NEWSLETTER

July 2019 | No. 3

Vol. 13

清華

National | Tsing Hua | University

NATIONAL TSING HUA UNIVERSITY

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Near the rear entrance off Baoshan Road is found Flower Talk, a spreading array of LED strips in the shape of a Chinese redbud.

CELEBRATING NTHU'S ANNIVERSARY WITH INTERACTIVE TECHNO-ART

On April 28 NTHU celebrated its 108th anniversary and the 63rd anniversary of its reestablishment in Taiwan in conjunction with a campus-wide exhibition titled "Cross Media—Technology and Art Festival 2019." President Hocheng kicked off the exhibition on April 25 by dropping a pinball into an installation piece titled Pinball Machine. There are nine pieces of art works in the exhibition, several of which are best seen at night, especially Morse Code, a powerful laser beam set up on the Campus Green next to the entrance on Guangfu Road, the beam shoots straight up into the sky and can be seen as far away as the Science Park.

Morse Code, set up on the lawn next to the entrance on Guangfu Road, features a powerful laser beam which shoots straight up into the sky and can be seen as far away as the Science Park.

Also of interest is Fool's Paradise, a piece of wire art located on the Pigeon Plaza between General Buildings I, II, and III, which simultaneously displays the faces of Albert Einstein, Marilyn Monroe, and former NTHU presidents Mei Yi-chi and Shen Chun-shan, depending on which side you are viewing it from. In the copse next to the snack bar is the ATGC Plum Light, a colorful polyhedron symbolizing the genetic sequence of the plum blossom. And on the lawn near the rear entrance off Baoshan Road is the Flower Talk, a spreading array of LED strips in the shape of a Chinese redbud, also best viewed at night.

A campus-wide techno-art lab

"Couples find Morse Code to be especially romantic," commented College of Arts dean Hsu Su-chu. Visitors can install a web application on their mobile phones to enter a message of congratulation to NTHU, which is then transmitted by the laser beam in the form of Morse Code; the same message can then be converted back into words and projected onto the large wall next to the Pigeon Plaza by using another web application.

Hsu added with a smile that when Morse Code was being tested last month, local netizens began to speculate as to the

purpose of the powerful beam of light, with some guessing that it might be an attempt to contact space aliens. Around the same time, a few Tsinghua students went out in the middle of the night and tried to use the light beam to recreate the spotlight seen in the movie Batman, but only succeeded in melting the reflector. "Actually, the entire campus is one big lab for conducting experiments in science, technology, and art," commented Hsu—herself an NTHU graduate—adding in a tone of leniency that Tsinghua students are fond of pulling such pranks, but need to pay more attention to safety and ethics.

A virtual marble rolling on the wall

During the opening ceremony, President Hocheng dropped a pinball into Pinball Machine, and while it made its way down the winding track inside, it made an interesting sound, and its route was displayed on his mobile phone. Moreover, visitors can scan a bar code and then project the pinball's movement on the wall next to the nearby Pigeon Square.

Hocheng said that the exhibition demonstrates the emphasis NTHU gives to cross-disciplinary learning in recent years, and that he hopes that Tsinghua becomes the center of a renaissance of higher education in Taiwan.

At the opening ceremony Hocheng offered a brief eulogy in honor of Hou-Wang Shu-zhau, who served as the honorary dean of the College of Arts, and was the founding director of the Spring Culture Foundation which has been providing generous support of the Cross Media—Technology and Art Festival since its inception.

Striding over time and space

Hsu, who also planned last year's Cross Media—Technology and Art Festival, said that this year's exhibition explores how information gets transformed as it's being transmitted by various electronic devices, and how this process is affected by various types of technology, including the Internet of Things, image detection, chemical materials, DNA, and mobile apps.

Hsu said that this year's exhibition also includes a number of nostalgia pieces, such as Tsinghua Faces, in which images of former presidents Mei Yi-chi and Shen Chun-shan are projected onto a wall; and Striding through Time and Space, which allows visitors to insert themselves into images of photos taken long ago at NTHU.

Interdisciplinary cooperation

The exhibition was jointly organized by the College of Arts and Tsinghua College over the course of three months. Two of the works were designed in collaboration with Professor Chu Hung-kuo of the Department of Electrical Engineering and Assistant Professor Gene Ng of the Department of Life Sciences. Numerous old photos and documents were provided by the Library.

ⓐ Walking Meditation was inspired by traditional Buddhist practices.

ⓑ Fool's Paradise simultaneously displays four different faces, depending on which side you are viewing it from.

The recipients of NTHU's 2019 Outstanding Alumni Award (left to right): T.S. Chang, Jordan Hu, and Chen Ruiyu.

NTHU ANNOUNCES 2019 OUTSTANDING ALUMNI AWARD

NTHU has recently announced the winners of the 2019 Outstanding Alumni Award: Chen Ruiyu, Jordan Hu, and T.S. Chang.

Chen Ruiyu (Power Mechanical Engineering: B.S., 1978; M.A., 1982)
Chen Ruiyu is an expert of electromechanical integration and product development, and his innovations have been adopted worldwide. His many outstanding contributions to NTHU and society as a whole make Chen a model alumnus.

In 1986 Chen Ruiyu started his first business, Liji Technology, which initially functioned mainly as a provider of industrial control devices. In 1993 he established the ICP DAS company, which focuses on the development of automation-related products, especially data acquisition systems. ICP DAS is based in the Hukou Industrial Park in Hsinchu, with branch offices in Xindian, Banqiao, Taichung, and Kaohsiung. Over the years ICP DAS has expanded beyond Taiwan, and now has a sales center in Shanghai, a technical service center in Beijing, and a branch office in Wuhan.

