

清華

NATIONAL
TSING HUA
UNIVERSITY

NEWSLETTER

April 2022 | Vol. 16 | No. 2



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NTHU RESEARCH TEAM DEVELOPS 3D IMAGING SYSTEM FOR CANCER DIAGNOSIS

When a malignant tumor is detected in the body, the first step in treatment is to make an image to assess its size and character, but the technology currently in use only provides an image of a thin cross-section of the tumor. To solve this limitation, JelloX Biotech, founded by a research team composed of members of the Brain Research Center and the College of Life Science, has recently developed the world's first 3D digital imaging system. In conjunction with an artificial intelligence (AI) diagnosis platform, the system creates a 3D color image of the sampled tissue, providing detailed information on the depth, distribution, and biomarkers of cancerous cells, thereby greatly improving the accuracy of early-stage cancer screening and making targeted therapy more accurate.

Prof. J.L. Yang (楊嘉鈴) of the Institute of Biotechnology said that pathologists usually inspect pathological sections with an electron microscope, which has high resolution; however, due to the opaqueness of the tissue, it only works when the tissue is cut very thinly, about 0.0005 cm, which is 1/20 of the diameter of a human hair. Thus assessing a tumor can be quite difficult, so much so that it is often necessary to have the assessment made by two or three pathologists working together. Moreover, although the accuracy can be improved by taking multiple sections, this increases the cost, and the disconnected 2D images can still be difficult to interpret.

This groundbreaking 3D imaging technology is based on an anatomic tissue-clearing solution for high-resolution 3D confocal imaging of

thick biological samples developed by Prof. Chiang Ann-shyn(江安世), the director of NTHU's Brain Research Center. Prof. Yang said that immersing the pathological tissue in the solution renders it translucent, making it possible to create an image that is far more detailed than one produced using the current method. Once the 3D image is made, it is scanned at high speed and then assessed using an AI platform. The entire process takes only two days, compared to a week for the current method.

In their newly established laboratory at the Hsinchu Biomedical Science Park, JelloX CEO Lin Yen-ying (林彥穎) points to a color image on a computer screen and explains that the white border is the molecular marker of breast cancer cells. According to Lin, their system can also detect lung cancer,

- This technology is based on an anatomic tissue-clearing solution for high-resolution 3D confocal imaging developed by Prof. Chiang Ann-shyn (江安世), the director of NTHU's Brain Research Center.
- The 3D imaging system displaying the molecular markers of breast cancer cells.
- In conjunction with an AI diagnosis platform, the system provides detailed information on the depth, distribution, and biomarkers of cancerous cells.





Team members (from right): Prof. Chiang Ann-shyn (江安世), JelloX CEO Lin Yen-ying (林彦穎), Prof. J.L. Yang (楊嘉鈴), and Prof. Chang Dah-tsy (張大慈).

liver cancer, colorectal cancer, esophageal cancer, and oral cancer, all at an early stage; it also can be used to greatly improve the effectiveness of immunotherapy for patients with advanced cancer.

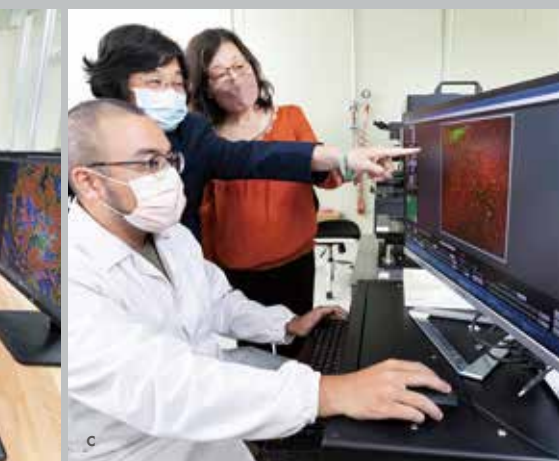
Lin said that their 3D digital imaging system won the Ministry of Science and Technology's 2021 Future Tech Award, and has already been used in clinical research at several hospitals, including Chang Gung and Chi Mei. The system

is expected to be used for actual diagnosis in the near future.

Lin received his Ph.D. from NTHU's Department of Electrical Engineering, and is now an assistant professor at the Institute of Photonics Technology and a researcher at the Brain Research Center. His specialization is the application of AI to biomedical technologies. He says that their system makes use of seven patented core technologies, and that for most of these the authorization to use them was attained by NTHU, which is now making arrangements for commercial production. The interdisciplinary research team consists of members from various departments at NTHU, including

Life Sciences, Computer Science, Power Mechanical Engineering, Biomedical Engineering and Environmental Sciences.

Prof. Chang Dah-tsy (張大慈) of the Institute of Molecular and Cellular Biology was so inspired by the project that she retired early to serve as the chief strategy officer at JelloX. She says that developing their imaging system required assembling an interdisciplinary team of scientists, physicians, and AI engineers, and that they could not have succeeded without the assistance provided by NTHU's Operations Center for Industry Collaboration, the Creativity Garage, and the Tsing Hua Entrepreneur Network.

