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**Science, Technology and Education News from Taiwan  
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The Council of Economic Planning and Development (CEPD) plans to develop Chung Hsin Village (central Taiwan) into a knowledge-based economy and R&D center. The cost of the plan in the first phase (2010-2012) is estimated at roughly NT\$3.66 billion. The Industrial Technology Research Institute, the Institute for Information Industry and other agencies would begin setting up research branches in the zone from the end of this year. After the R&D center opens, efforts to solicit high-tech businesses to set up their R&D operations will begin. The goal is to attract 115 firms in various high-tech and knowledge-based industries and add some 1,450 high-level research jobs.

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

A team of Taiwanese/Japanese astrophysicists captured a snapshot showing the growth of a galaxy cluster for the first time – NTU reached a breakthrough in using MRIs to detect tumors and identify them faster than through a traditional approach – Researchers at NCU developed a new LED encapsulation technology that is touted as the world's most advanced – Scientists identified four genes that are associated with bipolar I disorder in people who are ethnically Chinese – a biomedical engineer gained international renown with a breakthrough in creating a new generation of biotracer – Taiwan shines in the Geneva Exhibition of Inventions – NTU professor wins Nikkei Asia prize for research on hepatitis B – A research team of Academia Sinica discovered a key molecular mechanism that contributes to antibiotic resistance in "staphylococcus epidermidis" – Taiwanese/Japanese scholars at Academia Sinica discovered clear, direct evidence about the shape of dark matter's distribution – Taiwan and Australia cooperate in oceanographic research

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### 1. New water dispenser can talk

(Liberty Times, 02 04 2010)

The department of Electrical Engineering at the Southern Taiwan University of Technology has developed an "intelligent talking drinking water machine" to aid those with impaired vision. The special design lets blind people avoid worry about burning themselves when getting hot water from the machine, and the amount of water dispensed can be adjusted to suit one's personal preference for further convenience and independence.

Full article:

<http://www.taiwanheadlines.gov.tw/ct.asp?xItem=184688&CtNode=9>

### 2. Scholars unveil snapshot of galaxy cluster growth

(Central News Agency, 07 04 2010)

A team of astrophysicists from Academia Sinica and Japan have captured a snapshot showing the growth of a galaxy cluster for the first time. Academia Sinica's Postdoctoral Fellow Nobuhiro Okabe and Associate Research Fellow Keiichi Umetsu from the Institute of Astronomy and Astrophysics at Academia Sinica (ASIAA) cooperated with Madoka Kawaharada, special postdoctoral researcher from the Institute of Physical and Chemical Research (RIKEN) in Japan, to develop the result. The research team has revealed a snapshot of the dramatic growth of a galaxy cluster titled "Abell 1689." According to their study, which was published online in "The Astrophysics Journal" on April 9, the cluster grows through heating that is triggered by matter falling from a filamentary large-scale structure outside the cluster known as a "cosmic web." Using Japan's Suzaku X-ray satellite, the team was able to measure emissions from hot gas in the outermost regions of Abell 1689. They discovered that the anisotropic temperature distribution of the hot gas is 58 million degrees Celsius in one direction and 23 million degrees in the other around the boundary of the cluster. They then compared their X-ray data with a galaxy map made from Sloan Digital Sky Survey (SDSS) data as well as with "gravitational lensing" data from the Japanese Subaru telescope and the Hubble Space Telescope, eventually finding that the cooler gas is likely to have subsonic motion. Analyzing the X-ray, optical and gravitational lensing data, the team developed a clear snapshot showing the growth of the galaxy cluster being affected by the large-scale structure in which clusters are embedded.

