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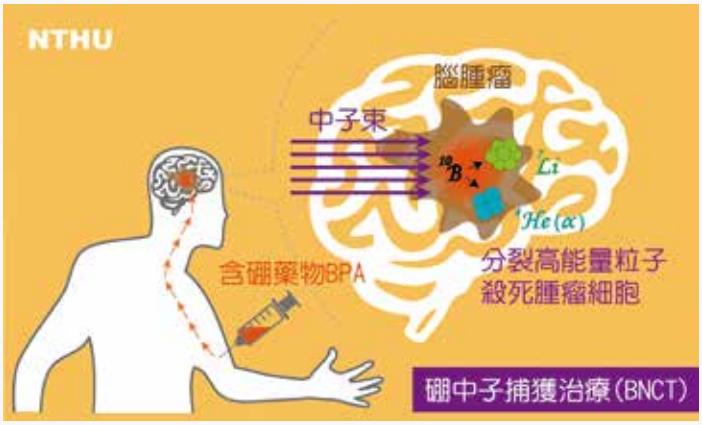
THE BORON NEUTRON CAPTURE THERAPY CENTER BEGINS TREATING OVERSEAS PATIENTS

On February 14th the melodious strains of the fourth movement of Mahler's Fifth Symphony were heard for some 20 minutes inside the nuclear reactor at NTHU—for this is the favorite piece of music of an European woman who was here to undergo boron neutron capture therapy (BNCT) for a malignant brain tumor. This was her second treatment, and her first treatment had reduced the glioblastoma deep in her brainstem from 3.51 cm to 1.06 cm. She was accompanied by her husband, and they are hopeful that the second course of treatment will completely eliminate the cancer cells.

NTHU has the only research reactor in Taiwan. In cooperation with the Taipei Veterans General Hospital (TVGH), the reactor was converted for use in BNCT, and now provides treatment for brain, head, and neck cancer. To date, the treatment has provided a new lease on life to over 130 cancer patients from around the world.

The head of NTHU's BNCT research program is Prof. Chou Fong-in. According to Chou, BNCT is a kind of target radiation therapy in which the patient is first injected with a boron-containing drug; once the drug has accumulated in the tumor, the neutron beam of the nuclear reactor is used to irradiate the tumor, and the high-energy particles generated by the boron neutron capture reaction effectively kill off the tumor cells, without damaging nearby normal cells. Thus BNCT is well suited for treating diffuse cancers and cases in which surgery is contraindicated.

As explained by TVGH oncologist Chen Yi-wei, boron-10 drug contains the structure like essential amino acids , and cancer cells need lots of nutrients to support their abnormal proliferation. Thus cancerous cells absorb almost all the boron-10 before the normal cells have a chance to. The boron acts as a kind of explosive charge, and once the cancerous cells have got their fill of it, the neutron beam is used to "detonate" the charge, killing off the cancer cells.

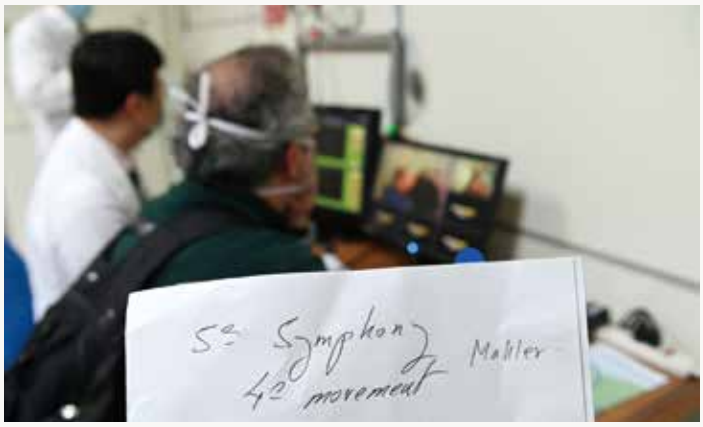


The BNCT treatment mechanism.