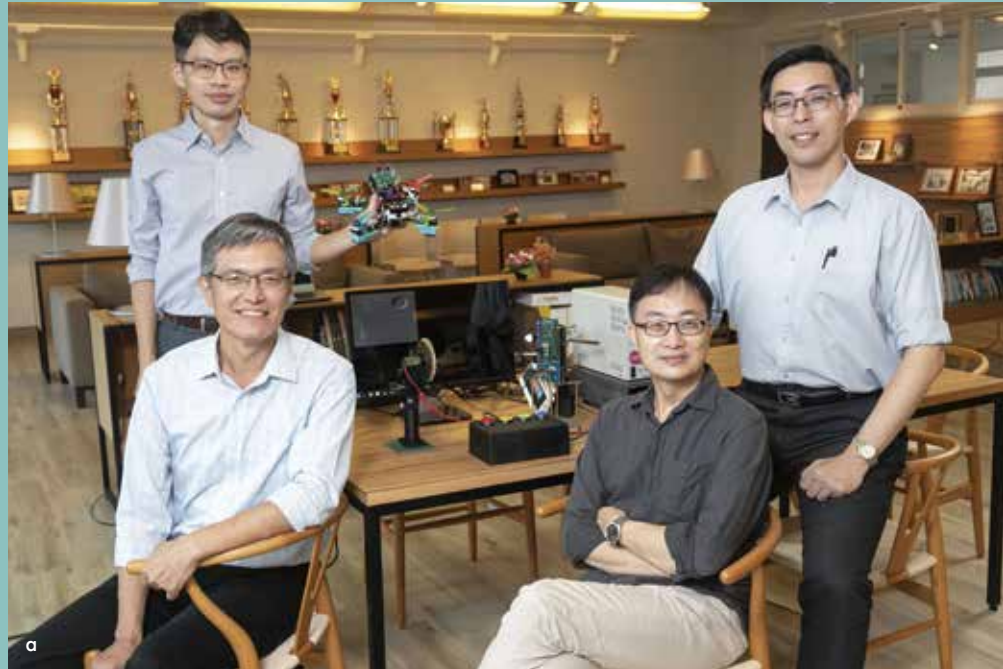


NTHU RESEARCHERS DEVELOP BIOMIMETIC EYE

An interdisciplinary research team in electrical engineering and life sciences has developed a biomimetic eye, which works in conjunction with AI to teach drones, robots, and self-driving cars to see like insects. Using little more than a low-power chip and a lens, it can quickly identify and track objects and avoid obstacles, making it suitable for such applications as automated search and rescue, unmanned inspection, monitoring, medical care, and agriculture.

The team's bionic eye has been featured in a number of top international journals, including *Nature Electronics* and the *Journal of Solid State Circuits*, and has won the Ministry of Science and Technology's 2021 Future Tech Award.

The team is headed by Prof. Tang Kea-tiong (鄭桂忠) of the Department of Electrical Engineering. According



to Tang, computerized dynamic vision is akin to a motion picture in that it is composed of static images presented in rapid succession; however, the process via which the computer stores each digital image and then compares it with the previous one, is slow, power-hungry, and memory-intensive, making such a device too heavy for use in a drone.

To solve this problem, the team was joined by Prof. Lo Chung-chuan (羅中泉) of the Department of Life Sciences, who has extensive knowledge of the visual and spatial perception of insects. Inspired by the vision of fruit flies and bees, he devised the "optical flow method," which uses the flow of light to judge the distance and speed of surrounding objects, so that

- a. Team members from left to right: Associate Prof. Lu Ren-shuo, (呂仁碩) Prof. Hsieh Chih-cheng (謝志成), Prof. Lo Chung-chuan (羅中泉), and Prof. Tang Kea-tiong (鄭桂忠).
- b. The interdisciplinary research team has developed a biomimetic eye for use in drones, robots, and self-driving cars.
- c. Lo Chung-chuan demonstrating how drones can be taught to see like insects.



obstacles can be quickly identified and avoided simply by capturing their contours and geometric features.

Prof. Lo explains that the energy consumption of the bionic eye is similar to that of a person walking along the road, simply noticing whatever buildings, signs, people, or parked cars are encountered along the way, which requires much less mental effort than assessing the speed of a rapidly approaching vehicle. Similarly, the bionic eye only pays close attention to moving objects, which both speeds up image processing and reduces power consumption.

Prof. Tang used an algorithm based on the principles of "pruning" and "sparseness" to train the bionic eye to mimic the visual processing of an insect eye, in which the unimportant parts of the calculation weight are set to zero and ignored, so that "the more zeros there are, the faster the calculation becomes, and the less power it consumes." Another feature of their bionic eye is that it directly performs calculations in the memory, without having to transfer data back and forth between the memory and the CPU, which can reduce power consumption by 90%.

Prof. Hsieh Chih-cheng (謝志成) of the Department of Electrical Engineering was in charge of developing the algorithm used in the sensor, which functions like



Hsieh Chih-cheng (right) developed the algorithm which allows the bionic eye to only pay close attention to moving objects, and Lu Ren-shuo (left) designed the neural-like chip framework which integrates the software and hardware.

the type used in surveillance and access control systems, in which a simple lens can differentiate between a person and a dog; once the camera determines that a person is there, it sends the data obtained from the facial characteristics to the computer's recognition system to determine who it is. Since there is no need to analyze all the information of each frame in detail, only a few microwatts of electricity are consumed, which is about one millionth of the electricity consumption of a light bulb.