In view of the increasing importance of embedded systems, in 1998 Chen decided to shift his focus to embedded controllers and remote I/O modules, and today ICP DAS's industrial control and automation products are used around the world in such areas as real-time information, earthquake and tsunami early warning systems, power monitoring, and electronic game consoles. Chen's many accomplishments are a fine testament to the emphasis NTHU gives to innovation, entrepreneurship, and industry 4.0.

"A true leader is able to boost everyone's morale," says Chen, adding that during his time at NTHU the person he admired most was the president at that time, Shu Shien-Siu, whose weekly speeches always left him feeling highly inspired.

Chen's many contributions to NTHU began as soon as his business became successful. He has served as the president of the Alumni Association of the Department of Power Mechanical Engineering, in which capacity he has organized numerous events and actively facilitated cooperation between industry and academia. Equally keen on promoting both education and research, over the years Chen has made numerous donations to his department's scholarship programs; in 2011 he made a major contribution to the Club One Hundred for building the multi-purpose gymnasium, and in 2018 he made another generous donation to the sustainability fund of his department.

"Tsinghua's quiet and peaceful environment fosters the imagination and encourages you think deeply," said Chen,

a Outstanding Alumnus Jordan Hu.
b Outstanding Alumnus Chen Ruiyu.

adding that university is the optimal time for finding one's direction in life.

Jordan Hu (Mathematics: B.S., 1984)

In addition to a successful career on Wall Street, Jordan Hu has developed a trading strategy analysis system currently used by customers worldwide. His many outstanding contributions to NTHU and society as a whole make Hu a model alumnus.

In 2001 Hu founded RiskVal Financial Solutions, a financial engineering company providing internet-based services to investment banks, hedge funds, and insurance companies. In response to the 2008 financial crisis, RiskVal launched a unique risk-control service that calculates the probability a given company will go bankrupt during a specified period of time.

There was soon a high demand for such services, and in 2008 the company's revenues surged 30% over the previous year to hit a record high. In 2009 Hu returned to Taiwan to set up a branch office in Taipei which now supports clients worldwide, including Citigroup, Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS. Amongst the companies with which RiskVal has established close partnerships are Bloomberg and TradeWeb.

Since its establishment, RiskVal has received numerous awards in such areas as arbitrage trading, risk control, project portfolio management, and real-time trading, including Custody Risk's 2015 Risk Technology Vendor of the Year Award and Waters Rankings' 2016 Best Market Risk Solution Provider. Hu himself won the SmartCEO Award for three consecutive years from 2015 to 2017; he has also received the 20th Outstanding Overseas Taiwanese SME Award and the 26th Model Entrepreneur Award.

Hu has long been a generous supporter of NTHU, and over the years has made several donations to the Qinghan Scholarship, a merit-based program providing support for disadvantaged undergraduates. Last year he established the Jordan Hu '89 RiskVal Scholarship for students with top grades in applied mathematics and computer science. Hu has also made significant contributions to a fund which helps new teachers to participate in international academic conferences and short-term overseas visits. Hu has recently cooperated with NTHU's Department of Mathematics to design a course in mathematics for financial engineering focusing on the latest trends in the financial industry.

"Things never go according to plan, so the best approach to life is to take things as they come, make the most of each moment and each opportunity," said Hu, adding that he's currently focusing his attention on giving something back to society and to NTHU. With this in mind, Hu joined a number of NTHU alumni to establish the NTHU North America Foundation in 2018, to which he has already made a generous donation.

"If not for the excellent academic foundation acquired at NTHU, I could never have gone to the United States for higher education," said Hu, who began his career in information technology, then shifted to financial

engineering, and eventually found his niche in financial risk analysis.

T.S. Chang (Electrical Engineering: B.S., 1989; Ph.D., 1995)
T.S. Chang is a leading figure in semiconductor research and process integration, and his innovations have been patented worldwide. His many outstanding contributions to NTHU and society as a whole make Chang a model alumnus.

Chang has more than 20 patents in the US and Taiwan, and has published more than 15 papers related to semiconductors. His manufacturing innovations have been widely implemented at TSMC, where he serves as the vice president. Amongst the many awards received by Chang are the 2010 TSMC Morris Chang Special Contribution Award and the 2011 TSMC Morris Chang Medal of Honor; in 2013 he became a TSMC Science and Technology Fellow.

Chang's unique understanding of technological manufacturing has been instrumental in enhancing the international competitiveness of Taiwan's integrated circuit industry. Ever since graduation, Chang has been contributing to NTHU in various ways, including teaching and guiding student research.

Since 2013 Chang has been coordinating various cooperative projects between TSMC and a number of departments at NTHU, thereby strengthening the school's role as a leading center of semiconductor research and innovation. The manufacturing process for fin-type transistors developed by Chang is now widely used at TSMC for production below 22 nm, since it enhances the efficiency of both component work and the manufacturing yield of integrated circuits. Such innovations have been incorporated into the curriculum of related programs at NTHU.

"Success is a combination of luck and hard work," says Chang, who also reminds students of the importance of liberal education, reflecting on the fact that he still makes frequent use of the knowledge he gained during his student days at NTHU in such areas as physics and chemistry. Finally, Chang encourages recent graduates to make the most of their first job by gaining valuable work experience and by cultivating a full range of leadership skills.

Outstanding Alumnus T.S. Chang.

