

清華

NATIONAL
TSING HUA
UNIVERSITY

NEWSLETTER

October 2021 | Vol. 15 | No. 4



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USHERING IN A NEW ERA OF MEDICAL EDUCATION

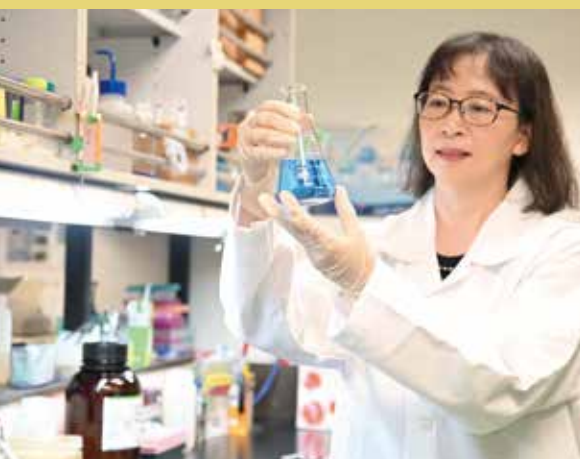
National Tsing Hua University's plan to establish a post-baccalaureate program in medicine has been approved at a recent cross-ministerial meeting held at the Ministry of Education. The school's recruitment and admission application process will begin by the end of 2021, and the first class of government-sponsored students will be enrolled in September 2022.

President Hocheng Hong said that NTHU already has a strong foundation in cross-disciplinary research in medical science, including big data analysis, application of artificial intelligence (AI), bioengineering, material science, and nuclear medicine, by which the school is well-positioned to train physicians specializing in more than one expertise. As such, this new program represents a quantum jump in medical education in Taiwan.

President Hocheng pointed out further that NTHU already has sufficient number of faculty members, funding, and infrastructure for the new program. In addition to the existing 180 faculty members teaching related courses, the program has recently recruited an additional 71 full-time faculty members, and 87 physician scientists from leading medical centers throughout Taiwan as adjunct faculty members. Moreover, the provisional office



College of Life Science dean Kao Ruey-Ho (高瑞和) (left) and Department of Medical Science chair Chen Linyi (陳令儀) (right) prepare for the post-baccalaureate program in medicine.



Prof. Chen and her research assistants

of this program has raised NT\$2 billion for medical education. An ongoing plan for establishing a state-of-the-art teaching hospital and medical complex in the Taoyuan Aerotropolis next to the Taoyuan International Airport is currently being reviewed by the Ministry of Health and Welfare.

The post-baccalaureate program in medicine is a four-year program, open for graduates from all disciplines. The government-sponsored students will be required to serve in a public healthcare facility for six years after completing their training. They will have an opportunity to undertake an additional two years of advanced training in a medical center.

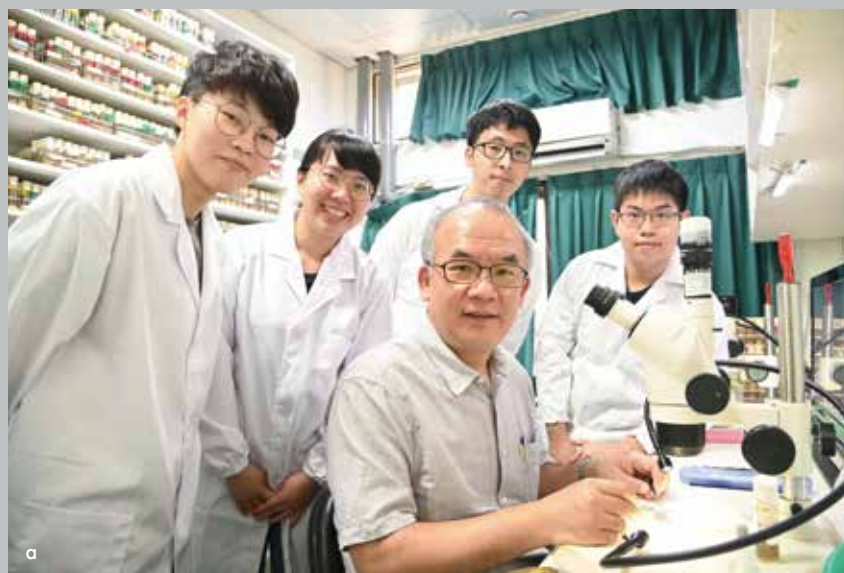
The post-baccalaureate program will be part of the future College of Life Sciences and Medicine (currently the College of Life Science). Dean of the College of Life Science, Kao Ruey-Ho, (高瑞和) former Superintendent of Tzu Chi Medical Center, said that

applicants who apply directly to NTHU will be evaluated based on test scores, transcripts, and interviews, to select students who have demonstrated academic excellence, as well as a passion for medicine and public welfare.

Government-sponsored students in the program will take several courses designed to prepare them for practicing in a rural area, such as Community Medicine Practicum, and make good use of AI diagnosis and telemedicine technology; they will also attend seminars on altruism and dedication to public health, which will be taught by laureates of the Medical Contribution Award.