Full article:

[http://focustaiwan.tw/ShowNews/WebNews\\_Detail.aspx?Type=aALL&ID=201004070019](http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aALL&ID=201004070019)

### 3. NTU announces breakthrough in using MRIs to detect tumors

(Central News Agency, 09 04 2010)

The National Taiwan University (NTU) announced that it has developed a method that will enhance the ability of magnetic resonance imaging (MRI) devices to accurately detect tumors and identify them a week earlier than would be possible through a traditional approach. The NTU team and its collaborators optimized MRI tumor contrast enhancement by improving "active feedback" techniques. The techniques make it easier for doctors to detect the difference between smaller and larger objects and possibly better differentiate between lesions and surrounding tissues. The research team used an active feedback enhanced MRI technique that limited the decay by manipulating the sound signals and bouncing them off each other to amplify them to a contrast four times sharper than using traditional methods. The technique permitted doctors to precisely determine the size and location of a two millimeter cancerous tumor that had grown in a mouse in one week/

Full article:

[http://focustaiwan.tw/ShowNews/WebNews\\_Detail.aspx?Type=aECO&ID=201004090035](http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aECO&ID=201004090035)

### 4. Taiwan to open innovation research zone

(Central News Agency, 13 04 2010)

Taiwan's government is moving ahead with a plan to open a new technology research center to serve as the country's industrial innovation and research base, according to the Council of Economic Planning and Development (CEPD).



The plan was approved by the Executive Yuan in November as part of Taiwan's hopes of promoting innovations in Taiwan's industries through cooperation among industry, academics and research institutes. The Ministry of Economic Affairs (MOEA) will begin in this year to establish the research and development park in central Taiwan to spur development of the innovation industry. It plans to invest NT\$3.6 billion in constructing the park. Aside from the innovation park, a market intelligence technology research center will also be opened in Jhongxing Village. The new center will be commissioned to develop green intelligence mobile technologies through cloud computing. Under the MOEA assessment, the two facilities will attract 1,450 talents in advanced research after their inauguration, the CEPD said.

Full article:

[http://focustaiwan.tw/ShowNews/WebNews\\_Detail.aspx?Type=aALL&ID=201004130022](http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aALL&ID=201004130022)

### **5. Taiwan researchers develop new LED encapsulation technology**

(Central News Agency, 13 04 2010)

A team of researchers from National Central University (NCU) in Chungli, Taoyuan County has developed a new LED encapsulation technology that is touted as the world's most advanced. The NCU's Department of Optics and Photonics said that the new technology developed by his team will enhance LED color rendering index (CRI) to 90. The CRI is a quantitative measure of the ability of a light source to reproduce the colors of various objects faithfully in comparison with an ideal or natural light source, with 100 being the highest CRI attainable. Most of the fluorescent lamps on market has a CRI of between 80 and 85. The team has developed a phosphor optical model that can predict precisely the color temperature of different phosphor compounds. The technology will help local LED producers to reduce their defect and will give them an advantage in the field of white LED production.

Full article:

<http://www.taiwanheadlines.gov.tw/ct.asp?xItem=185931&CtNode=9>

### **6. Local scientists identify keys to bipolar disorder in Chinese**

(Central News Agency, 14 04 2010)

A group of Taiwan scientists have successfully identified four genes that are associated with bipolar I disorder in people who are ethnically Chinese. "This study marks important progress in the identification of disease genes for bipolar I disorder. It is the only large scale bipolar I disorder study ever done on Han Chinese or on any Asian population," said the team leader of Academia Sinica's Institute of Biomedical Sciences. Bipolar I disorder is a mood disorder defined by the presence of recurrent episodes of abnormally elevated mood (mania), according to the research team. Researchers linked four genes -- SP8, ST8SIA2, CACNB2 and KCTD12 -- to bipolar I disorder in ethnic Chinese people, and three of them (SP8, CACNB2 and KCTD12) were identified for the first time. The study was the result of a collaboration between the Institute of Biomedical Sciences and 25 medical centers and psychiatric institutes in Taiwan. The study was published online in the international scientific journal *Molecular Psychiatry* on 13 April.