Associate Prof. Lu Ren-shuo (呂仁碩) of the Department of Electrical Engineering was in charge of designing the neural-like chip framework which integrates the software and hardware. During the design process, the team collaborated with TSMC and other

leading companies in IC design to develop a new generation of AI chips. Associate Prof. Lu said that the master chips for bionic drones are currently being developed.

The team was formed about four years ago, but it took some time for the members to become familiar with each other's fields. For example, whenever Prof. Lo began to explain the intricate workings of the fruit fly's neural system, the specialists in electrical engineering would always begin by asking "how many bits is that?"

Nonetheless, Prof. Lo's romantic enthusiasm eventually rubbed off on the practical-minded electrical engineers. The team is now planning on adapting their invention for use in stealth drones and a search-and-rescue device small enough to search for survivors trapped in a collapsed building.

A GOLD MEDAL IN SUSTAINABILITY FOR NTHU

NTHU has recently become the first university in Asia to receive a gold rating in the Sustainability Tracking, Assessment, & Rating System (STARS) run by the Association for the Advancement of Sustainability in Higher Education (AASHE).

STARS, an internationally recognized initiative for rating the environmental credentials of colleges and universities worldwide, was launched in 2006. It released its first annual ratings in 2010, providing a transparent, self-

reporting framework for measuring sustainability performance based on comprehensive and consistent criteria.

Among the more than 1,000 participating institutions of higher education worldwide, only ten have been rated platinum—the highest STARS rating—including Stanford University, the University of California, Berkeley and Cornell University. Among the 137 schools that have received the gold rating are the Massachusetts Institute of Technology, Columbia University,

Yale University, Princeton University, Penn State University, Northwestern University, the University of Illinois at Urbana-Champaign, the University of British Columbia in Canada, and University College Cork in Ireland. Another 159 universities have received the silver rating, and 41 have received the bronze rating.

A total of 20 universities in Asia are participating in STARS, including 5 universities in Taiwan, but prior to this year none had received higher than the silver rating. In



Group photo at the press conference (left to right): Dean of General Affairs Yan Dung-yung (顏東勇), Vice President for Academic Affairs Wu Yung-hsien (巫勇賢), Senior Vice President Lyu Ping-chiang (呂平江), Senior Vice President and Chief Sustainability Officer Tai Nyan-hwa (戴念華), NTHU president Hocheng Hong (賀陳弘), Senior Vice President Chen Sinn-wen (陳信文), Chief of Staff King Chung-Ta (金仲達), Dean of Student Affairs Wang Jyun-Cheng (王俊程), and Sustainability Office Director Lin Fu-ren (林福仁).

its very first year as a participant, however, NTHU has been awarded the gold rating, ranking among the top universities in the world for sustainability.

Sustainability Office director Lin Fu-ren (林福仁) said that STARS is divided into five categories: academic (teaching and research), participation (teachers, students, and the general public), campus management (buildings, energy use, procurement, transportation, refuse, and wastewater treatment), administrative planning (diversity and equality, financial investment, and work environment), and innovative leadership. Participating schools have to provide information on 113 major items and 1,088 minor items, supported by detailed documentation.

Director Lin said that NTHU's highest scores were in the academic category, since the university offers a total of 517 undergraduate and 216 graduate courses related to sustainability, which together amount to 13% of NTHU's total curriculum. In



a. President Hocheng said that receiving the STARS gold rating is an important milestone in NTHU's ongoing efforts in the area of sustainability.
 b. Tai Nyan-hwa was the first chief sustainability officer to be appointed in Taiwan.
 c. Lin Fu-ren said that NTHU was rated particularly high in the academic category.
 d. Student club NTHU Racing with the electric race car they developed.

addition, an increasing proportion of the research conducted at NTHU is directly related to the goals of sustainable development promulgated by the United Nations (UN), which has long been striving to find practical solutions to the environmental challenges facing mankind at this critical juncture in the history of the human race.

President Hocheng Hong said that NTHU was the first university in Taiwan to appoint a chief sustainability officer, a position which is concurrently held by one of the senior vice presidents. Moreover, each administrative

and academic department has appointed a sustainability officer, all 26 of whom belong to the Sustainability Committee, which meets every two months to discuss the latest developments and to coordinate their efforts. Furthermore, NTHU was the first university in Taiwan to encourage graduating students to sign the school's Declaration on Social and Environmental Sustainability.

President Hocheng said that receiving the STARS gold rating is an important milestone in NTHU's ongoing efforts in the area of sustainability, explaining that, "The natural beauty of the campus goes hand-in-hand with the principles of sustainability, and it is especially important to encourage teachers and students to think like global citizens and to share their environmental awareness with the larger society."