RESEARCHERS UNCOVER CAUSE OF PATHOLOGICAL ENLARGEMENT OF CELL NUCLEI

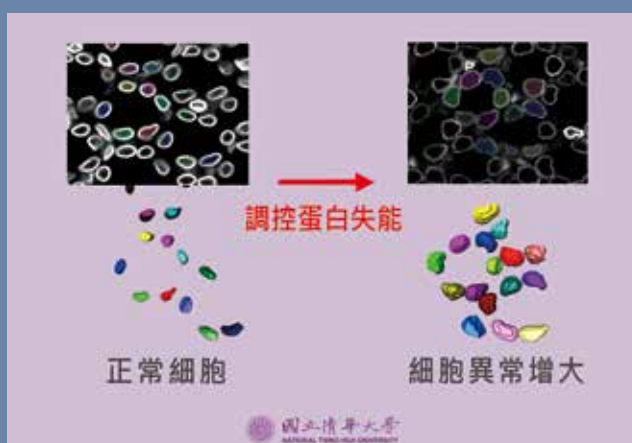
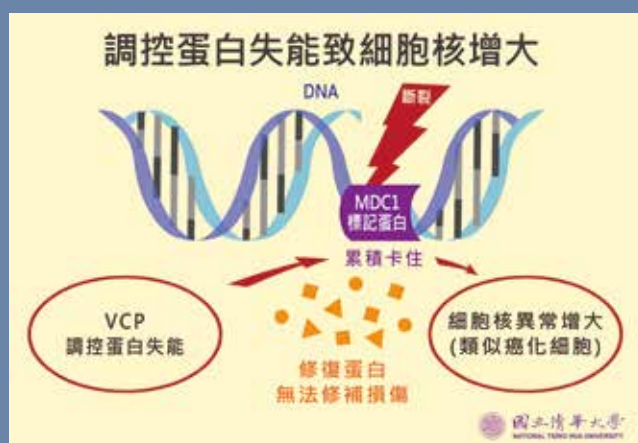
Why is it that abnormally proliferating cancer cells often have larger nuclei? A research team at NTHU studying fruit flies has recently found that this is mainly due to a compromised repair mechanism in the nucleus of damaged DNA. Once the regulatory protein is disabled, it causes the marker proteins to accumulate, such that the repair proteins are unable to repair the damaged DNA, resulting in abnormal enlargement of the cell nucleus—one of the most commonly observed pathological phenomenon of cancer cells. This is the first time that such phenomenon has been observed, and is expected to have a significant impact on future research on cancer and other degenerative diseases.



The team was led by Prof. Sang Tzu-kang (桑自剛) of the Institute of Biotechnology, and their groundbreaking discovery is published in a recent edition of the top international journal *Nature Communications*.

Previous studies have shown that the nucleus and cytoplasm

must maintain a certain ratio in order to maintain normal physiological operations. Cancer cells are characterized by abnormally enlarged nuclei and morphological changes, and the same changes are also found in some degenerative diseases, such as progeria; this is what led the team to investigate the cause of



- a. Prof. Sang Tzu-kang (桑自剛) (center) of the Institute of Biotechnology with his research team.
- b. Team member Chang Ya-chu(張雅筑), a post-doctoral researcher of the Institute of Biotechnology.
- c. Sang (center) and his research assistants working in the lab.



this abnormal enlargement of the nucleus.

Suspecting that the regulatory protein is the culprit, the research team "turns off" the regulatory protein and discovers what happened. Since the regulatory protein TER94 in fruit flies (*Drosophila*) is homologous to the regulatory protein VCP in humans, so the team used cells from the eyes of fruit flies for the experiments.

Under normal circumstances, whenever a strand of DNA is broken, the marker protein MDC1 will be brought in to carry out repairs which keep the cell functioning as usual. However, as the team discovered in the early phase of their research, if the regulatory protein VCP is unable to perform its regulatory function due to hereditary factors or genetic mutations, the marker protein MDC1 will continue to accumulate in the DNA break, preventing the repair protein from reaching the damaged site, which ultimately leads to an abnormal

enlargement of the cell nucleus.

The team's research was funded by the Ministry of Science and Technology, and amongst its members were post-doctoral student Chang Ya-chu (張雅筑) and master's students Peng Yu-hsiang (彭昱翔), Yu Bo-hua (余柏樺), Liang Pei-shin (梁珮欣), Huang Ting-yi (黃亭苙), and Shih Chao-chieh (施朝傑). Their duties included conducting the genetic screening of fruit flies, monitoring the size of the cell nuclei, and screening the DNA repair mechanism.

The first author of the team's research report was Chang, who has been studying the regulation mechanisms of cell nuclear morphology for many years, and is currently conducting post-doctoral research at the University of California, San Francisco, specializing in neuroscience.

Chang said that the team began by dissecting the fruit flies to obtain the eye cells. Then they dyed the antibodies, making it possible to observe the nucleus under a microscope. "In addition

to the regulatory protein, the marker protein and tumor suppressor protein in the human body all have a genetic sequence which is very similar to that of the fruit fly.

Sang said that the mechanism discovered by his research team is likely to play a key role in the development of small molecule drugs that inhibit the VCP protein, which is currently being studied in the United States as a means to slow down cancer metastasis and treating degenerative diseases.

UMC CHAIRMAN HUNG CHIA-TSUNG AWARDED AN HONORARY DOCTORATE



NTHU has recently awarded United Microelectronics Corporation (UMC) chairman Hung Chia-tsung (Stan Hung 洪嘉聰) an honorary doctorate in engineering in recognition of his outstanding contributions to Taiwanese industry and society. In his typically modest manner, Hung attributed his achievements to the far-sighted leadership and significant support that NTHU has provided to both UMC and the semiconductor industry as a whole. Honored to have become an official member of the NTHU community, he is looking forward to deepening the cooperation between NTHU and UMC, so that it becomes a model of university-industry cooperation.

Hung also had a special word of thanks for former president

Liu Chung-laung (劉炯朗), who nominated him for the honorary doctorate before passing away last year. He said that since 2006 Liu served as an independent director of UMC, in which capacity he played an instrumental role in the company's strategic transformation.

Hung recounted the founding and early growth of UMC during the rapid emergence of the semiconductor industry, and its subsequent transformation from a small-scale integrated device manufacturer (IDM) into a wafer subcontractor of international scope. When UMC first went public in 1985, its share capital was NT\$800 million, and its market value was NT\$1.1 billion. Today, UMC's market value exceeds NT\$800 billion.