As it turns out, the husband of the European patient is a physician. He said that his wife used to be an avid tennis player, but four years ago she unexpectedly saw two balls flying towards her at the same time, a classic symptom of diplopia. At first, they thought it was a problem with her eyes, but computer tomography later revealed a low-grade glioma in her brain, located deep inside her brainstem, making it difficult to remove using surgery. After undergoing two craniotomies with gamma knife radiotherapy, the glioma reappeared and had turned malignant. On the advice of a friend, they inquired about the treatment being offered at the TVGH.

Chen arranged for her to come to Taiwan in October 2019, and a positron tomography examination at TVGH confirmed that BNCT could be used to treat her condition. In January of this year she had her first treatment at NTHU's Boron Neutron Capture Therapy Center.

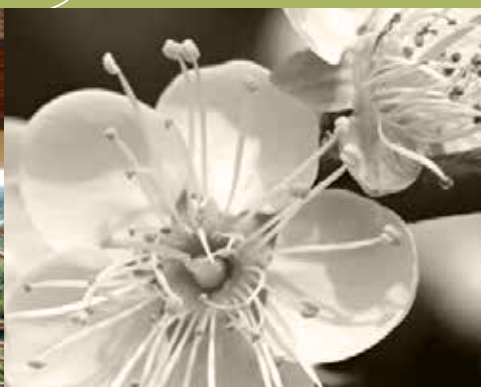
According to Chen, who undertook special training at Kyoto University in Japan to learn the latest BNCT procedures, the key requirements for BNCT are a boron-containing drug suitable for absorption by cancer cells, and a stable neutron source. NTHU's research reactor provides a very stable neutron source and is easy to adjust, even better than the accelerators developed in Japan for use in hospitals. Since Japan does not currently accept foreign patients, Taiwan has stepped in to fill the gap.



The Patient's husband wrote down the music that his wife would like to listen to during her treatment.

Lee Min, dean of the College of Nuclear Science and the director of the Boron Neutron Capture Therapy Center, indicated that, since 2010 the Center and TVGH have been jointly conducting clinical trials and emergency medical treatment, and that more than 130 patients with head, neck, or brain cancer have already been treated, most of whom only required a single exposure.

NTHU and the Taoyuan City Government are planning to jointly develop a medical complex as part of the Taoyuan Aerotropolis to be built next to the Taoyuan Airport. According to Lee, BNCT will play a major role at the new facility, and will be used to treat both Taiwanese and overseas patients. The Boron Neutron Capture Therapy Center is also working on the use of BNCT to treat liver cancer, and plans are afoot to establish cooperative relationships with additional hospitals and physicians.



RESEARCHERS DEVELOP AI APP TO GENERATE CATCHY ADS

An NTHU interdisciplinary research team led by Associate Prof. Wu Shan-hung of the Department of Computer Science, Associate Prof. Liu Yi-wen of the Department of Electrical Engineering, and Chair Prof. Chang Cheng-shang of the Institute of Communications Engineering has recently developed an automated system for the production of digital advertisements. Based on the information provided by the user, the system generates a variety of images and music, which can be fine-tuned to create the final product, thereby greatly reducing the time and cost of producing an advertisement.

Wu and Chang designed a conditional generative adversarial network (CGAN) application which generates an ad based on a large amount of related information harvested from the internet by using artificial intelligence (AI). Afterwards, all that remains to be done is to have an advertising specialist edit the ad and add the finishing touches.

Wu explained that the application performs a social network analysis which determines the most popular elements and user's preferences to generate eye-catching digital advertisements and optimal screen layouts. For example, the user enters a photo of a bed set with a circle around the bed, and the system automatically generates a variety of ads highlighting the bed's unique characteristics.

The system can also generate advertisements with models. For example, the user enters a photo of Keanu Reeves after circling certain features he wants to keep, such as the forehead and eyes, and the system will incorporate these features into a new image with similar characteristics.

Wu's team worked with the startup AppFinca to redesign the webpage for its app called "Flora." After analysis, the team

Prof. Wu Shan-hung & Prof. Liu Yi-wen and their interdisciplinary team developed the application of AI in advertisement.

changed Flora's advertising slogan to "He grows trees, and you grow up," and also came up with a lively color scheme to replace the rather drab one originally used for the page.