A GREAT LEAP FORWARD IN FUEL CELL TECHNOLOGY

ⓐ Prof. Chen Tsan-yao of the Department of Engineering and System Science has recently developed a highly durable atomic-scale catalyst.

ⓑ Chen (center) finds teaching both challenging and stimulating.

Scientists have long been struggling to develop high-capacity fuel cells for use in such environmentally friendly products as electric vehicles. However, Prof. Chen Tsan-yao of the Department of Engineering and System Science, has recently made a major breakthrough in this area by developing a way to use ultrasonic waves to make tiny grooves in the surface of various materials, which in conjunction with an atomic-scale platinum catalyst can be used to triple the efficiency of alkaline fuel cells.

This atomic-scale catalyst can increase the current intensity of fuel cells tenfold, with no loss of efficiency for eight months of continuous operation, while reducing the production cost by 90 percent; such cells have a lifespan of two to three years. This groundbreaking research was published in the February issue of *Nature Communications.* Prof. Chen said that he is currently working on developing a quantum-scale catalyst for making cells which are even smaller and more efficient.

The fuel cell challenge

A fuel cell is a power generation device that uses a redox reaction to convert chemical energy into electrical energy. However, unlike burning fossil fuels to generate electricity, the only byproducts of this method of power generation are water and heat; thus it is seen as a type of "green energy." Moreover, alkaline fuel cells are safer and more efficient than acid batteries, thus are widely used in spacecraft and satellites. However, fuel cell research still focuses on acid batteries, mainly due to catalyst limitations.

Prof. Chen said that there are many factors affecting the efficiency of the catalyst, especially size. At the same volume, the smaller the catalyst particles, the larger the surface area, and the higher the redox activity; but if the particles are too small, they become unstable, resulting in a rapid loss of efficiency. Thus Chen's challenge was to find a way to reduce size and increase stability.

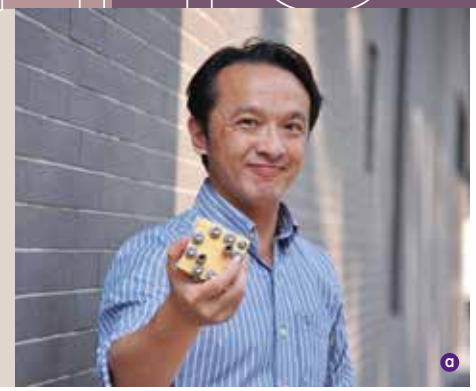
Insights gained from spectacle cleaners and coffee soda

Chen said that he has always had a strong interest in ultrasonic cleaners, and that he once had an optician leave his frames in the spectacle cleaner until the paint was shaken off. Afterwards he realized that it might be possible to use a similar process to make tiny grooves on a metal surface such as iron, and that a groove with a width of 0.3 nm could hold in place a catalyst three atoms in size.

Interestingly, another important breakthrough in Chen's research was inspired by coffee soda. When he encountered a bottleneck in 2016, he spent a lot of time in a coffee shop thinking about

ⓐ Chen's atomic-scale catalyst is expected to become a milestone in the development of fuel cell technology.

ⓑ Chen has developed a way of using ultrasonic waves to make tiny grooves on a metal surface, which in conjunction with an atomic-scale platinum catalyst can be used to triple the efficiency of alkaline fuel cells.



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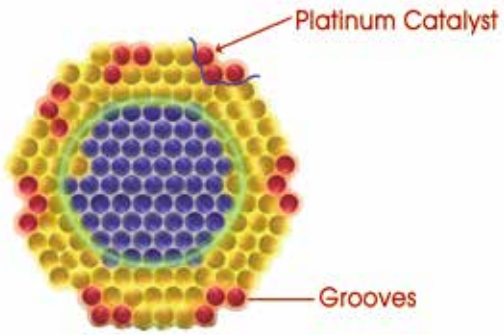


ⓑ

the problem, and while chatting with the owner he discovered that depending on the order in which the coffee and soda are poured into the glass, the sweetness, taste, and amount of bubbles are very different. As a result, he had his research assistants reverse the order in which they had been generating the redox reaction, and this solved the problem.

The traditional way to add additional materials to a metal surface is to add a layer and wait for it to stabilize before adding another. However, Chen developed a way to add new material every ten seconds, and to stop the reaction after only one or two seconds.

Reduced cost, increased efficiency, and extended lifespan

Not surprisingly, Chen's research assistants initially had some doubts about his unorthodox approach, which resulted in hundreds of failures before they finally found a cathode catalyst of an alkali fuel cell which remained stable while maintaining a high level of redox activity.

Chen said that the amount of platinum used in his atomic catalyst is only 1%, compared to 35% for the average commercial catalyst; and that the mass current density is increased by 30 times.

Giving up a handsome salary to return to NTHU

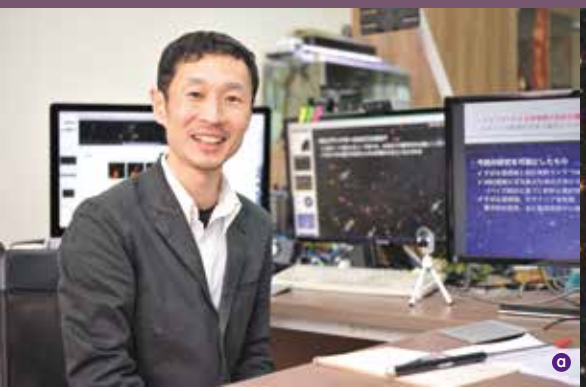
NTHU has a small number of professors who have left a career in industry to go into teaching, and Chen is one of them. After completing his master's, doctoral, and post-doctoral studies at NTHU, he worked for TSMC and Qualcomm. However, he eventually became dissatisfied with the unchanging work style in industry, and finally decided to give up his high-paying job and return to his alma mater to teach and conduct research.