"Since its establishment 40 years ago, UMC has received a huge amount of assistance from NTHU," said Hung, adding that while working at UMC over the past 30 years his company and NTHU have established a strong cooperative relationship, especially in the fields of R&D and smart manufacturing. At present, among the nine members of the company's board of directors, two are NTHU faculty members, and five of its senior executives are NTHU alumni. Hung is now looking forward to expanding this relationship in the near future.

President Hocheng said that Dr. Hung is a fine example of the adage "Actions speak louder than words." For, despite playing a key role in UMC's impressive growth, he's not well known outside the company itself. Thus he is comparable to the plum blossom—NTHU's school flower—which doesn't have an especially eye-catching appearance, but is instead celebrated for its low-key beauty in the form of its delicate shade and distinctive fragrance.

Inasmuch as he identifies with NTHU's values and vision, and has long been quietly supporting the school's development in various ways, Hung has become

an enthusiastic supporter of the university. For example, in honor of the late presidents Liu Chung-laung and Shen Chun-shan (沈君山), Hung assisted in the establishment of the Liu Chung-laung Memorial Hall and the Chun-shan UMC Concert Hall.

"In fact, it was former NTHU president Liu Chung-laung who first nominated Hung for an honorary doctorate," said Chen Lih-juann (陳力俊), chancellor of the University System of Taiwan. Indeed, Liu recognized Hung as not only a successful entrepreneur, but also a model citizen.

As an example of Hung's low-key philanthropy, Chen recounted how Hung, soon after his son was admitted to the Department of Economics at NTHU, made a donation to the school, requesting that it remain anonymous, since he didn't want his son to know about it. "Hung's wife and son are here today, and while speaking with them I realized that to this day they still had no knowledge of that donation," said Chen, adding that "His son has already graduated and now has a successful career of his own, and he donates a part of his salary to the school every month. As they say, 'Like father, like son!'"

Also attending the conferral ceremony was former minister of Science and Technology Hsu Chueh-min (徐壽民), who said that Hung is widely known as a man of few words, as borne out by his short acceptance speech. Instead of talking a lot, Hung is a man of action. He frequently donates to worthy causes, including the provision of medical supplies to help in the fight against the COVID-19 pandemic. What's more, for many years he has been making significant contributions to a variety of public welfare organizations, including those promoting



- a. NTHU president Hocheng Hong (left) presenting an honorary doctorate diploma in engineering to Hung Chia-tung.
- b. At the conferral ceremony (left to right): former minister of Science and Technology Hsu Chueh-min (徐壽民); Chen Lih-juann (陳力俊), chancellor of the University System of Taiwan; NTHU president Hocheng Hong; Hung Chia-tung (洪嘉聰); Mrs. Hung Chia-tung (洪嘉聰夫人); Hung Chia-tung's son (洪嘉聰公子); and Fred Huang (黃能富), dean of the College of Electrical Engineering and Computer Science.

environmental protection and providing scholarships for young scholars and schoolchildren from disadvantaged families.

Amongst the many prominent guests at the conferral ceremony were Distinguished Research Fellow of Academia Sinica Jane Winshih Liu (張韻詩), President of the NTHU Alumni Association Hsieh Yongfen (謝詠芬), Chairman of eMemory Technology Charles Hsu (徐清祥), UMC Co-president SC Chien (簡山傑). Also in attendance were a large number of UMC executives and NTHU faculty and students.

In addition to his role as chairman, Hung also serves as UMC's chief strategy officer; he also serves as a trustee for a number of other companies. When Hung joined UMC in 1991 he first served as the manager of the finance department, and was later promoted to the position of senior vice president. In 2008 he became the chairman of UMC, in which capacity he has spearheaded a series of adjustments in the company's business strategy which have transformed UMC into a global leader focusing on special technologies. After first strengthening UMC's financial structure, he shifted his attention to expanding cost-competitive production capacity and adjusting product portfolios; afterwards he began to focus on strategic

positioning, technology, production capacity, yield, profitability, and sustainable operations, in each of which he has met with much success.

Despite the exigencies brought

the former governor of the Central Bank.



about by the pandemic, during the past year and a half Hung has continued to strengthen UMC's competitive advantages by launching innovative services and raising standards. As a result, UMC's share price has recently hit record highs, and its market value has broken the NT\$800 billion mark, making it the fifth largest company in the Taiwan stock market.

Hung is the 40th person to receive an honorary doctorate from NTHU since 1996. Previous recipients include Yang Chenning (楊振寧), who won the Nobel Prize in Physics; Lee Yuanche (李遠哲), the former president of Academia Sinica; former TSMC chairman Morris Chang (張忠謀); the internationally renowned animal conservationist Jane Goodall (珍古德); and Perng Fainan (彭淮南),

A COLLEGE OF SEMICONDUCTOR RESEARCH IS ESTABLISHED WITH DR. BURN J. LIN AT THE HELM

NTHU's plan to establish a College of Semiconductor Research (CoSR) has been approved by the Ministry of Education and student recruitment will soon follow. President Hocheng Hong said that the institute will be headed by Academician of Academia Sinica Burn J. Lin (林本堅), whose research in immersion lithography has a major impact on the semiconductor industry worldwide. He added that with Lin's leadership, combined with NTHU's strength in technology and interdisciplinary studies, the CoSR will certainly become a major force in semiconductor research.

In addition to international companies such as Micron Technology and Tokyo Electron, the CoSR is being supported by Taiwan Semiconductor Manufacturing Company, Powerchip Semiconductor Manufacturing Corporation, GlobalWafers, Unimicron, United Microelectronics, Vanguard International Semiconductor Corporation, Novatek Microelectronics, and Nanya Technology, with an annual endowment totaling over NT\$130 million.

This college will consist four disciplines: Semiconductor Device, Semiconductor Design, Semiconductor Process, and



Semiconductor Material. Each year it will enroll about 80 master's students and 20 doctoral students. The first batch of students will be admitted as early as the spring of 2022.