The transformation resulted in Flora shooting up to the top position in the rankings of the Free Productivity Tools of the Apple App Store for Taiwan, outranking even Gmail. AppFinca vice president Sun Zhenwei said that the cost was only 60% of the original advertising fee.

Prof. Wu & Liu with their research team.

The system developed by the research team also produces jingles. They collected 600 hours of songs and used them to train the system to generate a jingle based on the lyrics and melody input by the user, and the result can be adjusted in terms of pitch, timbre, and rhythm. Even though the jingles generated by the application aren't likely to be nominated for a Grammy Award, the system significantly speeds up the creative process.

The research team has already published a total of 19 articles on their research, and have also presented their results at various international conferences, including the Conference on Neural Information Processing Systems and the International Conference on Acoustics, Speech, and Signal Processing. They are also conducting negotiations with United Microelectronics, Asus, and KKBox for commercial application of their system.

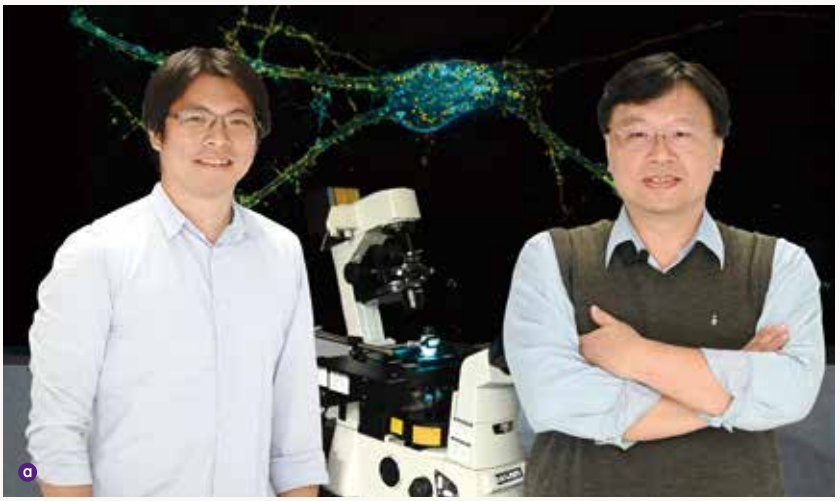
NEW TREATMENT FOR PARKINSON'S DISEASE DEVELOPED

Due to its high safety, ultrasound is widely used for conducting physical examinations, and plans are currently underway for expanding its application to the treatment of Parkinson's disease, dementia, and diabetes. An interdisciplinary research team at NTHU led by Associate Prof. Frank Lin of the Institute of Molecular Medicine and Prof. Yeh Chih-kuang of the Department of Biomedical Engineering and Environmental Sciences has successfully cured Parkinson's disease in mice by injecting cellular proteins that are highly sensitive to ultra-high-frequency sound waves into the deep brain region and afterwards using ultrasound to activate the cells.

Their innovative research has been published in the January issue of the prestigious international journal *Nano Letters*, and their non-invasive treatment has already been patented in Taiwan and the US in preparation for use in hospitals.

A specialist in synthetic molecular biology, Lin has long sought to find a safe, non-invasive way to control cell activity. Although light waves are safe, they can only penetrate the body to a depth of about 0.2 cm; magnetic waves can penetrate deeper, but lack precision. By contrast, ultrasonic waves penetrate to a depth of up to 15 cm, and can be focused on the affected area. Once ultrasound was recognized as safe and feasible, the challenge was to find a way to make cells respond to it.

Lin said that all mammals have a kind of high-frequency auditory pressure protein known as prestin. All prestin responds to ultrasound, but the prestin in the human body



a Prof. Frank Lin & Prof. Yeh chih-kung have successfully developed a new treatment for Parkinson's disease.

a The research explains the mechanism of Ultra sound treatment.

has little sensitivity to ultrasound. By contrast, the prestin in dolphins, whales, and bats is highly sensitive to ultra-high frequency sound waves, and Lin set out to determine why. By comparing their genetic maps he found that they all have a special amino acid, which he colonized into the cells of mice to modify their stress proteins. This resulted in an immediate tenfold increase in the cells' ability to sense ultrasound.