NTHU senior vice president and chief sustainability officer Tai Nyan-



hwa (戴念華) said that NTHU's school spirit can be encapsulated in the adage "Actions speak louder than words," which fits nicely with STARS's emphasis on hard data and practical results. Moreover, the year-long process of providing the detailed information required for participation in STARS was a valuable learning experience which has helped NTHU to rectify various deficiencies and to more completely implement international standards of sustainability.





According to Director Lin Fu-ren, in addition to holding competitions in which students propose ideas for making the campus more sustainable, NTHU encourages students to participate in sustainable development projects off campus. For example, in 2015 the KhuiMng Studio at NTHU joined hands with the Hsinchu City Government to launch the East Gate Market Revitalization Project, which has assisted young entrepreneurs in setting up shops

and businesses in an underused urban market. Moreover, with support provided by the Ministry of Science and Technology and the Ministry of Education, the Sprout Project at NTHU has been facilitating an economic development plan focusing on the communities located in the watershed of the Youluo River (Jianshi, Hengshan, Qionglin,

Zhubei) in Hsinchu County, as a model of sustainable urban and rural development based on ecological principles.

In addition to the impressive STARS rating, last November NTHU was awarded the Taiwan University Sustainability Award by the Taiwan Institute for Sustainable Energy (TAISE), winning the highest honor in the comprehensive evaluation.

Partial list of the STARS ratings for 2022

RATING	SCHOOL
 Platinum (10)	Stanford University (USA)
	Cornell University (USA)
	University of California, Berkeley (USA)
	Massachusetts Institute of Technology (USA)
 Gold (136)	Yale University (USA)
	Penn State University (USA)
	NTHU (Asia's first gold)
	Northwestern University (USA)
	Princeton University (USA)
	Columbia University (USA)
	University of Illinois at Urbana-Champaign (USA)
	University of California, Los Angeles (USA)
	Carnegie Mellon University (USA)
	University of British Columbia (Canada)
 Silver (159)	University College Cork (Ireland)
	Boston University (USA)
	University of Sydney (Australia)
 Bronze (41)	University of Toronto (Canada)
	University of Delaware (USA)
	University of Wyoming (USA)



e. Participants in NTHU's East Gate Market Revitalization Project.

f. An impressive feast at Dashan Beiyue, a restaurant started by NTHU alumni at an abandoned primary school in Hsinchu.

NTHU RETAINS THE MEIZHU TROPHY

The 54th annual Meizhu Tournament between NTHU and National Yang Ming Chiao Tung University (NYCU) came to a dramatic conclusion on the evening of February 27th with victories for NTHU's men's and women's volleyball teams, making NTHU the overall winner in this year's event. As a result, the Meizhu trophy will remain at NTHU.

The volleyball finals were held at the NTHU Gymnasium with about a thousand spectators in the stands and another 1,600 watching the live broadcast. The audience's thunderous cheers alternated with utter silence as all eyes remained fixated on the movement of the volleyball.

NTHU president Hocheng Hong said that this was the most exciting Meizhu Tournament he has ever been to. He thanked all the participants, especially the NTHU Cheerleading Squad for their



rousing cheers at just the right moment.

First came the men's volleyball match, and the NTHU team came out on top with a 3 to 1 victory.

Observing from the stands, President Hocheng said that he was proud of their top-notch performance, winning attitude, and skillful moves, which were virtually free of error.

Next came the women's volleyball match, and the NTHU team won three sets in a row, making it look as easy as splitting bamboo, clinching the Meizhu trophy for NTHU.

This year's Meizhu Tournament was held at NTHU, and included ten official scored competitions, viz., table tennis, tennis, baseball, men's volleyball, women's



- The NTHU women's volleyball team came through with an impressive victory.
- Mei Lingyin (梅齡尹), captain of the NTHU women's volleyball team, receiving the Meizhu trophy on behalf of NTHU.



volleyball, women's basketball, men's basketball, badminton, bridge, and chess. In addition, there were eleven other unscored exhibition matches, including soccer, kendo, archery, softball, go, and women's table tennis. NTHU received one point each for its victories in badminton, baseball, women's basketball, men's volleyball, and women's volleyball, and an additional half point for its draw in chess, bringing its score to 5.5 points out of 10—a narrow

- c. After the tournament, President Hocheng personally thanked the NTHU Cheerleading Squad for their rousing cheers at just the right moment.
- d. The NTHU men's volleyball team was in top form for the tournament.
- e. The NTHU women's volleyball team came through with an impressive victory.
- f. Members of the Meizhu steering committee celebrating with a leap, along with (starting with 4th from left) NTHU president Hocheng Hong, Dean of Student Affairs Wang Jyun-Cheng (王俊程), and Director of Extracurricular Activities Wu Shun-chi (吳順吉).

victory if there ever was one.

The full-scale Meizhu Tournament was not held for the past three years due to the Covid-19 pandemic and a dispute over the rules.



GREAT EXPECTATIONS AT THE OPENING CEREMONY OF THE COLLEGE OF SEMICONDUCTOR RESEARCH



The opening ceremony of NTHU's College of Semiconductor Research (CoSR) was held on December 27th. Among the distinguished guests were ROC president Tsai Ing-wen (蔡英文), Minister of Education Pan Wen-chung (潘文忠), Hsinchu mayor Lin Chihchien, and

Powerchip Technology Corporation CEO Frank Huang (黃崇仁). During the ceremony, NTHU president Hocheng Hong said that the semiconductor industry plays a key role in Taiwan's economy, and that specialized education is essential to maintaining its competitive edge; thus the establishment of the

CoSR is a major milestone for both NTHU and the nation.