President Hocheng further indicates that NTHU is the only university in greater China that has three Nobel laureates amongst its alumni. Moreover, NTHU has been rated among the top 100 schools worldwide in electrical engineering and computer science, materials science, physics, chemistry, chemical engineering, machinery, and statistics—placing it in an excellent position to turn out graduates with a broad-based creative vision, the basis of cutting-edge research.

Dr. Lin said that domestic universities already turn out plenty graduates for the semiconductor

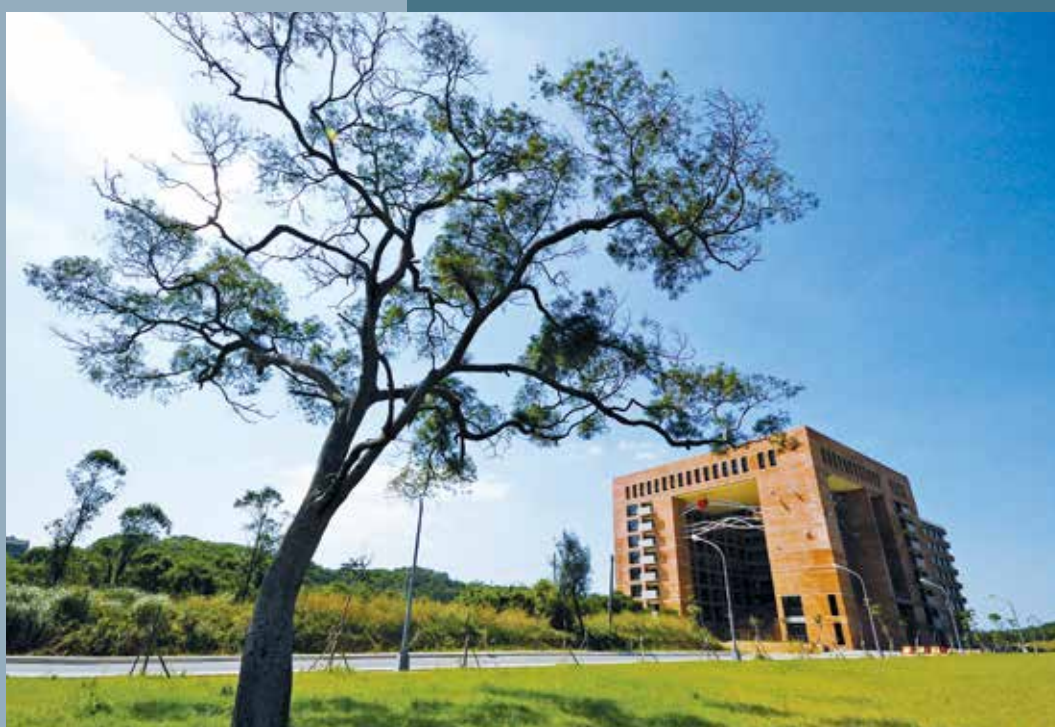


Dr. Burn J. Lin (林本堅) will be the first dean of the College of Semiconductor Research gastric cancer.

industry in Taiwan, so that the CoSR's main focus should be on raising the nation's global competitiveness. To realize this vision, Lin wants to cultivate each student into a specialist, generalist, innovator and problem solver. A student first acquires the ability to dig deep in a given field of the semiconductor technology, thus becomes a sought-after specialist. However, the semiconductor technology encompasses too many fields for any individual to comprehend all. He has to work with people of other disciplines as a team. He needs to be proficient in related fields in order to communicate with other specialists, thus, has to be a generalist. Besides being broad, the technology also progresses at an awesome pace. The specialist/generalist ought to

be able to solve new problems and be innovative for revolutionary approaches. Only when someone fully proficient in all three aspects will he be able to become a formidable leader in semiconductor research.

During his 22 years at IBM in the United States, Lin was credited with many ground-breaking innovations. He joined TSMC in 2000, and in 2002 he began to develop immersion lithography, which has had a tremendous impact on the semiconductor industry.



RESEARCHERS DEVELOP ULTRASONIC VORTEX THROMBOLYSIS DEVICE

As the COVID-19 pandemic continues to wreak havoc worldwide, people are rushing to get vaccinated, yet many are hesitant, due to the risk of thrombosis. With this situation in mind, a research team led by Professor Yeh Chih-kuang (葉秩光) of the Department of Biomedical Engineering and Environmental Sciences has developed the world's first ultrasonic vortex thrombolysis device, which uses tornado-like sound waves to dissolve embolisms quickly and safely. Their device has already been patented in the United States and Europe, and their research was published in the US as a cover article in the *Proceedings of the National Academy of Sciences* at the beginning of this year. Prof. Yeh's device has also received a NT\$2 million award from the Spurring Innovation and Startups Program



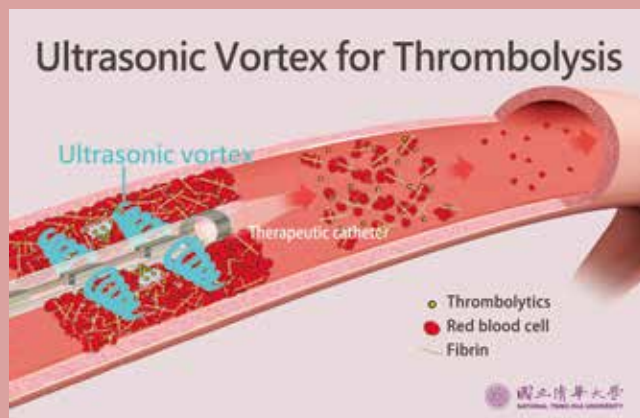
Professor Yeh Chih-kuang (second from left) with team members Hsieh Tsunghan (謝宗翰) (first on left), Lai Chunyen (second from right), and Lo Weichen (羅尉辰) (first on right).

of the Ministry of Science and Technology.