Lin's next task was to find a way to use ultrasound to treat diseases, for which purpose he turned to ultrasound expert Yeh, who devised a way to enclose prestin gene fragments in tiny bubbles which can be imported into the affected area by intravenous injection. As soon as the ultrasound is applied, the bubbles break, introducing the gene fragments into the affected cells, thereby activating their ability to detect and respond to ultrasound.

As Yeh points out, Parkinson's disease and Alzheimer's disease are caused by the degeneration and death of the cells in the basal nucleus of the brain. But once the cells with prestin gene fragments have been transplanted into the affected area, ultrasound can be applied to awaken atrophied cells so that they can begin to form new neural connections.

The research team has produced a video showing how a mouse with Parkinson's disease stops short while crossing a wooden bridge, and how the same mouse, following cell transplantation and ultrasound treatment, easily crosses the bridge in less than three seconds. It has also been found that the treatment results in a significant increase in dopamine levels in the brain, demonstrating its effectiveness in the treatment of Parkinson's disease. Lin said that this same procedure can also be used to treat diabetes by stimulating insulin-producing cells.

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Prof. Sean Chen who invented a "shield" to stabilize the quantum dot and enhance its capacity.

NTHU RESEARCH TEAM DEVELOPS NEXT GENERATION OF DISPLAY MATERIAL

A research team led by Prof. Sean Chen of the Department of Materials Science and Engineering has recently announced that they have developed a new quantum dot material which is more stable and provides more realistic color. The main limitations of the current generation of quantum dot display material is that they are unstable and easily damaged, and the team has rectified this by putting a 1-nanometer "shield" on each quantum dot. The new material has a wide range of applications, including the screens used in televisions, computers, mobile phones, and cameras.

With the support of the university, the team has already applied for a patent for the new material and has established the Xinhua Optical Energy Company to produce it on a commercial scale. It is expected that the first new quantum dot screens will begin production in this year.

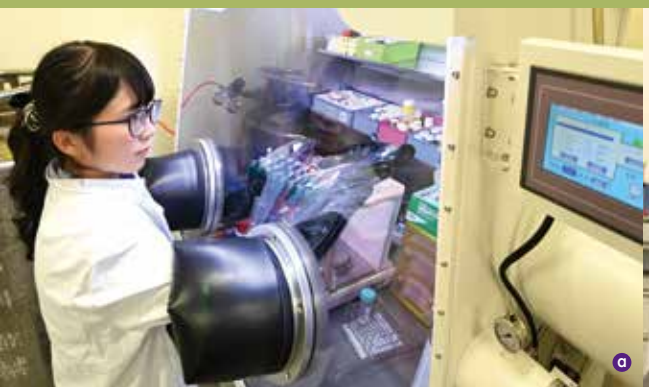
Most of the displays currently on the market are liquid crystal displays (LCD), which have a color gradation and saturation limiting display to only one third of the colors visible to the human eye, and even the so-called "retinal grade" OLED displays used in such devices as the iPhone 11 can only display about half of the colors visible to the human eye. According to Chen, displays produced with this new material (QLED) will display nearly 90% of the colors visible to the human eye.

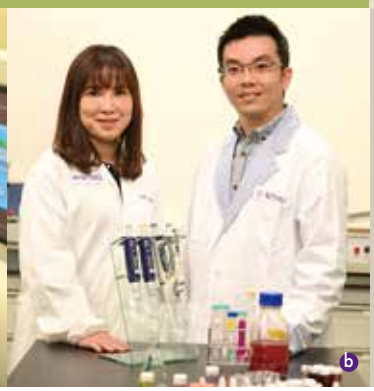
However, there are still a few challenges to be overcome before quantum dot material goes into widespread use. Chen explained that quantum dots are spherical crystals of about three nanometers in size, and are easily damaged by water vapor and oxidation, which diminishes their luminosity. At present, major manufacturers such as Samsung control such problem by sandwiching the quantum dots in a layer of protective film, but even the slightest gap in this layer can causes it to fail.

