (CRIC) of Canada President Veena Rawat, Taiwan's representative in Canada David Lee, National Science Council Minister Lee Lou-chuang, and the Canadian Trade Office in Taipei (CTOT). Taiwan and the Canadian research center will also focus on new generation cognitive radio technology, which could have a number of applications, including in high definition and 3D television and even biomedicine.

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aECO&ID=201012070023

4. Taiwan, Canada ink cancer research cooperation deal

(Central News Agency, 07 12 2010)

Taiwan's National Science Council (NSC) signed a memorandum of understanding Tuesday for cooperation on cancer research with Canada's Terry Fox Research Institute (TFRI). The agreement was signed by NSC Minister Lee Lou-chuang and TFRI Scientific Director Victor Lin.

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aLIV&ID=201012080012



5. Taiwan researchers improve delivery of cancer drug

(Taiwan Today, 09 12 2010)

Taiwan researchers have developed a nontoxic, magnetic drug nanocarrier that helps enhance the delivery of a chemotherapy drug for prostate cancer patients. Led by Hua Mu-yi, professor of chemical and materials engineering at the university, the research enables targeted application of paclitaxel, which is derived from the bark of the Pacific yew tree and used to treat prostate cancer. The team explained that when magnetic targeting is applied to the nanocarrier, every milligram of which is capable of carrying 0.3 milligram of paclitaxel, the carrier concentrates its drug delivery to the cancer cells. This provides more effective treatment, reduces damage to healthy cells and allows for lower drug dosages, the team said. The research was published in the October issue of *Biomaterials*.

<http://www.taiwantoday.tw/ct.asp?xItem=135320&ctNode=445>

6. Taiwan develops breakthrough LED lights

(Taiwan Today, 12 12 2010)

National Yunlin University of Science and Technology (Yuntech) and Full-Sun Optotech Co. Ltd. have jointly developed the world's first phosphorless light-emitting diode lights. The new LED lights have a high color-rendering index and a low luminous decay rate, two features that cannot be found in any other LED lights currently in use.

<http://www.taiwantoday.tw/ct.asp?xItem=136593&ctNode=445>

7. New breast cancer vaccine trials set for Taiwan

(Taiwan Today, 12 12 2010)

Clinical trials of a new vaccine that uses the patient's immune system to control and kill breast cancer will begin in Taiwan by year-end, according to Taipei-based Optimer Biotechnology Inc. They will be conducted at 15 local cancer centers on terminal patients for a period of two years. The treatment was developed jointly by the firm's parent company Optimer Pharmaceuticals Inc., Memorial Sloan-Kettering Cancer Center and Taiwan's Academia Sinica.

<http://www.taiwantoday.tw/ct.asp?xItem=137032&ctNode=445>

8. Taiwan develops world's smallest RRAM

(Taiwan Today, 15 12 2010)

Taiwan's National Applied Research Laboratories has developed the world's smallest memory chip and will release the product onto the market in 5-10 years. The resistive random access memory features patterns measuring 9 nanometers and holds 20 times more information than the flash memory cards used in most cameras and cell phones. It also needs just 0.005 % of the electricity used in standard products. Research team member Ho Chia-hua said the new technology should make it possible to put 500 gigabytes of information onto a square centimeter microchip. "This can be expanded to 1.5 terabytes, accommodating 200 hours of video, 100,000 songs and millions of photos or documents." The RRAM was first unveiled by National Applied Research Laboratories at the International Electron Devices Meeting in San Francisco on 8 Dec.

<http://www.taiwantoday.tw/ct.asp?xItem=136659&ctNode=445>

9. Academia Sinica makes advance in cancer research

(Taiwan Today, 20 12 2010)

A research team at Academia Sinica's Genomic Research Center made a breakthrough in the study of glycosphingolipids (GSLs) found on the surface of human embryonic stem cells that could potentially be used in the development of more effective cancer treatments. In its systemic survey of GSLs using a combination of biological techniques, the research team discovered that upon differentiation of embryonic stem cells into embryoid bodies, the GSLs underwent a change in their structure. Scientists believe GSLs may play a key role in cancer cell migration. In the study, the research team identified seven previously unknown GSLs, including Gb5Cer, globo-H and SSEA-3, all of



which have been proven to be promising targets for breast cancer and prostate cancer therapeutics. The results of the team's study were published in the international journal "Proceedings of the National Academy of Sciences".

<http://www.taiwantoday.tw/ct.asp?xItem=137772&ctNode=445>

10. Taiwan researchers unlock secrets of fruit fly's brain

(Taiwan Today, 21 12 2010)

A Taiwan research team has made significant strides in mapping out the architecture of the fruit fly's brain that could lead to a greater understanding of the human brain. The team led by Chiang Ann-Shyn, director of National Tsing Hua University's Brain Research Center, has spent the past three years compiling high-resolution 3D images of roughly 16,000 neurons in the fruit fly's brain, or more than 10% of the total number. Using reverse engineering to gain a better understanding of each neuron's special characteristics and then grouping them together, the team has mapped out an atlas of the fruit fly brain, describing it as being made up of 41 local processing units and 58 tracts covering the whole brain. The results of the team's research have been published in the latest issue of the international scientific journal Current Biology.

<http://www.taiwantoday.tw/ct.asp?xItem=138270&ctNode=445>

11. Taiwan to join trial of new drug against oral cancer

(Central News Agency, 22 12 2010)

Taiwan will join six other nations that are participating in the third-stage clinical trial of a new drug to treat late-stage oral cancer. Hao Sheng-po, president of the Asian Society of Head and Neck Oncology, said that the new U.S. drug is meant to work by stimulating the immune systems of patients, before resorting to treatments such as surgery, chemotherapy or radiotherapy.

http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?ID=201012220040&Type=aLIV

12. New speech recognition system takes on nonstandard accents

(Liberty Times, 30 12 2010)

Retired professor of Applied Mathematics Li Tzu-fen of National Chung Hsing University has developed a voice recognition system that takes on Mandarin, Minnan and even Japanese and converts spoken language into text. Moreover, it also has no problem in dealing with heavily Taiwanese-accented Mandarin. Li achieved his breakthrough by designing a mathematical operation that takes the speech signal and sets up a database from it. The system also includes a textual database. Each sound and each word have a group of digits associated with them, and after the user begins to speak, the computer system automatically searches for matches. Once the sound matches the word, the computer can output text. Apart from single words, the system can also use an expanded database to generate an entire sentence at a time. A patent application is underway for the invention. This new speech recognition system is not limited to Mandarin only; it can also be expanded to work in Minnan (otherwise known as Taiwanese), Japanese, and English, with no problem handling speech mixed with Minnan and Mandarin. At present, Li has collected samples of 11,000 types of speech, including Mandarin, Minnan and English in the database.

<http://www.taiwanheadlines.gov.tw/ct.asp?xItem=213038&CtNode=9>