Around 14 out of every 100,000 people in Taiwan suffer from thrombosis. For example, deep vein thrombosis in the legs can cause blood vessel inflammation and swelling of the limbs, and severe cases can require

amputation. The mortality rate for pulmonary embolism is about 65%. Professor Yeh explained that the main method of treating thrombosis at present is to insert a catheter into the blood vessel and release thrombolytic drugs, but it may not be effective, and it sometimes happens that a partially

decomposed blood clot flows off and causes another blockage elsewhere. This was the problem which motivated Yeh and his research team to set out in



search of a more effective form of thrombolysis.

Working in conjunction with a domestic materials factory, the team developed an ultrasonic component with a tiny probe measuring only 0.2 cm. Using a heart catheter, the device is inserted into the blood vessel, where it emits a tornado-like ultrasonic vortex, creating a strong turbulent flow around the thrombus, which loosens up like cotton. This increases the efficiency with which the thrombolytic drugs penetrate the thrombus, so that it dissolves into minute particles measuring only 0.001 cm.

"Clinically, I once saw a blood clot that was over 40 cm long. Using only medication to dissolve something that big would be too

slow and of limited effectiveness," Yeh explained. "It's a lot like washing clothes. If you only soak them in laundry detergent, they're not going to come out very clean, no matter how much you use; but when the clothes are agitated in the washing machine, they get thoroughly washed in a jiffy."

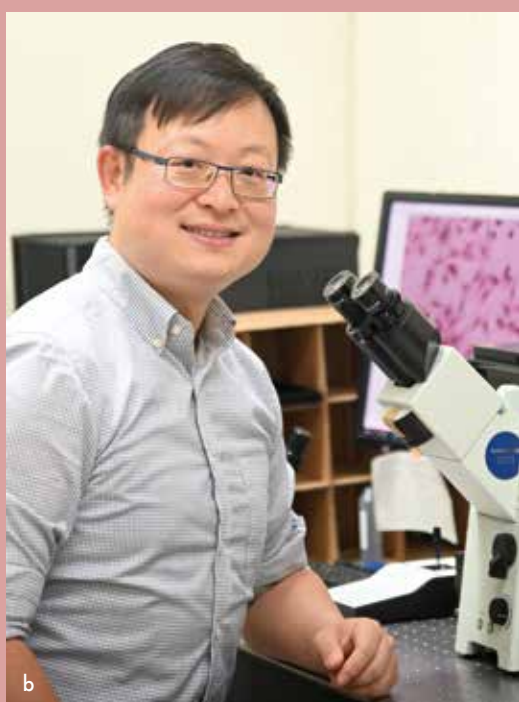
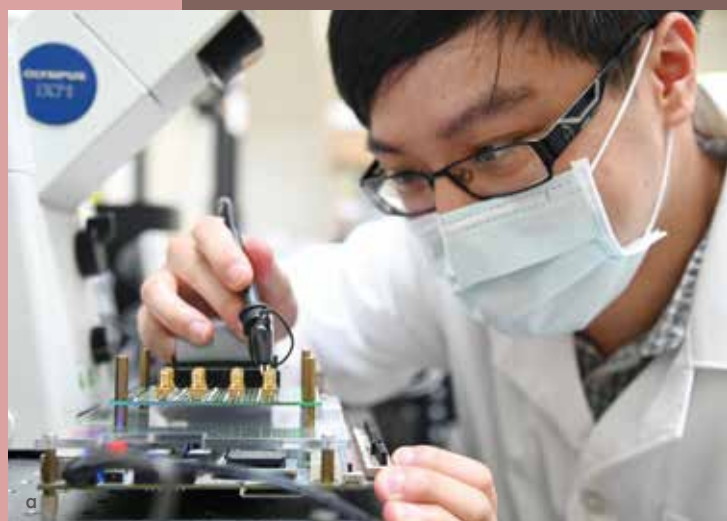
Yeh said that in experiments conducted on mice, ultrasonic vortex thrombolysis reduced brain thrombosis in mice by 60% in just ten minutes, which is not only fast, but also reduces the amount of medication needed, and the risk of bleeding. What's more, ultrasonic sensing provides instant information on the progress of thrombolysis.

Yeh added that his team is currently working on developing a procedure for conducting extracorporeal thrombolysis, which precludes the use of a catheter. In this non-invasive procedure the thrombus is dissolved by using directional ultrasound waves emitted from outside the body, making

it highly suitable for treating embolisms in the brain and coronary arteries. In addition, ultrasonic vortex technology is also being developed for use in conjunction with the release of the microbubble drugs used in the treatment of brain and neurological diseases, such as Parkinson's and epilepsy.

Reflecting on how he first got interested in ultrasonic vortex technology, Yeh recalled with a smile that it was while on an outing with his kids to the National Museum of Marine Science and Technology in Keelung some ten years ago. As they were observing the waterspout demonstration, he realized that ultrasonic waves also create a similar kind of vortex, and decided to see if he could come up with some useful applications.

Yeh's research team is called VorteSonic (a portmanteau



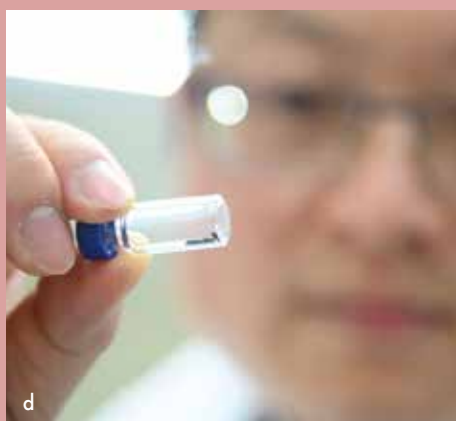


- a. Xie operating the ultrasonic apparatus.
- b. Lai (foreground) using a microscope to examine the results.
- c. Serving as VorteSonic's professional manager was Dr. Lai Junyan, who studied innovative medical materials at Stanford University in the United States.

consisting of vortex and sonic), and is based at the Ultrasound Imaging Lab of the Department of Biomedical Engineering and Environmental Sciences. Amongst the team members are Lo Weichen (羅尉辰) and Hsieh Tsunghan (謝宗翰), both doctoral students in the Institute of Biomedical Engineering and Environmental Sciences. Lo developed the ultrasonic microprobe, and Hsieh developed its drive system. Serving as the team's professional manager was Dr. Lai Chunyen

(賴俊延), who studied innovative medical materials at Stanford University in the United States.