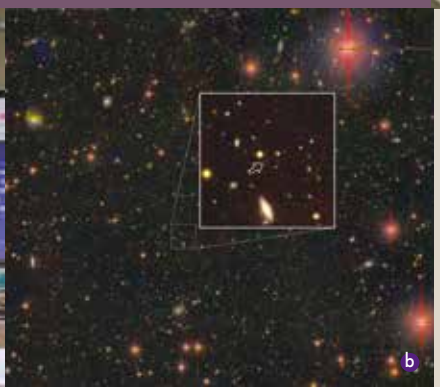
Chen said that while research remains his favorite endeavor, he also finds teaching both challenging and stimulating, since "you never know when a student will come up with a brilliant idea."

Chen said that several countries, including Japan and South Korea, have built fuel cell power plants in recent years, and that one of the athletes villages being built for the 2020 Tokyo Olympics will be powered by hydrogen fuel cells. He also said that if it becomes possible to develop a quantum-scale catalyst half the size of an atomic-scale catalyst, it would be ten times more efficient than the current atomic-scale catalyst.

Comparison of the atomic-scale catalyst and commercial catalyst

Characteristic	Atomic-scale catalyst	Commercial catalyst
Platinum content	1%（low cost）	35%（high cost）
Durability	8 months	4 months
Mass current density (milliampere / milligram)	2,000	200





ⓐ Prof. Goto Tomotsugu of the Institute of Astronomy is a member of a research consortium which has recently discovered 100 supermassive black holes.
ⓑ Photograph pinpointing the location of one of the supermassive black holes discovered by Goto's research consortium.

UNCOVERING THE ORIGIN OF THE UNIVERSE

Dr. Goto, Tomotsugu of the Institute of Astronomy, working in conjunction with 46 researchers from top universities around the world, including Ehime University, the University of Tokyo, and Princeton University, has participated in the recent discovery of 100 supermassive black holes with masses over one million times larger than that of the sun, and located about 13 billion light-years from Earth. This discovery has disproved the hypothesis that the reionization that occurred in the early days of the universe following the Big Bang was caused by black holes.

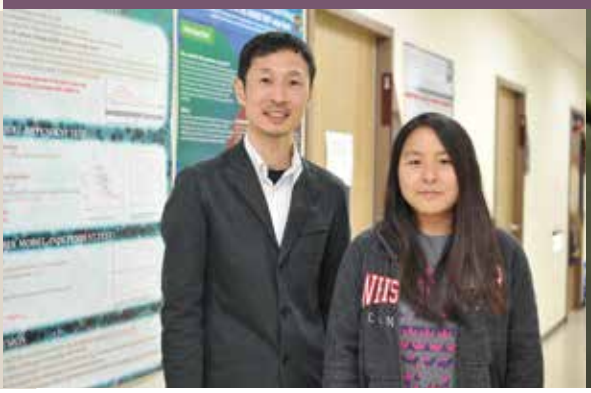
This groundbreaking discovery was announced during a meeting of the research consortium held at the University of Tokyo on March 13. Astronomers estimate that the universe was formed about 13.8 billion years ago. Goto said that their three-year study also found that in the very early days of the formation of the universe quite a few supermassive black holes had already appeared. He likened this to a petite mother giving birth to a huge baby, and said that there are still many related mysteries waiting to be solved.

New insight into the origin of the universe

Goto explained that during the first 300,000 years following the Big Bang there was a Dark Age in which there were no fixed stars and no galaxies. Later there occurred a phase change referred to as "reionization," which filled the universe with neutral hydrogen atoms, making it transparent—a very important event in the history of the universe. But what was it that brought about reionization? There is still no consensus on this issue, but until recently, many astronomers asserted that it was most likely caused by a large black hole.

Thus astronomers around the world have been making a major effort in recent years to find these supermassive black holes. An effective way to find a supermassive black hole is to observe the bright quasars that are emitted as a black hole consumes surrounding matter, but very few bright quasars have ever been discovered. Goto's research consortium used three large-caliber telescopes (one located in Chile, one located in Spain's Canary Islands, and one in Hawaii) fitted with super wide-angle cameras to observe and photograph various quasars previously undiscovered due to their low luminosity.

The consortium conducted a total of three hundred nights of intensive observations—at a nightly cost of around NT$3 million—during which they discovered a total of 83 new supermassive black holes, and confirmed the existence of a further 17 supermassive black holes which had previously been conjectured on the basis of spectral records.



Goto (left) and his student Lu Tingyi, a senior in the Department of Physics who participated in his latest research project.

"This is a big leap forward in the history of black hole observations," exclaimed Goto with obvious excitement.

Goto further explained that by ascertaining the distribution density of these black holes, the team was able to confirm that the radiation energy generated by one hundred black holes is not enough to cause the universe to reionize, and that this requires at least one thousand black holes, thereby refuting the theory that black holes precipitated the reionization of the universe. The next step is to determine whether the large number of galaxies which appeared during the initial stage of the universe were a contributing factor to reionization.