The CoSR is headed by Academia Sinica fellow Burn Lin (林本堅), whose research in immersion lithography technology has had a major impact on the development of the semiconductor industry worldwide. Lin has formulated

an approach to education emphasizing specialization, generalization, and innovation, the latter of which was emphasized in the speeches of Presidents Tsai Ing-wen and Hocheng Hong.

a. ROC president Tsai Ing-wen (蔡英文) (left) and NTHU president Hocheng Hong pointed out the key role of innovation.

b. President Hocheng (right) presenting President Tsai with an 8-inch silicon wafer imprinted with her photo in laser relief.



President Tsai said that the CoSR is the fourth such college recently established in Taiwan, and that she has attended each of their opening ceremonies as a way of underscoring the nation's emphasis on industry-university cooperation and education in semiconductor technology. The challenges brought about by the Covid-19 pandemic and the changing global economic situation have highlighted the importance of Taiwan in the global supply chain, especially regarding the high-tech industry. At the same time, making the most of the present situation to enhance semiconductor education and to accelerate the development of related

R&D requires close cooperation between industry, government, and academia, especially in terms of strengthening the competitiveness of Taiwan's semiconductor industry.

President Tsai said that by virtue of its long-standing strengths in electrical engineering, computer science, materials science, and machinery, Tsing Hua University is ideally situated to collaborate with the semiconductor industry in education and research, an arrangement which affords a high level of flexibility. She also said that each of Taiwan's four colleges of semiconductor research has its own "secret weapon," and that at NTHU Dean Lin is the secret weapon!

In his speech, President Hocheng emphasized the importance of the semiconductor industry to national security. He further added that specialized education is essential to maintain the industry's competitive edge and to cultivate the next generation of experts, for whom no challenge is insurmountable.

President Hocheng pointed out that NTHU is the only university in greater China that has three Nobel Prize winners among its alumni. Moreover, for the past decade, NTHU has been giving increased emphasis to interdisciplinary education and innovation, with the result that around a quarter of its graduates have a double



specialization—about the same as the California Institute of Technology. With the establishment of the CoSR, Tsing Hua is set to become a leading player in semiconductor research.

President Hocheng further pointed out that the greatest strength of the CoSR is Dean Lin, whose remarkable achievements in both industry and academia have made him the Einstein of semiconductor technology. It is due to Lin's reputation that CoSR's establishment has attracted so much attention from domestic and foreign media, including the Japanese newspaper Asahi Shimbun. President Hocheng also added that: "The future of semiconductor innovation will soon become manifest at NTHU!"

During his speech, Dean Lin pointed out that it is essential for Taiwan to train specialists capable of meeting the challenges posed by the rapid pace of development in the semiconductor industry, and that this is the central mission of the CoSR.

The CoSR has four programs, viz., components, design, manufacturing, and materials. After the admission criteria were announced, the response was very enthusiastic. A total of more than 400 university graduates applied, and the first batch of incoming students consists of 80 master's students and 12 doctoral



Minister of Education Pan Wen-chung (潘文志) (right) and Hsinchu mayor Lin Chihchien on stage at the opening ceremony of the CoSR.

students; recruitment of the next class of doctoral students is currently underway. While some of the students in the first batch will commence their studies in February, most will enroll in August.

Dean Lin had a special word of thanks for the eleven enterprises that have provided both funding and faculty for the CoSR: the Taiwan Semiconductor Manufacturing Company, the Powerchip Semiconductor Manufacturing Corporation, GlobalWafers, Unimicron, United Microelectronics, Vanguard International Semiconductor Corporation, Novatek Microelectronics, Nanya Technology, Micron Technology, and Tokyo Electron. He also announced that matching funds will be provided by the National Development Fund of the

Executive Yuan.

With the combined funding provided by government and business, the CoSR has recruited an impressive faculty, consisting of 40 full-time and jointly appointed instructors, including top scholars and industry leaders from the United States and Japan.

TSING HUA UNIVERSITY HOSPITAL GETS THE GO-AHEAD FROM THE MINISTRY OF HEALTH AND WELFARE

On March 14, the Ministry of Health and Welfare approved the plan to establish the Tsing Hua University Hospital in Taoyuan. To be located in the Taoyuan Aerotropolis being built next to the Taoyuan Airport, the teaching hospital and medical complex will have a total of 910 beds, including 200 general acute care beds in the initial stage. In addition to serving Taoyuan and the surrounding areas, the hospital will make the most of its convenient location by

catering to the needs of medical tourism. By adopting the BOT (build, operate, transfer) model, the hospital will be established without government funding, and is expected to be completed in 2027.