Full article:

[http://focustaiwan.tw/ShowNews/WebNews\\_Detail.aspx?Type=aLIV&ID=201004140009](http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aLIV&ID=201004140009)

### **7. Taiwanese scientist makes breakthrough in biotracer research**

(Central News Agency, 16 04 2010)

A Taiwan-trained biomedical engineer has gained international renown with a breakthrough in creating a new generation of biotracer. Lin Cheng-an, an assistant professor in Chung Yuan Christian University's Department of Biomedical Engineering, received the 2010 Young Investigator Award from the International Society for Optical Engineering (SPIE) in January for his achievements in using nanotechnology in developing new materials for biotracer production. His paper, which described a novel method of synthesizing fluorescent gold nanoclusters for biotracer production, was carried in the 2009 *ACS Nano*, a peer-reviewed scientific journal published by the American Chemical Society. Biotracers are an important tool to track and mark cells in biomedical research. At present, quantum dots are the preferred material for cellular imaging because of their stability and brightness relative to organic dyes. But they still have major drawbacks. They cannot be used in humans because



they contain toxic ions, such as cadmium. In comparison, Lin said, the biotracer he developed using fluorescent gold nanoclusters are more suitable for molecular imaging inside the human body because nanoparticles are smaller, and gold is a bioinert and biocompatible material. "It will allow us to track cells -- for example, an antibody that is a marker for cancer -- over a long period of time," Lin said, adding that the material can be used in biophotonics, biomedicine and molecular biotechnology. Lin acknowledged that his new material still needs to undergo more biosafety and biocompatibility, and other issues, such as how to flush it out of one's system, also need to be resolved before it can be used in humans on a clinical basis.

Full article:

<http://www.taiwanheadlines.gov.tw/ct.asp?xItem=186361&CtNode=9>  
[http://focustaiwan.tw/ShowNews/WebNews\\_Detail.aspx?ID=201004160033&Type=aEDU](http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?ID=201004160033&Type=aEDU)

## **8. Engineer invents automatic pet feeding device**

(Liberty Times, 23 04 2010)

In response to the worries of pet owners when they need to leave the house for a substantial period of time, Hsiuping Institute of Technology Assistant Professor Lin Yung-song has created Taiwan's first automatic feeding machine for small dogs. The contraption is able to release food on a timer, as well as enabling the pet owner to record various utterances on the installed microphone and speaker system to soothe the pet when the owner is away from home.

Full article:

<http://www.taiwanheadlines.gov.tw/ct.asp?xItem=187061&CtNode=9>

## **9. Taiwan shines in Geneva innovations exhibition**

(Central News Agency, 24 04 2010)

Taiwan grabbed 28 gold, 21 silver and 10 bronze medals Friday at the 38th International Exhibition of Inventions of Geneva -- to lead the medals table at the annual high-profile event. A total of 54 Taiwanese inventors showcased 63 cutting-edge items at this year's exhibition, ranging from small-sized devices to state-of-the-art electronic equipment. A team from the Technology and Science Institute of Northern Taiwan won three gold, six silver and four bronze medals. Their power-saving night light and a skylight that can improve air circulation and open up to give residents an escape route in an emergency both won gold medals. The electricity-saving bulb, equipped with a smart chip, allows users to adjust its light by clapping and can save as much as 90 percent of the power of regular bulbs. It is also equipped with a low frequency sleep inducer and a high frequency mosquito repeller to help users sleep soundly. A multifunctional foldable bike displayed by a Taiwanese firm attracted a crowd for its ability to be converted into a shopping basket. Another product that grabbed some of the limelight was an electric clothes dryer created by students from Kun Shan University. The machine can automatically switch off by using the exhaust temperature to determine when the clothes are dry, saving energy.

Full article:

[http://focustaiwan.tw/ShowNews/WebNews\\_Detail.aspx?Type=aECO&ID=201004240019](http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aECO&ID=201004240019)

## **10. NTU professor wins Nikkei Asia prize for research on hepatitis B**

(Central News Agency, 26 04 2010)

Chen Ding-shinn, a professor of National Taiwan University College of Medicine, has won the Nikkei Asia prize. It said that Chen, 66, was awarded in honor of his accomplishment in discovering a link between the hepatitis B virus and liver cancer.