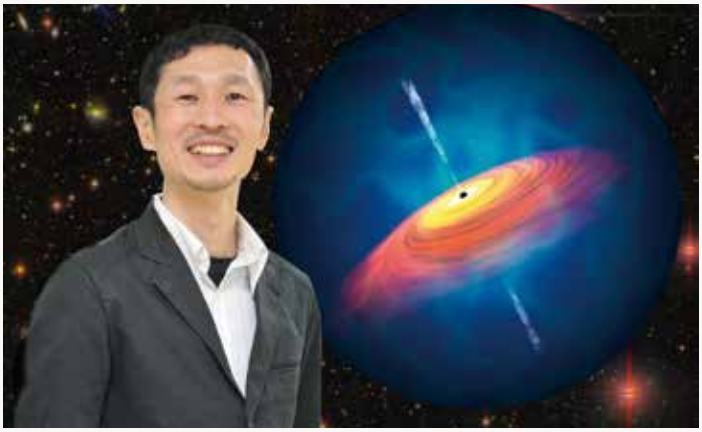
Watching stars by night, running by day

Upon entering Goto's office at NTHU, apart from various posters of black holes, what stands out most is a bookcase full of trophies Goto has won in marathons over the years, as well as the numerous related photos adorning the walls. Since joining NTHU in 2014, he has won each annual cross-campus footrace for faculty and staff. Goto has also performed well in numerous marathons held all over Taiwan.

Goto said with a smile, "Astronomers do their observations at night, so I fill my free time in the day by doing laps around the observatory." In fact, the observatory in Hawaii he frequently visits is located over 4,000 meters above sea level, and such oxygen-thin environments are optimal for marathon runners in training.

Goto said that what makes it so difficult to discover a new black hole is that you're looking at millions of tiny lights, and you have to focus in on the one that indicates a black hole—a process which requires a lot of patience and can be likened to running a marathon. He said that his interest in astronomy began during high school; after joining the astronomical society he soon became fascinated by the size and origin of the universe, and thus decided to make astronomy his career.

As for Goto's experience working in Taiwan, he said that he likes the research environment very much, and finds that teachers and students get along like friends, and that students have a lot of freedom to choose their research topics. One of Goto's students is Lu Tingyi, a senior in the Department of Physics; she said that she participated in Goto's latest research project and gained a lot of valuable experience. Lu said that Goto is very kind and personable, and that he encourages his students to keep up with all the latest research being done in the field.



Goto in front of an image showing a bright quasar being emitted as a black hole consumes surrounding matter.

NTHU ALUMNUS WON YOUNG SCHOLAR AWARD

NTHU alumnus Huang Min-yu has recently been honored with a 2019 Marconi Society Paul Baran Young Scholar Award for his groundbreaking research in the area of 5G communications. Huang, now 27, is the first Taiwanese to receive this award. He earned his bachelor's degree from the College of Electrical Engineering and Computer Science in 2013 and is currently a Ph.D. student in the Department of Electrical and Computer Engineering at the Georgia Institute of Technology.

Nearly 300 scientists, including several Nobel laureates, recently gathered at the award ceremony held at Stanford University. Georgia Tech. Prof. Wang Hua, who nominated Huang for the Award, introduced Huang, who was greeted with a long round of applause. Visibly moved and excited, Huang greeted the audience with a bow and said that he was honored to be the first Taiwanese to win this prestigious award.

Cerf (left) and Huang at the award ceremony.

Rewarding promising young scholars

The Marconi Society was founded in 1974 by the descendants of Italian electrical engineer Guglielmo Marconi, who was responsible for the first radio transmission across the Atlantic Ocean, and won the 1909 Nobel Prize in Physics for his pioneering work in the field of telegraphy. In addition to the Young Scholar Award, the Society also awards the annual Marconi Prize, popularly regarded as the "Nobel prize in communications," to outstanding research pioneers in the field of communications; past recipients include the inventor of the World Wide Web and the founder of Google. Three past recipients of the Marconi Prize have later been awarded the Nobel Prize, and six recipients have been awarded the Turing Award.

The Young Scholar Award was established in 2008 to reward outstanding scholars under the age of 28 for significant contributions in such areas as quantum communications, machine learning, communication positioning and 5G. Most of the previous winners came from Stanford University and the Massachusetts Institute of Technology.

In the selection process for this year's Young Scholar Award, Huang received the highest ratings in the areas of "academic appraisal" and "research innovation." The other two winners of this year's Award were from the University of California at Berkeley and Tsinghua University in Beijing.

A new world record

Huang's research centers on fifth generation mobile communication. He explained that the three key factors of 5G technology are high bandwidth, high efficiency, and high-speed calibration and communication linking, the last of which is his specialization. He said that because 5G uses high-band output, the communication link signal is easily attenuated, making it of critical importance to be able to quickly and accurately adjust the signal.

Previously, the fastest transmission speed was 45 milliseconds, but transmission at such a speed resulted in lower accuracy. Huang overcame this limitation by using high-level physics, mathematics, and circuit technology to design a special feedback system chip which increases the speed of automatic signal detection and calibration of the signal to a mere 0.001 milliseconds, breaking the world record. This enables accurate remote control even for such fast-moving objects as self-driving cars and drones.

Far from resting on his laurels, Huang has recently expanded his research to the sixth generation of mobile communication, including technology for transmitting tactile and olfactory information over the internet, which is expected to one day be applied to fields such as telesurgery.

Shooting for the stars

During his studies at NTHU Huang had excellent grades and graduated at the top of his class. With a strong recommendation from Prof. Shawn Hsu, he received a full scholarship to pursue a Ph.D. at the Georgia Institute of Technology.

Hsu said that Huang impressed him as being not only smart, but also extraordinarily hardworking, such that Huang soon

Outstanding Alumnus T.S. Chang.