Yeh thanked the Spurring Innovation and Startups Program for providing funding and training, as well as the Ministry of Education for the support provided under the auspices of its Academia-Industry Joint Innovation Program.



- d. This tiny device emits a tornado-like ultrasonic vortex.
- e. Measuring a mere 0.2 cm, this tiny probe can be inserted into a blood vessel to dissolve a thrombus.

LIU CHUNG-LAUNG CHAIR PROFESSORSHIP LAUNCHED WITH AN ENDOWMENT FROM MACRONIX INTERNATIONAL

Former president
Liu Chung-
laung (劉炯朗)

passed away last year, and people from all walks of life cherish the memory of this internationally renowned educator and pioneer in information science. In his honor, NTHU has recently announced the establishment of the Liu Chung-laung Chair Professorship, to be supported by a NT\$30 million endowment donated by Macronix International. President Hocheng said that Liu was a model president, and that the Professorship will ensure that his name will be forever associated with Tsinghua.



President Hocheng said that the hoary-headed Liu enlivened all manner of occasion with his geniality and sense of humor. Past NTHU presidents who have also been honored with an eponymous chair professorship include Mei Yi-chi (梅貽琦) and Shu Shien-siu (徐賢修).

The Chair Professorship will be funded by the interest generated by the endowment, and will recruit internationally renowned scholars in a variety of fields. Each chair professor will be appointed for three years, and can be reappointed. During the period of the appointment, each appointee will be required to publish research results in the name of



- a. Former NTHU president Liu Chung-laung (劉炯朗) (left) and Macronix chairman Miin Wu (吳敏求) at the inauguration ceremony of the Macronix Building in 2011.
- b. Macronix chairman Miin Wu (left), former NTHU president Chen Lih-juann (陳力俊) (right), a student representative, and the NTHU mascot depositing the final book from the old library into the new library in the Macronix Building in 2013.
- c. The grand-opening of the Learning Resource Center with Chairman Wu at the center and presidents Lih-juan (fourth from the right) and Liu Chung-Laung (third from the right)

the Chair Professorship, and to participate in academic seminars and public welfare activities.

Hocheng said that the University is currently selecting a new president, and that it would be terrific if the new president were to concurrently serve as the Liu Chung-laung Chair Professor.

Liu strongly resonated with Macronix's focus on innovation and R&D, as well as its emphasis on education, and for many years he served as the director of the Macronix Education Foundation, in which capacity he helped establish the Macronix Golden Silicon Award and the Macronix Science Award, both of which have helped countless talented

young people pursuing careers in science and technology.

Macronix chairman Miin Wu (吳敏求) said that Liu was a rare combination of humor and erudition, and that his reputation in computer science will surely attract top-notch scholars to NTHU.

Liu served as the president of NTHU from 1998 to 2002, during which time he facilitated major corporate donations for the construction of several new buildings, including the Macronix Building, a multifunctional library for which Macronix donated NT\$400 million—the largest corporate donation ever made to a single university at the time.



CONSTRUCTION BEGINS ON THE HALL OF LITERATURE

Work has recently commenced on the construction of the building which will house the Wang Mo-jen and Chou An-yi Hall of Literature. The building has been designed by noted architect Huang Sheng-yuan (黃聲遠), who has designed the building to blend into the undulating landscape on the south side of campus, complete with an adjacent footpath.

Major funding for the project has been provided by the late novelist Wang Mo-jen (王默人) and his wife, Chou An-yi (周安儀). Situated between Xiangsi Lake and the

College of Humanities and Social Sciences, the site has a distant view of the public artwork Leaf on the lawn in front of the TSMC Building, and the building is expected to be completed in the autumn of 2022.

Since Madam Chou lives in the United States, and was unable to attend the groundbreaking ceremony due to the pandemic, both Wang and Chou were represented by their daughter Wang Muchun (王慕淳). During the ceremony she received on their behalf a glass model of the Hall from NTHU president Hocheng

Hong. The unique souvenir was designed and handcrafted by Huang and Shiao Ming-tun (蕭銘屯), associate dean of NTHU's College of Arts.

The Hall will archive and display the manuscripts and publications of Wang and Chou, as well as related memorabilia, and is destined to play a key role in the promotion of Taiwanese literature. The four-story building will include an exhibition hall, a lecture hall, a library, a meeting room, and an 80-seat open-air theater for bringing literature to life.



Distinguished guests at the groundbreaking ceremony for the Wang Mo-jen and Chou An-yi Hall of Literature.

Huang, the lead architect of Fieldoffice Architects, said that the building has a dynamic feel and is designed to seamlessly blend in with the surrounding hills and trees. Approaching the building from the College of Humanities and Social Sciences, you enter on the third floor, and exiting on the first floor brings you to directly to Xiangsi Lake. The design is inspired by Wang's novels, especially the tunnel in *The Lower Stratum* (1976).

President Hocheng said that Wang and Chou, both prolific writers, have used their unique talents to champion the cause of those on the lower echelons of Taiwanese society. In recognition of his extraordinary literary achievements, NTHU nominated Wang for the Nobel Prize in Literature in 2017. In addition to this building, Wang and Chou provided funds for establishing the Wang Mo-jen and Chou An-yi Lecture Series in 2014 to organize

talks and workshops by noted writers and scholars from Taiwan and abroad.