On a related note, NTHU's plan to establish a post-baccalaureate program in medicine was approved by the Ministry of Education in September of 2021; the first batch of 23 state-financed students will be enrolled in August of this year, and will eventually

do their internships at the new hospital. NTHU president Hocheng Hong said that the establishment of the hospital and the program in medicine will usher in a new era of medical science at NTHU, very much in consonance with the school motto "Self-discipline and social commitment." He further added that the hospital will serve as a center for primary telemedicine in Taiwan.

In April 2019, NTHU and the Taoyuan City Government agreed on a plan to jointly develop a



With much impetus provided by NTHU president Hocheng Hong, the construction of the Tsing Hua University Hospital is expected to begin at the end of 2022.

medical complex as part of the Taoyuan Aerotropolis to be built next to the Taoyuan Airport. On March 15, Taoyuan mayor Cheng Wen-Tsan (鄭文燦) said that the Taoyuan City Government has given its full backing to the project, including the plan to expand the number of acute care beds in stages, eventually reaching the goal of 499 general acute care beds approved by the Taoyuan Department of Public Health.

Mayor Cheng said that there are no large-scale hospitals in the Luzhu, Dayuan, Guanyin, and Qingpu areas of Taoyuan, and that the new hospital will fill this pressing need, while concurrently serving as a convenient hub for medical tourism.

In addition to the general acute care beds, the hospital will also have an intensive care unit, a respiratory care unit, negative pressure isolation rooms, and a psychiatric unit for both inpatients and outpatients, all of which will be gradually expanded over a number of years to reach a total capacity of 910 beds.

Referring to the famous lecture on the advent of atomic microminiaturization titled "There's Plenty of Room at the Bottom," given by Nobel laureate Richard Feynman in 1959, President Hocheng said that NTHU has become a key player



a. The hospital will be located a mere 400 meters from the Hengshan Station (A16) of the Airport MRT, only two MRT stops from both the airport and the Taoyuan Station of the high-speed rail line.
b. The site of the future hospital.

in the development of innovative primary medical technology and services, and that its efforts in this area reflect Taiwan's "new southbound policy."

President Hocheng stated that the Tsing Hua Hospital will be a world-class facility that makes abundant use of the many medical-related materials and technologies

developed at NTHU in such areas as dental and bone materials, prosthetics, pharmaceuticals, nuclear medicine, neurology, genetics, artificial intelligence (AI), the Internet of Things, and big data, making it "a paragon of cross-disciplinary medicine, and the hospital of the future."

President Hocheng also said that, in addition to providing first-class medical care for the people of Hsinchu, Taoyuan and Miaoli, the Tsing Hua Hospital will make the most of its location to develop a telemedicine system for providing international diagnostics and surgery services to various Asian cities, such as Jakarta, New Delhi, Mumbai, and Yangon.

Although it is technically a public construction project, no government funding will be required. President Hocheng said that the hospital will have the highest cost-performance ratio of all the university-affiliated hospitals in Taiwan, and its completion will constitute a major contribution to medical care in Taiwan and beyond.

The hospital will be built on 7.2 hectares of land provided by Taoyuan City, of which 5 hectares will be used for the hospital itself, while the remaining 2.2 hectares will be used for the affiliated teaching and research facilities, including classrooms, research rooms, laboratories, and



dormitories. The two sections will be connected by an underground passage to be built as part of the first phase of the Taoyuan Aerotropolis.

The project is being overseen by NTHU senior vice president Lyu Ping-chiang, who said that the BOT plan has already been approved by the Ministry of Education, adding that a number of well-known hospitals have expressed initial interest, and that the construction firm for the

project will be selected in the near future. The construction cost is estimated at NT\$8.5 billion, and the preliminary work is expected to start by the end of this year.

Senior Vice President Lyu (呂平江) said that the hospital will be located a mere 400 meters from the Hengshan Station (A16) of the Airport MRT, only two MRT stops from both the airport and the Taoyuan Station of the high-speed rail line. The same MRT line also connects with the Zhongli

c. Diagram showing the hospital (left) and its affiliated teaching and research facilities (right).

d. NTHU Senior Vice President Lyu Ping-chiang (呂平江) showing the excellent location of the hospital.

e.f. Simulation of the Tsing Hua University Hospital.



Railway Station, and the site will also be served by the Green Line soon to be added to the Airport MRT. In addition to the residents of Dayuan, Luzhu, Guanyin, Xinwu and other small towns in the area, the hospital will also serve the 250,000 projected residents of the Taoyuan Aerotropolis.

Senior Vice President Lyu noted that the hospital will provide a range of specialty medical care, including nuclear medicine, neurology, gene therapy, and immunotherapy, the last two of which are currently unavailable in Taiwan. Tsing Hua University has the only research reactor in Taiwan. In cooperation with the Taipei Veterans General Hospital (TVGH), the reactor was converted for use in boron neutron capture therapy (BNCT), and now provides treatment for brain, head, and neck cancer. To date, the treatment has provided a new lease on life to over 200 cancer patients from around the world, including Spain, Brazil, Australia, Singapore, and Japan.