Huang (center) with the other two winners of this year's Young Scholar Award: Vasuki Narasimha Swamy (right) of the University of California at Berkeley and Wang Bichai of Tsinghua University in Beijing.

became his research assistant and protégé. Hsu said that one time he asked Huang to prepare an important cross-disciplinary report in a very short period of time, and that he was amazed at how well and quickly Huang completed his task, even though much of the subject matter was outside Huang's specialization,

"What impressed me most about Huang was his high aspirations; he wouldn't settle for mediocrity, and had the courage to compete with scientists from all over the world," recalled Hsu, adding that he expects that Huang will make more outstanding research breakthroughs in the future.

In addition to the Marconi Young Scholar Award, Huang has previously won numerous other awards. Over the past four years he has published more than 20 journal articles in the field of solid state electronics and communications as the first author or co-author; he has presented five papers at the International Solid-State Circuits Conference (ISSCC), popularly regarded as the "Olympics of the semiconductor industry"; representing the Georgia Institute of Technology, he won the Best Circuit Design Award in 2016 and 2019 from the Institute of Electrical and Electronics Engineers (IEEE); in 2018 he won IEEE's Microwave Theory and Technology Research Scholarship; and in 2019 he won IEEE's Ph.D. Achievement Award.

Huang said that he hopes to have the opportunity to return to his alma mater to share his experience with younger students, including what it's like to be so deeply involved with a research project that one has to celebrate the New Year in the laboratory. His advice is to start with a thorough understanding of the theoretical foundations of electrical engineering, since many of his chip designs were inspired by the ideas he first learned about in such basic courses as Control Systems and Electronics. He also said that if you want to make a name for yourself, then it's important to be able to think independently and to try things out.

Prof. Jerry Chou (right) with his team (left to right): Yu Liyu, Yang Chichen, Hsu Kengjui, Chen Hunghsin, Lin Yuanching, and Lin Shaofu.

STUDENT TEAM WON THE ASC SUPERCOMPUTER CHALLENGE

A team of students from the Department of Computer Science recently won the championship in the ASC Student Supercomputer Challenge. More than 300 teams competed in the event, and the results were announced just as NTHU was about to celebrate its 108th anniversary and the 63rd anniversary of its re-establishment in Taiwan, greatly adding to the festive atmosphere.

Organized by the Asia Supercomputer Community (ASC), the ASC Student Supercomputer Challenge is the largest such event in the world, the next two largest being the SCC held in the US and the ISC held in Germany. This year's competition was held at the Dalian University of Technology in China. Last year the team from Tsinghua University in Beijing won all three competitions, but was the runner-up in this year's ASC competition.

The team's advisor was Prof. Jerry Chou of the Department of Computer Science, who for many years has been training students to participate in similar competitions. Under his guidance in the SCC competition the NTHU team won the overall prize in 2010 and 2011, and won the Highest LINPACK award in 2007, 2008, and 2014; and at the 2013 ASC competition the NTHU team was the runner up.

The NTHU team receiving the championship trophy at the 2019 ASC Student Supercomputer Challenge.

Chou said that some of the team members gained valuable experience by participating in last year's US competition, and that this was a major factor in their outstanding performance, along with their high level of coordination which enabled them to overcome obstacles quickly.

The NTHU team consisted of five juniors and seniors of the Department of Computer Science. With Chen Hunghsin as the captain and Hsu Kengjui, Lin Yuanching, Lin Shaofu and Yang Chichen as members and two students, Yu Liyu and Wang Yuzheng, served as coaches. Captain Chen said that ever

since the team was formed last summer, each member spent 20 hours every week preparing for the competition, and that's what enabled them to perform so well in the competition.

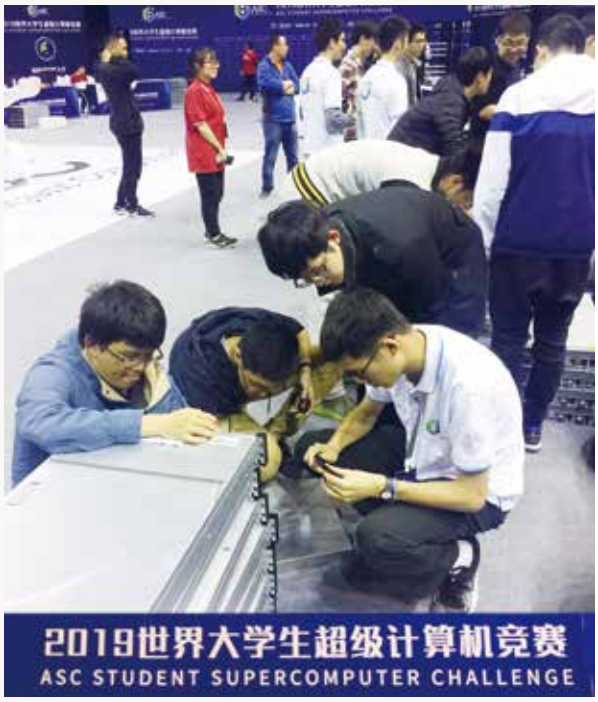
In recent years the ASC competition has been giving increasing importance to artificial intelligence. Yang Chichen—the only female team member—led the team in the artificial intelligence face recognition segment of the competition, in which they converted a low-resolution image into a high resolution image. She said that she used to be rather undisciplined, but the pressure of preparing for the competition impelled her to greatly improve her computer skills, adding that she is especially grateful for Prof. Chou's encouragement and guidance.

