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Science, Technology and Education News from Taiwan
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As Taiwan's vanguard for the development of cutting-edge technologies in applied sciences, the government-backed Industrial Technology Research Institute (ITRI) is currently focusing resources on R&D in green energy and biomedicine. ITRI reported that these two sectors now account for a full half of the institution's R&D spending. The work is being carried out by the Green Energy & Environment Research Laboratories and Biomedical Technology and Device Research Laboratories, both of which are newly established. ITRI explained that green energy R&D covers electric cars, smart power grids, photovoltaic energy, LED lighting, offshore wind-power generation, and green building (encompasses both green energy and the environment, and involves the integration of technology in the areas of electronics, optoelectronics, and devices). In its biomedicine research ITRI is focusing on medical equipment and devices. ITRI's specialized manpower spanning the fields of biomedicine, medical equipment and devices, precision machinery, and materials gives the institution a highly competitive strength. That strength is used in the development of systems, software, and services, which accounts for 70% of ITRI's R&D work. ITRI won 396 U.S. patents last year, boosting the accumulated number of its patents, in such areas as mobile phones, flat-panel displays, and notebook PCs, to 14,000. To give its R&D work an added boost, ITRI has initiated a 10-year talent development program beginning this year. The program calls for the selection of 40 outstanding researchers under the age of 40 to be sent abroad for year-long periods of research in foreign institutions.

Highlights of major news from the scientific world in Taiwan in November 2010:
Academia Sinica discovered a method of inducing luminescence in leaves utilizing gold nanoparticles – AUO developed the world's first solar-powered touch keyboard solution for notebook computers – NCKU succeeded in using the world's first "artificial targeting light activated nano scissors" – COA developed DNA identification for bitter melon – "Lancet" documents unusual germ cell tumor case in Taiwan – Hon Hai sponsors the largest cancer treatment center in Asia in Taipei City – Academia Sinica develops an upgraded disease-simulated program – the National Tsing Hua University developed a new process that will increase the performance of integrated circuits and dramatically transforms the way semiconductors are produced – the first Taiwanese was elected to the European Molecular Biology Organization – the APEC Research Center for Typhoon and Society (ACTS) was inaugurated in Taipei – Tatung University researchers developed revolutionary biodegradable plastics that can decompose and turn into nutrients 4-6 months after being buried in the ground – the National Taiwan University developed a low-cost collision avoidance radar system – Taiwan and UK signed an MOU to strengthen bilateral cooperation in the field of biotechnology – the Automotive Research and Testing Center (ARTC) developed an advanced car system that can warn drivers of traffic jams – scientists extract collagen from pig lungs

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1. Researcher brings tree-lit streets closer to reality

(Taiwan Today, 02 11 2010)

A postdoctoral research fellow at Academia Sinica's Research Center for Applied Sciences recently discovered a method of inducing luminescence in leaves utilizing gold nanoparticles that could one day be used to create more environmentally friendly natural street lighting. Su Yen-hsun, who graduated from National Cheng Kung University's Institute of Physics this year, discovered that implanting sea urchin-shaped gold nanoparticles into Bacopa caroliniana plants caused the chlorophyll in the leaves to produce a red emission. The research results appeared in a recent issue of Nanoscale published by the U.K.-based Royal Society of Chemistry.

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2. AUO unveils world's first solar powered touch keyboard solution

(Central News Agency, 03 11 2010)

Taiwan-based flat panel maker AU Optronics Corp. (AUO) has developed the world's first solar-powered touch keyboard solution for notebook computers to meet the growing demand for energy efficient electronics products. The solution, which enables a touch notebook computer keyboard to draw power from natural and artificial light, is expected to cut power consumption by about 20 %.

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3. NCKU SMART team achieves breakthrough in precision gene surgery

(Central News Agency, 05 11 2010)

A cross-disciplinary Small Medicine and Advanced Research Translation (SMART) team led by Prof. Dar-Bin Shieh of Institute of Oral Medicine in Medical College at National Cheng Kung University (NCKU), Tainan, Taiwan, has announced a breakthrough in the precision in-cell gene scission at pre-designed sequence sites using Artificial Targeting Light Activated Nano Scissors (ATLANS) and a custom build photonic device. This innovative discovery is recently accepted by internationally renowned journal Biomaterials and is currently under patent application. The nano-enabled novel technology recognize, capture and perform double strand cutting of the desired DNA sequence like restriction endonuclease did but it is completely artificially synthesized and controlled by specific photon energy. In addition, the team successfully shut down target drug resistant gene STAT3 in cancer cell using ATLANS and created a new inspiration toward future cancer gene therapy.