NTHU senior vice president Tai Nyan-hwa (戴念華) said that the Department of Medical Science was established 12 years ago, and has recently added two doctoral programs, viz., smart biomedicine and precision medicine. The department has also paved the way for the post-baccalaureate program in medicine, which has appointed 180 NTHU faculty members already teaching related subjects, and 71 full-time professors and assistant professors. An additional 87 practicing physicians from leading medical centers throughout Taiwan have also been appointed to teach on a part-time basis.

The plan to establish the hospital was approved by the Ministry of Education in July of 2021. Senior Vice President Lyu indicated that the hospital will provide medical students at NTHU with numerous internship opportunities.

Senior Vice President Lyu also mentioned that the hospital will make good use of artificial

intelligence and big data, and will also make extensive use of the latest medical technology and telemedicine, providing comprehensive and state-of-the-art medical care to locals and visitors alike, while also serving as a world class teaching hospital.



WORK BEGINS ON NTHU'S CHUN-SHAN UMC CONCERT HALL

In early 2019, NTHU announced a plan to convert the aging Main Auditorium into a world-class concert hall to commemorate former NTHU president Shen Chun-shan (沈君山), who passed away in 2018. The project has been made possible by a generous donation from the United Microelectronics Corporation (UMC), as well as donations from numerous business leaders and alumni. The groundbreaking ceremony was held on January 7, 2022, and the Chun-shan UMC Concert Hall will open its doors in mid-2024. The Hall is expected to become one of the premier concert venues in Northern Taiwan.

The Concert Hall was designed by Albert Xu (徐亞英), an internationally renowned master of architectural



acoustics, who has transformed the traditional layout of the auditorium into a vineyard-style seating arrangement in which the seats are arranged radially around the stage, providing the audience with a more immersive listening experience. The plan also includes elevating the roof, nearly doubling

the volume of the hall, bringing the reverberation time into the two-second range required for a first-class concert hall, and providing the hall with perfectly balanced acoustic qualities.

The renovations include the use of steel framing to provide structural reinforcement for the entire building, the replacement of the lighting system, the addition of rehearsal and dressing rooms,

- The groundbreaking ceremony for the Chun-shan UMC Concert Hall.
- President Hocheng said that the project is being carried out by same team that built the National Kaohsiung Center for the Arts (Weiwuying).
- Lo Hsing-hua (羅興華) said that his design is sure to bring a brand new experience in terms of architecture, acoustics, and lighting.
- Co-president Chien said that the Tsing Hua Auditorium holds countless memories for Hsinchu residents.
- The Concert Hall's exterior will retain the distinctive trim appearance of the original auditorium.
- A cross-section of the Chun-shan UMC



and making the building wheelchair accessible. The Concert Hall will have a total of 1,283 seats, which is about the average size of first-rate concert halls worldwide. The exterior will retain the distinctive trim appearance of the original auditorium.

During the groundbreaking ceremony, NTHU president Hocheng Hong said that the Auditorium, which was built in 1973, holds a special place in the memories of countless alumni, since for nearly half a century it served as the main venue for ceremonies, performances, and speeches. However, due to the growing size of the university, the auditorium could no longer accommodate the entire student body, so the decision was made to repurpose it into a top-notch concert hall.

President Hocheng pointed out that Shen Chun-shan played a key role in the reestablishment of NTHU in Taiwan; as a classic renaissance man, he was also well versed in both science and the



humanities, and an accomplished bridge and go player. As such, President Hocheng maintained that naming the Concert Hall after Shen was a fine way to commemorate one of the most outstanding figures in the history of NTHU.

President Hocheng said that the project is being carried out by the same team that built the National Kaohsiung Center for the Arts (Weiwuying) (衛武營), including architect Lo Hsing-hua (羅興華) and his lighting and sound crew. Albert Xu was the acoustic designer of the Weiwuying and the Philharmonie Luxembourg in Europe, and for many years he has

worked with prominent architects worldwide, including I.M. Pei (貝聿銘); his expertise in acoustic design has played a key role in the project right from the start.

President Hocheng also thanked all the donors from various walks of life who have contributed to the project. In addition to the major funding provided by UMC, he thanked Alumni Association president Tsai Jinbu (蔡進步), who donated the funds for the VIP room, which will be named after his parents, Lo, who donated the design, and former NTHU president Liu Chung-laung (劉炯朗), who made the first donation.



UMC co-president S.C. Chien (簡山傑) said that his company's donation is meant to both commemorate Shen and thank NTHU for its many contributions to education and national development. He added that UMC owes a debt of gratitude to NTHU, which for many years has been a primary source of outstanding personnel for Taiwan's semiconductor industry. He also said that the Concert Hall is sure to become a major draw for music lovers in Hsinchu and beyond.

S.C. Chien noted that he has lived in Hsinchu for more than 30 years, and that this is where his three children grew up; they have been to the Tsing Hua Auditorium many times to participate in various activities. Thus, he is pleased to play a part in the repurposing of this building which holds countless memories for so many Hsinchu residents.

Lo Hsing-hua mentioned that the main challenge in the architectural design was figuring out the original design of the auditorium, and then deciding which elements to retain and which ones to remove, a process that required twice as much time and effort as building a new concert hall. Fortunately, he has an abundance of related experience, including the renovation of the Metropolitan Hall and the expansion of the National Palace Museum, both in Taipei; his design is sure to bring a brand-new experience in terms of architecture, acoustics, and lighting.