Recalling the many hardships that her father had to overcome in pursuing his career as a writer, Wang said that, in telling the story of those struggling on the lower levels of Taiwanese society during the martial law era, he stepped on the wrong feet, and in 1985 he had little choice but to flee to the United States, where he put

his creative writing on hold for the time being. In this connection, he once remarked, "Perhaps the worst thing about leaving was that in doing so I had severed my connection with Taiwan and its people, the suffering of whom I had become so familiar with and which has become my main inspiration for writing."

In the United States Wang kept a low profile, until in 2011 a student of Professor Chen Chienchung (陳建忠) of NTHU's Institute of Taiwanese literature completed a thesis on Wang, ushering in a new era of interest in Wang's work. As an expression of thanks, in 2014 Wang and Chou helped establish the Wang Mo-jen and Chou An-yi Lecture Series. In 2015 Wang received an honorary doctorate of literature from Tsinghua University.



a. The building is designed to blend into its surroundings.

b. NTHU president Hocheng Hong (right) presenting Wang's daughter Wang Muchun (王慕淳) with a glass model of the building.



NTHU STUDENT RUNS ONLINE SUMMER COURSE FOR DISADVANTAGED KIDS

Chou Chiao-chi (周巧其), a doctoral student at the Institute of Biotechnology, was born in a rural area of Taichung County, spent much of her summer vacation running summer camps for disadvantaged students. When the covid-19 pandemic began to rear its ugly head in Taiwan at the end of last spring semester, she quickly organized an online summer camp titled Something to Do This Summer, featuring volunteer teachers from all over Taiwan and even one in the United States. The camp consisted of six modules: science, dance, music, animation, programming, and fashion design. Chou said that the participants in the science module learned about



the various types of mold found in a typical household and then applied what they had learned to preparing an entry for a science fair; those in the fashion design module were guided in weaving fabric using plants and other locally sourced materials; those music module participants learned how to compose digital music;

in animation module, students learned how to create animate games; and those in programming learned how to make a blood-oxygen machine.

The summer camp began on July 19 and was completely free. Each module ran for two weeks and met three times per week, two hours each time, for a total of 12



- a. The homepage of the Something to Do This Summer website.
- b. Chou taught the participants how to cultivate mold by using the microorganisms commonly found in the home.
- c. The module Let's Make Music! was taught by Chou Hsuanhung (周宣宏), who is currently the resident composer of the Kaohsiung Symphony Orchestra.
- d. In the module MAYA Animation the kids learned how to use MAYA software to create an animation video.
- e. Wu Jiaying (吳家盈) taught the participants the basics of weaving.
- f. The module Move Your Body was taught by Wang Hsiang-ti (王湘緹).

hours. Due to the need for remote synchronization and the limited amount of materials available, each course was limited to 15 students. Enrollment was limited to students aged 12-14 from middle- and low-income households in remote areas; students with special circumstances; and the children of front-line medical staff.

Chou recalls how during her childhood she enjoyed the wonders of nature in her hometown, yet many of her classmates were so poor that they had to spend their free time picking mushrooms, for which they only earned only about NT\$14 per basket. Thus when covid-19 hits Taiwan, she saw it as a great opportunity to organize an online course for disadvantaged students in rural areas.

The first module, titled The Science Corner, was conducted

by Chou herself. Using petri dishes delivered to their homes in advance, the participants were shown how to cultivate mold by using the microorganisms commonly found at home, which they then used to produce a mini science exhibition. She was assisted by Lin Guanyu, currently a PhD candidate at Stanford University in the United States, and Lin Ziyang, a doctoral candidate at NTHU who currently writes a science column for the Mandarin Daily News.

Lin Guanyu (林冠宇) won a gold medal in the International Junior Science Olympiad competition at the age of 13, and later won gold medals in the International Physics and Geoscience Olympiads.

Despite the fact that he is currently working on his doctoral dissertation, and undeterred by the 15-hour time difference between

the US west coast and Taiwan, Lin immediately accepted Chou's invitation to teach a session on optics.

The module titled Digital Creation: p5.js and the Internet of Things was taught by Hu Youyang (胡悠揚), the co-founder of the Y2K science innovation team, and Lai Junting (賴俊廷), the founder of the Perceptual Savage science innovation team. They

taught the participants how to use the open-source JavaScript library "p5.js" to write programs. They also taught them how to make a blood-oxygen machine which displays an animated warning drawn by the student whenever the user's blood-oxygen level falls below 95%.

Fashion Design 101 was co-taught by fashion designer Wu Jiaying (吳家盈) and Chuang Ching-an (莊景安) of the Department of Arts and Design. They taught their students about different fibers, fabrics, and expressive methods. They provided the participants with a simple kit for making hand-made paper, and had them collect local weaving materials, such as bamboo.

The module MAYA Animation was taught by multimedia animation designer Yan Haoyu (顏浩宇), who taught the kids the 12 rules of animation and how to use MAYA software, enabling them to create a 10-second animation video.

The Let's Make Music module! was taught by Chou Hsuanhung (周宣宏), who has a master's in film and multimedia soundtrack from New York University, and is currently the resident composer of the Kaohsiung Symphony Orchestra. Chou taught the students about the computer software used for composing music, how it's used to edit musical compositions, and how to create mobile



phone ringtones, commercial soundtracks, and pop music.

The module Move Your Body was taught by Wang Hsiang-ti (王湘緹), who has a master's in dance from the University of Taipei. Wang taught the students about the various muscles in the body, balance, and choreography.

Chou is a student of Prof. Li Chia-wei (李家維), a distinguished professor at the Institute of Molecular and Cellular Biology. Li is planning to retire in the near future, and had already begun to reduce his student-advising duties, but he was so moved by Chou's enthusiasm that he decided to make an exception. The first time Chou met Li, she asked him what he saw as his greatest accomplishment in life, and he

still remembers how touched Chou was when he replied that it was the special course he and his colleagues at NTHU taught for aboriginal students in Pingdong in the aftermath of Typhoon Morakot in 2009.