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4. COA develops DNA identification for bitter melon

(Taiwan Today, 10 11 2010)

Researchers at the Council of Agriculture's Hualien District Agricultural Research and Extension Station have successfully developed fast and accurate DNA barcode technology for species identification of bitter melon.

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5. Lancet documents unusual germ cell tumor case in Taiwan

(Central News Agency, 10 11 2010)

A case study of the treatment of a rare germ cell tumor in Taiwan was published in the international medical journal "Lancet" earlier this year and could serve as a reference for other doctors, according to the Taipei Mackay Memorial Hospital.

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6. Hon Hai-Sponsored NTUCM Cancer Center Breaks Ground

(Taiwan Economic News, 16 11 2010)

Sponsored by the Yonglin Foundation of Hon Hai Group, the cancer medical center, under the auspices of the College of Medicine, National Taiwan University, broke ground on 15 November, aiming to become the largest cancer treatment center in Asia following its inauguration in two years and serving as a beachhead for Hon Hai to foray into the realm of biomedicine. With a projected investment of NT$10 billion, the cancer medical center will be a 14-story building, plus four basement levels, boasting 500 sickbeds and is situated inside the premise of National Taiwan University Hospital in Gongguan area of Taipei City. It will be furnished with a proton treatment center and will offer remote-care service by taking advantage of cloud-computing technology.

http://cens.com/cens/html/en/news/news_inner_34379.html

7. Taiwan develops upgraded disease-simulation program

(Taiwan Today, 16 11 2010)

A simulation program that models the spread of highly communicable diseases more than a thousand times faster than its U.S. counterparts was unveiled on 16 November by Taiwan's Academia Sinica. "This breakthrough will allow local medical experts to more effectively predict the transmission patterns of diseases such as swine flu," Academia Sinica said. According to Academic Sinica, the program allows for the simulation of various airport quarantine policies that can delay infection peak-dates. This will help determine the optimum time for initiating intervention policies. Developed in conjunction with the Centers for Disease Control, National Taiwan University and the University of Hong Kong, the program is the nation's first-ever foray into the world of disease-simulation modeling. Taiwan is now the third country behind the U.K. and U.S. to roll out a homegrown disease-simulation modeling system.

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8. Research team makes semiconductor breakthrough

(Taiwan Today, 18 11 2010)

An international research team of the Hsinchu-based National Tsing Hua University has developed a new process that will increase the performance of integrated circuits and dramatically transform the way semiconductors are produced. According to the researchers, this is the first time photovoltaic and silicon electron devices have been combined to produce high-performance transistors. "The team used a new transfer technique to successfully build ultrathin layers of single-crystal indium arsenide on silicon substrates," they said. "This resulted in the creation of a nanoscale transistor." The new technology increases transmission speed, data storage capacity and reliability of consumer electronic devices. The team's results were published in the 11 November issue of Nature, a U.S.-based science journal. Researchers from the University of California, University of New Mexico and South Korea's Ulsan National Institute of Science and Technology also participated in the project.

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9. First Taiwanese elected to European biology organization

(Central News Agency, 19 11 2010)

A Taiwanese has been elected for the first time as an associate member of the European Molecular Biology Organization (EMBO). Academia Sinica President Wong Chi-Huey was honored with life-long membership in the Germany-based organization on the basis of his outstanding work in the field of biochemistry. Wong is recognized internationally for his work in new synthetic chemistry and enzyme catalysis, which contributed greatly to the development of vaccines. His duties as an EMBO associate member includes serving as an editing consultant of the EMBO journal, assisting young scholars in their research, and participating or leading EMBO's research projects.

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10. APEC inaugurates typhoon research institute in Taiwan

(Central News Agency, 22 11 2010)

The APEC Research Center for Typhoon and Society (ACTS) was inaugurated in Taipei on 22 November, making it the trade bloc's first research institute ever to be set up in Taiwan. The ACTS will build up a platform for Taiwan and 10 other APEC member economies vulnerable to typhoons to share related information and experience in disaster prevention and relief. It is co-funded by Taiwan's National Science Council(NSC) and the Philippines' Department of Science and Technology (DOST). The facility will expand the number of its current staff of 10 to 100 in a few years, in a bid to provide more training programs for researchers from other APEC member economies. Personnel training, weather stations, and joint surveillance and tracking analysis panels are some of the center's first priorities. The center plans to expand the Dropwindsonde Observation for Typhoon Surveillance near the Taiwan Region (DOTSTAR), a research project on typhoons, to cover more countries. Setting up radar systems on the Philippines' Batanes Islands, north of the main island of Luzon, to help keep track of typhoons is an objective in the longer term.