The director of the Preparatory Office for the Concert Hall is Victoria Wang (王文儀), who graduated from NTHU's Department of Foreign Languages in 1986, and formerly served as the artistic director of the National Taichung Theater. She said that she is particularly



grateful for the artistic inspiration she received at NTHU, and that the Main Auditorium holds a lot of significance amongst the entire Tsing Hua community, pointing out that nowadays such renovations generally include many different upgrades. Wang expects the Concert Hall to be the best venue in Taiwan for classical music.

"Before long, in addition to the library and labs, Tsing Hua students will also have numerous opportunities to recharge their souls by listening to live classical music," commented Wang



- g. The Concert Hall will have a vineyard-style seating arrangement.
- h. In front of the Main Auditorium, left to right: UMC co-president S.C. Chien (簡山傑), NTHU president Hocheng Hong, and Alumni Association president Tsai Jinbu (蔡進步).
- i. The groundbreaking ceremony for the Chun-shan UMC Concert Hall.



with a smile. She said that in addition to concerts by world-class orchestras, the Hall will also regularly be used for free concerts, and will host concerts put on by the Department of Music. Wang hopes that the completion of the Concert Hall will usher in a new era for NTHU, in which frequent attendance at concerts put on by world-class performers becomes part of the standard college experience of each and every Tsing Hua student.

As a way of getting the ball rolling, the Preparatory Office has arranged four concerts for the first half of this year, to be held at various existing on-campus venues, including the International Conference Hall at the Learning Resource Center (the Macronix Building), the Sun Yun-suan Memorial Center in the TSMC Building, and Lecture Hall A on the Nanda Campus of NTHU. The first program, titled "Paganini's Master

and Lover—A Duet for Violin and Guitar," was held on February 24th. The performers were violinist Li I-ching (李宜錦), the former concertmaster of the National Symphony Orchestra, and guitarist Su Meng-feng (蘇孟風), winner of best instrumental at the Golden Melody Awards.

NTHU LAUNCHES THE NEIGHBOR PROJECT FOR TAIWANESE STUDENTS RETURNING FROM UKRAINE

Due to the armed conflict between Russia and Ukraine, numerous Taiwanese nationals studying overseas have decided to return to Taiwan. In response, NTHU has launched the Neighbor Project, which allows graduate and undergraduate students returning from Ukraine to temporarily continue their studies in Taiwan.

The Neighbor Project has been

jointly launched by NTHU president Hocheng Hong and W. John Kao (高為元), who will take over as president in May of this year, and is designed to help Taiwanese students affected by the armed conflict in Eastern Europe continue their education.

President Hocheng explained that Taiwanese citizens live in all corners of the global village, and when they run into difficulties we

need to extend a helping hand in whatever way we can.

Similarly, in early 2020, as universities around the world began to close their campuses in response to the Covid-19 pandemic, NTHU set up the Weigong Academy, a special program allowing overseas Taiwanese students, as well as those who had gained admission to overseas universities, to



temporarily enroll at NTHU until they could commence their overseas studies. The Neighbor Project will work in a similar way.

Vice President for Academic Affairs Wu Yung-hsien (巫勇賢) said that Taiwanese students returning from Ukraine will be allowed to temporarily enroll at NTHU, tuition free, and that their status will be similar to that of exchange students. He added that graduate and undergraduate students participating in the program will be allowed to enroll in any course at NTHU (including lab courses, practicums, and physical education classes), and will receive a grade report for each course completed. Graduate students participating in a research project will receive a certificate detailing their role in the project.

Wu said that eligible Taiwanese students have already been informed about the program by various overseas units of the Ministry of Education. Although the spring semester has already started, special provisions have been adopted to allow participating students to enroll and choose their classes, and also receive additional guidance and an opportunity to do make-up work if necessary. As for students who cannot return to Taiwan, they will be allowed to enroll in NTHU's online courses free of charge.

Professor Fang Tien-sze (方天賜) of the Center for General Education, a former diplomat and currently the assistant director of NTHU's Center for India Studies, has been appointed to advise students participating in the Neighbor Project.

The Office of Student Affairs said that accommodations for participating students will be made available in student dormitories.

For more information on the Neighbor Project, please contact Miss He at the Office of Academic Affairs. Telephone: (03) 573-1017; email: slher@mx.nthu.edu.tw.

NATIONAL TSING HUA UNIVERSITY WELCOMES INTERNATIONAL STUDENTS

For information on Admission and Financial Aid, please visit our website at <http://oga.nthu.edu.tw/index.php?lang=en#> or contact Ms. Hui-Chen Chan, Division of International Students, Office of Global Affairs. Email: hcchan@mx.nthu.edu.tw
Tel: +886-3-5162461
Fax: +886-3-516-2467
Office hours: 8:30AM -5:00PM, Monday through Friday (Taiwan time)

Application Timeline:

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



NATIONAL TSING HUA UNIVERSITY NEWSLETTER

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PUBLISHED BY THE OFFICE OF THE SECRETARIAT

PUBLISHER : President Hong Hocheng
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