Inspired by the shield used by the comic book superhero Captain America in the Avengers series, Chen hit upon the idea of giving each quantum dot its own shield about one nanometer in size, which effectively resists water and oxidation, and increases stability and the display's lifespan.

In the past two years several companies have begun selling televisions with quantum screens, but due to the fragile nature of quantum materials, they are difficult to mass produce, and the price is relatively high: a TV with a 60-inch quantum screen sells for up to NT$160,000. However, using Chen's unique shield technology to protect the quantum dots will significantly reduce production costs.

"Once you've seen a quantum dot TV, you'll never go back to an LCD TV," said Chen with a smile. In Chen's estimation, quantum dot displays will soon become the new standard for televisions, computer monitors, wearable devices, and mobile phones.





ⓐ NTHU's research team is the first one successfully used nitric oxide to normalized the tumorous blood vessel.
ⓑ Prof. Chen & Prof. Lu have jointly developed a new treatment for cancer.

NEW CANCER TREATMENT DEVELOPED AT NTHU

A research team led by Associate Prof. Chen Yunching and Assistant Prof. Lu Tsai-te of the Institute of Biomedical Engineering have recently developed a new treatment for cancer, in which blood vessels with malignant tumors are normalized by injecting a specially developed nanometer nitric oxide carrier, which also facilitates the movement of cancer drugs and immunocytes into the tumor. Their groundbreaking research has recently been published in the prestigious journal *Nature Nanotechnology*.

Chen likens the organs of the human body to a city, and cancer cells to a gang of ruffians occupying a particular neighborhood. Releasing angiogenesis factors causes the surrounding blood vessels to provide self-expanding nutrients, resulting in normal hypoxic necrosis of the cancer cells. The forms of cancer treatment currently in use, such as chemotherapy and target drugs, mainly work by killing the cancer cells or tumorous blood vessels, but cause abnormalities in the functions and structure of the blood vessels; moreover, if any of the cancer cells survive the treatment, they become recalcitrant, like hardened ruffians, increasing the chances of a relapse or metastasis.

What makes this innovative treatment especially interesting is its use of angiogenesis factors, which have hitherto been regarded as accomplices of cancer cells. Chen explained that after the tumorous blood vessels are normalized, they can help to enhance the function of anti-cancer drugs and immune cells.

It was while considering ways to counteract tumorous blood vessels that Chen approached Lu. Lu said that nitric oxide expands blood vessels and promotes blood circulation, and is thus used to treat such conditions as myocardial infarction and pulmonary hypertension. However, because nitric oxide can effectively transport molecules only for a short time, it is mostly used to treat acute symptoms, and is ineffective for chronic diseases like cancer.

Thus the research team developed a polymer nano-carrier consisting of lactic acid and glycolic acid to stabilize the bionic dinitroso iron complex that releases nitric oxide, thereby extending the time in which nitric oxide molecules are effectively released from a few minutes to several days, allowing them to accumulate in tumorous tissues, and restoring the abnormal blood vessels to normal. At this point, cancer drugs and immune cells can move straight into the tumor, destroying the cancer cells in one fell swoop.

Immunotherapy has become a leading topic in cancer treatment research in recent years, but getting the immunocytes to the location of the cancer cells has been problematic. Chen said that her team has already used nitric oxide nanocarriers combined with immunocyte therapy to eliminate liver tumors in mice.

Lu said that the new nitric oxide nanocarrier he has developed can be easily synthesized in three steps, and the dosage form can be completed in one step, making it suitable for mass production. He has already applied for patents in Taiwan and the US for his nitric oxide nanocarrier, and the team is currently investigating the possibilities to cooperate with domestic hospitals and pharmaceutical companies.