Prof. Chou gave a special word of thanks to Quanta Cloud Technology and Quanta Computers for providing travel funds and computer equipment over the years, and to the National Center for High-performance Computing (NCHC) for providing software technology. He also said that he is looking forward to seeing a new generation of talented programmers in Taiwan to participate in the development of high-performance computing.

In this year's competition each of the 20 finalist team was asked to set up supercomputer platform and then using it to solve seven optimization problems relating to high-performance computing and artificial intelligence, such as modeling global climate change, without exceeding a runtime power consumption of 3,000W.

In announcing the results the judges said that the NTHU team demonstrated a comprehensive and profound understanding of supercomputing, which they were able to apply with flawless precision.

a Jerry Chou holding up the championship trophy.
b Yang Chichen—the only female team member—led the team in the artificial intelligence face recognition segment of the competition.



The NTHU team at work in the finals.

TO JOINTLY DEVELOP A MEDICAL COMPLEX IN TAOYUAN CITY

NTHU will soon have an affiliated hospital. On April 15, President Hocheng Hong and Taoyuan mayor Cheng Wen-Tsan signed a letter of intent outlining a plan for NTHU and the Taoyuan City Government to jointly develop a medical complex as part of the Taoyuan Aerotropolis to be built next to the Taoyuan Airport. President Hocheng said that the Tsinghua Hospital will be a world-class facility which 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, and artificial intelligence (AI).

Mayor Cheng said that the population of Taoyuan area is growing continuously, and the completion of the Taoyuan Aerotropolis is expected to attract an additional 300,000 people into the city. According to the Ministry of Health and Welfare, Taoyuan needs an addition 2,000 hospital beds, and the Tsinghua Hospital is intended to meet this need, and will also be optimally located so as to play a major role in Taiwan's rapidly growing medical tourism industry.

NTHU and the Taoyuan City Government recently signed a letter of intent to jointly develop a medical complex at the Taoyuan Aerotropolis.

President Hocheng thanked Mayor Cheng for his enthusiastic support of the project, and affirmed that "Tsinghua and Taoyuan is definitely a winning combination," adding that in developing the medical complex Tsinghua will be drawing on its abundant resources in a wide range of fields, including engineering, the humanities, management, and the arts.

Hocheng also said that the Tsinghua Hospital will make the most of its location to develop a telemedicine system for providing international diagnostics and surgery services in various Asian cities, such as Jakarta, New Delhi, Mumbai, and Yangon.

NTHU president Hocheng Hong (right) and Taoyuan mayor Cheng Wen-Tsan (left) displaying the letter of intent.

He said that telemedicine is the next phase of Tsinghua's southwest expansion, pointing out that NTHU already has set up an EMBA in Malaysia and eight Chinese language centers in India.

Prof. Chiang Ann-shyn, dean of the College of Life Science and director of the Brain Research Center, said that in addition to drawing on NTHU's extensive resources in such areas as biomedicine, information technology, and AI, the Tsinghua Hospital will be equipped will a wide array of cutting-edge technology, including state-of-the-art equipment for conducting gene therapy and immunotherapy.

Chiang further indicated that the deciphering of genetic maps over the past decade has produced revolutionary changes in medical treatment, including new ways of treating cancer and prolonging life, adding that NTHU is at the vanguard of these developments.

With some examples from the United States, Chiang said that researchers have developed more than ten kinds of immunotherapy, including a technique for removing a patient's autoimmune cells, altering their genes to enhance their functioning, and then returning them to the patient's body. He also said that a number of insurance companies now offer a million-dollar insurance policy for the treatment of tumors in the circulatory system, and that neuroscientists at Stanford University have developed a way to treat paralysis by controlling neural structures deep inside the brain.

Chiang also pointed out that one of Taiwan's greatest strengths is digital information and that digital medical treatment is destined to play a key role in the new era of biomedical science; thus he suggested that the Tsinghua Hospital should give priority to establishing a pathology database suited for using AI as a diagnostic tool. He also said that the medical center's strategic location next to the Taoyuan Airport will allow it to provide speedy results for advanced tests not available in developing countries.

The letter of intent covers the first three years of the project, during which period the Taoyuan City Government will provide land and consulting free of charge, and the construction costs will be borne by NTHU. Hocheng said that the fundraising campaign has gotten off to a good start, and that many companies have expressed interest in contributing to the project.

ⓐ On May 4 NTHU conferred the 2019 Character Award to 28 students for their exemplary extracurricular contributions.
ⓑ Liu Weichung (center) with his mother and grandmother at the award ceremony.

NTHU LAUDS EXEMPLARY STUDENTS WITH CHARACTER AWARD

On May 4 NTHU conferred the 2019 Character Award to 28 students for their exemplary contributions to society and outstanding performance in various competitions. Amongst the recipients were the award-winning poet Lin Peishan, the budding biologist Cheng Hsuan, and the tireless volunteer Chen YungHsiang. During the award ceremony Senior Vice President of Academic Affairs Chen Sinn-wen praised the recipients as models of the Tsinghua spirit.

Dean of Student Affairs Hsieh Hsiao-chin said that the Character Award was established by President Hocheng Hong in reference to the school motto, "Self-discipline and social commitment," adding that the Award is a way of emphasizing that university education should give due emphasis to the cultivation of good character and a wholesome personality.

Shining forth in the commonwealth of letters

Lin Peishan was recommended for the Award by assistant professor of the Department of Chinese Literature Yang Chia-hsien, who is also a well-known writer, poet, essayist, and literary critic. Yang said that while NTHU has always enjoyed a strong reputation in science and technology, its contributions to the literary world have yet to garner much attention. However, in recent years a number of students of the College of Humanities and Social Sciences have gone on to become noted novelists, poets, and cultural commentators, amongst whom Lin has shone particularly bright.