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11. Taiwanese researchers develop revolutionary biodegradable plastics

(Central News Agency, 23 11 2010)

A research team of the Bio-Polymer Lab at the Tatung University has developed a series of revolutionary plastic materials that can decompose and turn into nutrients 4-6 months after being buried in the ground. The plastic is made mainly of corn starch with some biodegradable polymers, and turns into carbon dioxide and water as it degrades. Patents for making the plastic have been filed in the European Union, the United States, Japan and Taiwan.

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12. Duo wins Taiwan-France science award

(Central News Agency, 24 11 2010)

Taiwanese researcher Yeukuang Hwu and French scientist Patrick Soukiassian were joint winners of this year's Taiwan-French Science Award for their collaborative research on cutting-edge materials. Hwu, a research fellow with Academia Sinica's Institute of Physics, and Soukiassian, a researcher with the Universite de Paris-Sud/Orsay et CEA-Saclay, France, will share the prize money of 38,200 euros. Their joint research was called -- "Nanochemistry at advanced semiconductors surfaces and interfaces: Epitaxial graphene and silicon carbide."

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13. Technology breakthrough increases road safety

(Taiwan Today, 25 11 2010)

The low-cost collision avoidance radar system developed by a National Taiwan University researcher team could reduce car accidents by 90 %. The 77GHz millimeter wave CAR system can detect moving vehicles 100 meters away. When it senses a sudden decrease in the distance, the device will automatically activate a car’s breaking system. An additional second of reaction time can translate into 30 meters more in breaking distance for vehicles traveling at high speeds. Similar devices are already available on the market, but their high cost makes them beyond the reach of most drivers. The new developed device, about the size of a handset, will cost less than US$100 using a streamlined manufacturing process, making it likely that CAR will be a standard feature of most vehicles in the future. The research project has been selected as one of 211 research papers from around the world to be presented at the 2011 International Solid-State Circuits Conference, to be held in San Francisco next February.

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14. Taiwan inks biotech cooperation MOU with UK

(Central News Agency, 26 11 2010)

UK's Biotechnology and Biological Sciences Research Council (BBSRC) and Taiwan's National Science Council (NSC) signed a memorandum of understanding (MOU) on 25 November to strengthen bilateral cooperation in the field of biotechnology. Under the MOU, Taiwan and the UK will exchange visits of scientists, sponsor joint seminars and launch cooperative research projects in three major areas -- food security, biomass energy and industrial biotechnology, and health bioscience.

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15. Aerospace sector witnesses milestone development

(Taiwan Today, 26 11 2010)

The aerospace industry turned a new page with the opening of the Taiwan Advance Composite Center in Shalu Township (Central Taiwan) on 25 November. The TACC, part of the facilities of the state-run Aerospace Industrial Development Corp. (AIDC), occupies 4.13 hectares of land and represents more than NT$2 bio. in state investment. The AIDC's 24 major clients from eight countries, including the U.S.-based Boeing Co., Airbus S.A.S. from France and Japan's Mitsubishi Heavy Industries Ltd. The facility is poised to become the center of research and development, design and manufacturing of composite materials for Taiwan's aerospace industry.

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16. Advanced car system can warn drivers of traffic jams

(Central News Agency, 28 11 2010)

The non-profit Automotive Research and Testing Center (ARTC) has developed an advanced driving management system for electric vehicles that can advise drivers about traffic jams. The system, integrated with the prizewinning Electric Power Steering System and Driver Status Monitor System software, is able to analyze location, engine speed and other information to allow the driver to know the condition of both his car and the road. The system -- operated under a cloud computing system -- is able to detect road conditions and warn the driver of danger. It can also warn the driver when his batteries are low and advise where to go for a recharge,. The system can also inform the driver about a mechanical breakdown even before it occurs, he added. In the event of a breakdown, the system can automatically inform the nearest police station and service center, he continued. The Electric Power Steering System and the Driver Status Monitor System were gold and silver award recipients, respectively, at the 2010 Taipei International Invention Show and Technomart in October.

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17. Taiwan scientists extract collagen from pig lungs

(China Times, 29 11 2010)

A Taiwan research team has successfully extracted collagen from porcine lungs, allowing waste to be turned into useful material, Taipei's Chinese Culture University (PCCU) said. Widely used in cosmetics production and plastic surgeries, collagen is usually drawn from animal byproducts such as pig skin, cowhide or fish skin. The team has written up their findings in a paper scheduled to be published by the international journal Food Chemistry in February 2011.

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