TEACHING DRONE TO FLY LIKE AN INSECT

Although unmanned aerial vehicles (UAV) are becoming increasingly common in such fields as communications and agriculture, their use is hampered by their small size and limited battery capacity. However, a multi-disciplinary team at National Tsing Hua University(NTHU) led by Professors. Tang Kea-tiong of the Department of Electrical Engineering and Lo Chung-chuan of the Department of Life Sciences has recently developed an artificial intelligence (AI) chip that mimics the optical nerves of the fruit fly, allowing drones to automatically avoid obstacles while remaining in an ultra-power-saving mode. The chip also has potential applications in such areas as unmanned vehicles, smart glasses, and robotic arms.

Most of the UAVs currently in use rely on the transmission and reflection of electromagnetic waves or infrared rays to detect and avoid obstacles, but this consumes a lot of power, and when numerous devices are operating in the same area they tend to interfere with each other. An alternative approach to avoiding obstacles is to use optical lenses to capture and analyze images, but the amount of information to be processed is too large to be done quickly, and this approach also consumes a lot of power.

Intrigued by the fruit fly's uncanny ability to avoid obstacles, Tang, a specialist in neuro-imitation systems, figured that it might be possible to replicate the optical nerve of this tiny insect and adapt it to AI applications. Thus he began to collaborate with Lo on the development of a high-efficiency AI chip that mimics the visual system of the fruit fly.

The first task was to solve the problem of information overload. Dynamic vision has about 30 frames per second—far too many for individual processing in a power-efficient manner. According to Tang, the lenses currently used in cameras and

Prof. Tang & Prof. Lo showing the AI chip they have jointly developed.

mobile phones have millions of pixels, whereas the eye of a fruit fly has only about 800 pixels. When the fruit fly's brain processes such visual signals as contour and contrast, it utilizes a kind of attention mechanism which automatically filters out whatever information is unimportant, such as large stationary objects, and only pays attention to moving objects and those objects it is liable to collide with.

By imitating this attention mechanism, the research team has developed an AI chip which makes it possible to use hand gestures and an image sensor to operate a drone. For example, when the operator displays all five fingers, the drone flies forward, and when he displays two fingers, it stops. Because the computer only needs to distinguish the rough contours of the hand, and ignores such details as color and fingerprints, the process is highly efficient.

First the drone is taught to focus on what's most important, and then it's taught how to judge distance and the likelihood of a collision with an approaching object. For this purpose, Lo conducted a detailed investigation on how the fruit fly detects optical flow, for which purpose he made extensive use of the maps of the fruit fly's neural pathways produced by the Brain Research Center at NTHU. Lo explained that optical flow is the relative trajectory left in the field of vision by nearby moving objects, and used by the brain to determine distance and to avoid obstacles.

Lo added that small drones cannot carry heavy or energy-intensive devices, making sonar and radar impractical for avoiding collisions. Although analyzing the optical flow can also be used for this purpose, it requires complex mathematical algorithms and a high-speed CPU, making it unsuitable for a small drone. By contrast, the AI chip developed by his research team can perform the same operations by using only a few dozen "neurons," while consuming only a microwatt of electricity.

Tang said that the AI chip developed by his research team also represents a major breakthrough in the area of in-memory computing. Computers and mobile phones first move data from the memory to the CPU's central processing unit, and once it's processed, the data is moved back to the memory for storage, and this process is what consumes up to 90% of the energy and time of the AI deep-learning process. By contrast, the AI chip developed by the NTHU team mimics neuronal synapses, allowing it to perform calculations in the memory, which greatly improves efficiency.

The research team was established in 2017 and includes Tang, who developed the artificial neural system; Hsieh Chih-cheng, who developed the smart lenses; Chen Hsin, who developed the bionic system; Lu Ren-shuo, who devised the chip framework; Sun Min, who was responsible for model design; Chang Meng-fan, who developed the memory circuit; and Lo, who specializes in neural models.

NEW ART CENTER TO BE BUILT AT NTHU

On January 8 the naming ceremony was held for a new conference and art center at NTHU, to be named "Spring Hall" in honor of Hou-Wang Shu-zhau, the founder of the Spring Foundation and the honorary dean of the College of Arts.

The event opened with a stirring rendition of "Dedication" sung by students of the Department of Music, accompanied by a retrospective video on Mrs. Hou-Wang with a series of eulogistic lines written by the guests of honor using interactive technology, including "A leading patron of modern art in Taiwan," "A radiant person with a passion for life," and "An enthusiastic promotion of art education."