"When I told her that real generosity means giving your best to those who need it most, rather than simply giving away whatever you no longer need to whoever happens to be around, she kind of lit up," recalls Li, who is highly impressed by the way Chou has taken his advice to heart and put it into practice, undeterred by a lack of financial resources.

All the lecturers volunteered their time; the cost of the course materials and postage was minimal, and was covered by

a donation of NT\$50,000 from art collector Chang Yamei (張雅美), plus a NT\$20,000 donation provided by Y2K. "I wouldn't think of it as a great act of philanthropy; the way I see it, when there is a need you can fulfill, you just do it," said Chou with a beaming smile.



An exhibition by Y2K founders Chou Chiao-chi (周巧其) and Hu Youyang (胡悠揚) at the National Museum of Natural Science in March 2021.

A NEW CENTER FOR INDIGENOUS SCIENCE DEVELOPMENT

As part of its ongoing efforts to enhance science education amongst Taiwan's indigenous peoples, NTHU established the Center for Indigenous Science Development (CISD) in 2019—the first of its kind in Taiwan. To provide the CISD with a dedicated space, work will soon commence on a pavilion combining indigenous bamboo craftsmanship with a modern steel frame. At the groundbreaking ceremony, numerous aboriginal elders were joined by Legislator Kao Chin Su-mei (高金素梅) in offering prayers and blessings. Expected to be completed next summer, the building will host a variety of science activities and exhibitions, and will serve as base for research and educational activities relating to Austronesian studies.

The groundbreaking ceremony was opened with a prayer led by



a. Atayal elder Fan Kun-sung (范坤松) holding up a cup of millet wine during the blessing ritual.

b. Animated model of the future home of the CISD.

Atayal elder Fan Kun-sung (范坤松), who chanted a blessing in the Atayal language for a successful completion and smooth operation. He then performed a traditional ritual in which tree branches were burned to announce that the site is about to be developed.

Also at the ceremony was President Hocheng Hong, who said that while Taiwan's indigenous peoples have long been celebrated for their rich culture and art, their equally important scientific knowledge has been largely overlooked. He pointed out that one of the purposes of the CISD is to deepen our understanding of the traditional wisdom of Taiwan's indigenous peoples, and to find ways in which it can be applied to finding effective solutions for such pressing issues as global warming and climate change.

Legislator Kao Chin said that due to the lack of a written language,



much of the wisdom of aboriginal peoples has been lost, yet much remains, the preservation of which is one of the primary tasks of the CISD, adding that aboriginal children should take great pride in their cultural heritage. In addition to calling for aboriginal languages, culture, and science to be included in the new curriculum for primary and secondary schools, she encouraged NTHU to set up a program for aboriginal youth in Hsinchu's Jianshi and Wufeng townships, modeled on the existing program for aboriginal high school students in Pingdong.

The NT\$44 million budgeted for the construction of the bamboo structure was mainly provided by the Ministry of Education and the Council of Indigenous Peoples. Department of Higher Education director-general Chu Chun-chang (朱俊彰) said that the Ministry of Education attaches great importance to this project, and that the building itself will serve as a model for future projects of a similar type. Furthermore, the

Ministry of Education has arranged a variety of activities promoting aboriginal culture as part of its 2021 Aboriginal Culture and Education Program.

CISD director Fu Li-yu (傅麗玉) said that the new building will be located behind the Education Building on the main campus, and all of the makino bamboo used in its construction will be sourced from Jianshi Township in Hsinchu County. This one-story building will include a basement, with space for classrooms, research rooms, and an exhibition hall, as well as an adjacent traditional granary and watchtower. She also noted that it will be the country's first aboriginal bamboo structure built with an official building permit.

Fu said that she is especially grateful to the building's architect, Lin Chih-cheng (林志成), for coming up with a design which not only looks authentic, but also meets building regulations. In the process of designing the building Lin consulted with both indigenous elders and bamboo architecture

specialists to pioneer a whole new construction technique for the project. The bamboo used in the building will be pretreated by using a process which includes both boiling and roasting, for additional strength and durability, and for protection from insect damage. After the building is completed and in use for a certain number of years, bamboo sections can be individually replaced, making the building easier to maintain. Because bamboo is hollow, it has excellent insulation properties, and it's hoped that the development of this new construction method will help to revive Taiwan's bamboo industry.

Fu said that the first floor will have a research room, a meeting room, and a classroom with a capacity of 50 people. There will also be an augmented reality installation, allowing visitors to download an app to their tablet or mobile phone, whereupon Giwas, the heroine of Go Go Giwas, an animated science education film produced in Taiwan, along with her sidekicks, take them

- c. The groundbreaking ceremony for the future home of the Center for Indigenous Science Development (CISD).
- d. The ceremony included a traditional ritual in which tree branches were burned to announce that the site is about to be developed.
- e. Legislator Kao Chin said that aboriginal children should take great pride in their cultural heritage.
- f. CISD director Fu Li-yu has been promoting aboriginal science education for over 20 years.





on a voyage of discovery featuring the traditional wisdom of Taiwan's indigenous peoples.

Amongst NTHU's various projects promoting indigenous science education and research over the past 20 years is The Flying Squirrel Tribe science education website. The Go Go

Giwas animation series, which showcases the traditional wisdom and ecological perspectives of Taiwan's aborigines, won a Golden Bell Award in 2016 and was again nominated in 2019.

Fu said that since its establishment two years ago, the CISD has trained some 600 elementary and

middle school teachers in the use of science modules highlighting aboriginal culture and scientific knowledge.



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NATIONAL TSING HUA UNIVERSITY NEWSLETTER

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PUBLISHED BY OFFICE OF THE SECRETARIAT

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