Full article:

[http://focustaiwan.tw/ShowNews/WebNews\\_Detail.aspx?Type=aALL&ID=201004260039](http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aALL&ID=201004260039)



### 11. Research team reveals how staph infections resist antibiotics

(Central News Agency, 28 04 2010)

A Taiwanese research team has discovered a key molecular mechanism that contributes to antibiotic resistance in "Staphylococcus epidermidis," a type of staphylococcus that lives on the skin, according to Academia Sinica, Taiwan's top research institute. Staphylococcus bacteria are notorious for quickly developing resistance to antibiotics and are the main culprit in hospital-acquired infections that can kill patients admitted for other diseases. The groundbreaking research revealed the structure of the protein component, called Teicoplanin-Associated Locus Regulator, or TcaR, that effectively prevents the formation of the biofilm under normal conditions. The article "Structural Study of TcaR and its Complexes with Multiple Antibiotics from Staphylococcus epidermidis" was published in the scientific journal "Proceedings of the National Academy of Sciences (PNAS)" on 27 April.

Full article:

[http://focustaiwan.tw/ShowNews/WebNews\\_Detail.aspx?Type=aALL&ID=201004280013](http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aALL&ID=201004280013)  
<http://www.taiwantoday.tw/ct.asp?xItem=100941&ctNode=445>

### 12. Astrophysicists unveil shape of dark matter's distribution

(Central News Agency, 29 04 2010)

An international team of astrophysicists including Japanese scholars working at Academia Sinica discovered clear, direct evidence about the shape of dark matter's distribution. Dark matter is an enigma of the cosmos that has fascinated astrophysicists for many years. The existence of dark matter was originally hypothesized to account for discrepancies found between measurements of the mass of galaxies, clusters of galaxies and the entire universe. Recently, astrophysicists from Japan and Taiwan, including Postdoctoral Fellow Nobuhiro Okabe from the Institute of Astronomy and Astrophysics at Academia Sinica (ASIAA), have evidence that dark matter is distributed in an elliptical shape in massive clusters of galaxies, a finding that confirms a major prediction in the prevailing theory about dark matter. The team observed the clusters of galaxies using the Subaru Telescope's Prime Focus Camera (Suprime-Cam). Observations with Suprime-Cam yielded wide-field images of massive clusters of galaxies -- typically located 3 billion light years from Earth -- which the team then used to measure and analyze dark matter distribution. From their analysis of the images, the team obtained evidence that the distribution of dark matter in the clusters has, on average, an extremely flattened shape rather than a simple spherical shape. The degree of the flattening was quite large, corresponding to ratio of 2:1 in terms of the ratio of the major to minor axes of the ellipse. The team's article, entitled "Direct measurement of dark matter halo ellipticity from two-dimensional lensing shear maps of 25 massive clusters," was published online 23 April in Monthly Notices of the Royal Astronomical Society, a leading astrophysics journal.

Full article:

<http://www.taiwanheadlines.gov.tw/ct.asp?xItem=187806&CtNode=9>  
[http://focustaiwan.tw/ShowNews/WebNews\\_Detail.aspx?ID=201004290008&Type=aEDU](http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?ID=201004290008&Type=aEDU)

### 13. Taiwan, Australia sign MOU on marine research

(Central News Agency, 29 04 2010)

The Australian Institute of Marine Science (AIMS) in Townsville and Taiwan's National Science Council (NSC) signed a memorandum of understanding (MOU) on 28 April for cooperation in the area of oceanographic research. The two sides have agreed to promote exchanges of research staff, to co-sponsor strategic seminars and conduct of joint research programs and they look forward to achieving breakthroughs in oceanographic research through various cooperative projects.

Full article:

[http://focustaiwan.tw/ShowNews/WebNews\\_Detail.aspx?Type=aLIV&ID=201004290033](http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?Type=aLIV&ID=201004290033)