President Hocheng said that the name "Spring Hall" perfectly reflects Hou-Wang's genial temperament, adding that he has a copy of her book *A Dialogue between Reason and Perception* in his car and reads it often. In this book she mentions her fondness for the boisterousness of spring, which for her symbolizes creativity and innovation.

Hocheng also said that he has been greatly inspired by Hou-Wang's artistic spirit, and he encouraged the entire Tsinghua community to follow her advice, "Be contemporary. Be creative."

At the naming ceremony (right to left): Hou Jieteng, Hocheng Hong, George Hou, and Chen Lih-juann.

Amongst the distinguished guests was Hou-Wang's eldest son and Spring Foundation chairman George Hou, who said that while growing up he often went to the Spring Gallery to look at the art and to have some fun. He explained that the idea of "spring" has been a major theme in his life, both as an artist and as the chairman of the Foundation when it began working together with NTHU in the area of arts education.

During the event former NTHU president Chen Lih-juann said that Hou-Wang was passionate about art and philanthropy,

and took a "gentle yet unyielding" approach to the promotion of modern art in Taiwan, and the splendid art produced under her patronage is the legacy she has bequeathed to Taiwanese society, adding that, "the sounds of spring will soon grace the Spring Hall."

Also in attendance was Tung Ho Steel chairman Hou Jieteng, who said that many the top artists in Taiwan displayed their work at the Spring Gallery during the early stage of their careers, including Chu Ming and Dong Yangzi, and that his mother always made it a point to support young artists in various ways, and that she leveraged the success of the family steel business to enrich the cultural development of society.

Another highlight of the event was an impromptu rendition of the song "In Praise of Spring" by George Hou and dancer and vocalist Mia Hsieh, who accompanied their piece with a hang drum. Hsieh graduated from the Department of Foreign Languages in 2008, and said that when she was studying at NTHU there wasn't much happening on campus in the way of arts, and that she's delighted to see that the arts now feature quite prominently on NTHU campus.

The Spring Hall will be located on the South Campus between the TSMC Building and the College of Humanities and Social Sciences, and construction will begin in July. The basement will have a 350-seat auditorium which will host a variety of musical and theatrical performances.

ⓐ Hocheng said that NTHU is fast becoming a model of creativity and innovation.
ⓑ Chen Lih-juann said that the sounds of spring will soon grace the Spring Hall.
ⓒ Hou Jieteng said that the cooperation of art and industry has enriched the cultural development in Taiwan.

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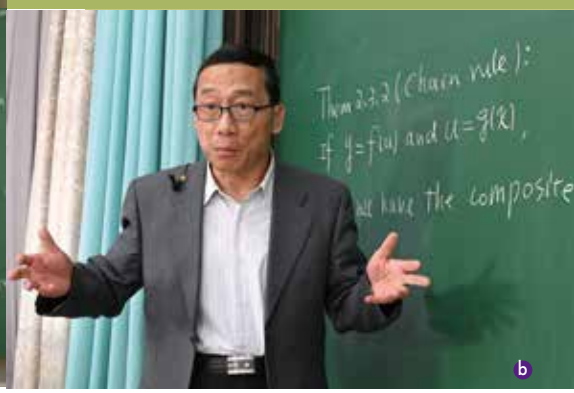
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DISTANCE LEARNING COMES OF AGE

In recent years NTHU has run numerous MOOCs (massive open online course) for the benefit of students at home and abroad, one of the most popular of which has been the Introduction to Calculus offered by Prof. Yan Dung-yung of the Department of Mathematics. Amongst the students in Yan's course was the 13-year-old Liu Che, who after completing the course got a perfect score in the calculus section of the Advanced Placement Exam held by the College Board in the United States. In her ongoing passion for pursuing advanced topics in mathematics, Liu has also visited NTHU to audit one of Yan's classes.

After completing his Ph.D. in mathematics at the University of Washington in the United States, Yan taught at the Institute of Mathematics at Johns Hopkins University before coming to NTHU. Although many college students studying science and engineering find calculus highly challenging, in Yan's view, "it's not that difficult, as long as you have a good teacher." His online calculus course usually attracts hundreds of students, yet he was surprised to learn that amongst them was a 13-year-old girl.

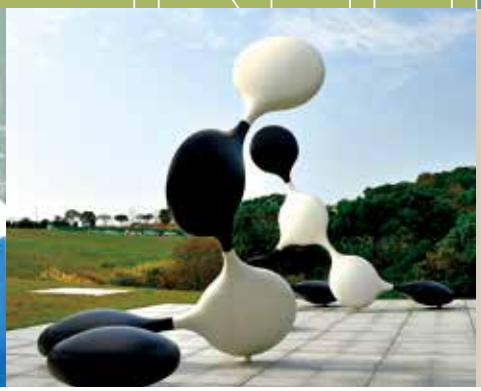
Liu's mother, Chen Meili, said that her daughter began her education with homeschooling, and then began to teach herself more advanced subjects by making extensive use of the plethora of internet resources that have become available in recent years.

Liu said that in May of last year she came across NTHU's MOOC website and decided to sign up for Yan's calculus course, and soon was delighted to discover that Yan also covers the theoretical aspects of calculus.

Mrs. Chen said with a smile that her daughter soon became so engrossed in Yan's calculus course that she sometimes watched the lectures late into the night with obvious relish, all the while writing calculus calculations on a whiteboard. When she had a question, she would post it online and the teaching assistant would soon provide the answer. Later, when Liu discovered that the video for the second half of the film was not open to the public, she wrote to NTHU's Center for Teaching and Learning Development, and Yan agreed to provide her with access to all the calculus video segments.

After completing the 43-hour online course, Liu passed the related exam and obtained a certificate. A few months later she got a perfect score in the calculus section of the Advanced Placement Exam held by the College Board in the United States.

In addition to NTHU's online calculus course, Liu has also completed several other online courses offered by top American universities, including Stanford's course in machine learning, Harvard's course in computer science, and MIT's course in computer science.



ⓐ Yan's Introduction to Calculus course helped Liu (right) get a perfect score in the calculus section of the Advanced Placement Exam held by the College Board.
ⓑ Prof. Yan's MOOC course Introduction to Calculus ran for two years.
ⓒ Liu solving a calculus problem in Yan's online course at NTHU.

Chen also said that her daughter is fortunate to have made Yan's acquaintance. Last year Liu participated in a science program for high school students run by the Ministry of Education, and was assigned to the elementary cohort. During the introductory session she caught a glimpse of Yan, but was too shy to approach him and say hello. When applying to join the advanced section of the same course last year, it happened that some of her application documents relating to her online coursework at NTHU got misplaced, so she wrote to the school to request replacements. Yan was in charge of the case, and when he called Liu for more information, she immediately recognized his voice.

Liu, who is now 14 years old, is currently participating in the advanced stage of the science program for high school students run by the Ministry of Education. Amongst the 300 participants, between 10 and 15 will be selected for additional training in preparation for representing Taiwan in the International Mathematical Olympiad competition, and Yan expects that her participation will significantly enhance the team's performance.

Yan (left) presenting Liu with NTHU souvenirs.

NTHU's MOOC website OpenCourseWare (OCW; http://ocw.nthu.edu.tw) has been operating since 2008. Taught by teachers who have won the Outstanding Teaching Award, the courses are recorded in the classroom and made freely available on the internet. To date, the OCW has already run a total of 142 courses; the website has had 5.2 million visitors, who have clicked on course details 31 million times.

NTHU

NATIONAL TSING HUA UNIVERSITY WELCOMES INTERNATIONAL STUDENTS

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Fax: +886-3-516-2467
Office hour: 8:30AM -5:00PM, Monday through Friday (Taiwan time)

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Degree Student
Fall Semester Application Graduate Program: January 1~March 15
Undergraduate Program: November 15~February 15
Spring Semester Application: August 15 to October 16

Exchange Student
Fall Semester Application: February 1~ April 15
Spring Semester Application: September 1~November 1

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