In 2017 Lin received the Yehong Poetry Award, a prestigious international prize awarded to women writing in Chinese, and in 2018 she won the Outstanding Young Poet Award conferred by the New Poetry Society of the Republic of China. In addition to being a talented writer, Lin has also excelled in literary research; she has presented academic papers at a number of international seminars and in 2018 was awarded the Academia Sinica Fellowship for Doctoral Candidates in the Humanities and Social Sciences.

In her acceptance speech Lin said that she is grateful for the generous funding provided by NTHU which has enabled her to participate in international seminars held at Nanyang Technological University in Singapore, Kobe University in Japan, and Columbia University in Canada.

Using interdisciplinary expertise to meet international challenges

Another recipient of this year's Character Award was Liu Weichung, a junior with a double major in Power Mechanical Engineering and Quantitative Finance. Last year Liu was an exchange student at the Hong Kong University of Science and Technology, where he teamed up with classmates from Finland and China to participate in hackUST + hardUST, the largest "hackathon" competition in Asia, in which his team won two awards.

Liu led his team in using artificial intelligence, face recognition, and deep learning technology to develop a device which help preventing accidents caused by fatigue and underage drivers. Liu added that his

a Lin Peishan, a Ph.D. student in the Department of Chinese Literature, is both a talented writer and accomplished researcher.

b Cheng Hsuan, a double major in Medical Science and Foreign Languages and Literature presenting her team's entry at the iGEM competition.

knowledge of computer programming has greatly benefited from his daily interactions with his teachers and classmates at NTHU.

Cheng Xuan, a fifth-year student with a double major in Medical Science and Foreign Languages and Literature, also won the Award. She was the captain of NTHU Formosa, an interdisciplinary student team which recently earned a gold medal at the International Genetically Engineered Machine (iGEM) competition, the world's largest synthetic biology competition. Her team developed a wearable device similar to a wristwatch which can perform blood tests to enable early detection of diabetes, high blood pressure, fatty liver, and various types of cancer.

Both Cheng and Liu are fine examples of the increasing number of atudents who pursue double majors at NTHU. Liu said that Tsinghua provides an abundance of international resources which help students hone in on their career paths while developing expertise in a variety of fields.

Learning by volunteering

Chen Yunghsiang, a doctoral student in the Department of Power Mechanical Engineering, is passionate about volunteering. In addition to serving as a guide and scanning special collection materials at the Library, he worked at the 2017 Taipei World Universiade as a member of the Hsinchu Smile Sports Volunteer Team; over the past four years he has logged over 1,400 hours of volunteer service. He said that graduate students have to spend a lot of time doing research, and rarely interact with people outside of their own little orbit. Thus Chen finds that one of the benefits of volunteer service is that it broadens your horizons by bringing you into contact with a wide range of people.

Another recipient of this year's Character Award was Chen Hsuanjen, a senior in the Department of Music, and a longtime member of the Goodwill Ambassadors, in which capacity she has received a large number of VIPs visiting NTHU and has also performed vocal music at various campus events. She said that as a Goodwill Ambassador she has learned a lot about teamwork and effective communication, both of which are sure to play a key role in her future teaching career.

Encouraging independent learning, self-exploration, and self-transcendence

Dean Hsieh said that in addition to lauding students who have performed well in intercollegiate competitions or who have provided yeoman service for volunteer organizations or school clubs, the Character Award also honors those who have exhibited exceptional courage in overcoming adversity, adding that this is the second year in which this annual award has been presented, and that many parents have already expressed their appreciation for awards of this kind.

"The Character Award is a way of encouraging independent learning, self-exploration, and self-transcendence," explained Hsieh, adding that the winners are chosen by a panel of 15 judges based on the nominees' contributions to NTHU and society as a whole.

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CELEBRATED THE ANNIVERSARY WITH A PLAN TO MAKE TSINGHUA A CENTER OF CULTURAL RENAISSANCE

On April 28 NTHU celebrated its 108th anniversary and the 63rd anniversary of its reestablishment in Taiwan. During the convocation President Hocheng Hong announced a plan to establish a Hall of Literature on campus, as well as a "writers' path" connecting Xiangsi Lake and the College of Humanities and Social Sciences. In conjunction with the plan to upgrade the Main Auditorium into a concert hall, these new developments can be seen as marking the advent of a cultural renaissance at NTHU.

Generous support from overseas Chinese

President Hocheng announced that the purpose of the Hall of Literature is to promote literary research and that major funding for the project is being provided by novelist Wang Mo-jen, and his wife, Chou An-yi. It is expected that their donations towards the project will total well over one million US dollars.

Lee Kuei-yun, Director of the Institute of Taiwanese literature, said that in 2014 Wang and Chou also provided funds for establishing the Wang Mo-jen and Chou An-yi Lecture Series, which organizes talks and workshops by noted writers and scholars from Taiwan and abroad.

Lee said that Tsinghua will put the donations received to good use by establishing a museum destined to play a key role in the promotion of Taiwanese literature. In addition to serving as an archive for the manuscripts and publications of Wang and Chou, the museum will regularly hold related seminars and exhibitions.

Noted architect Huang Sheng-yuan was commissioned to design the Hall of Literature. Huang's proposal is to make the building blend into the natural features of the NTHU campus by locating it amongst the trees on the hill to the north of the College of Humanities and Social Sciences, to which it will be connected by the writers' path—a proposal which has met with strong approval from Wang and Chou.

A plethora of new construction

During his speech Hocheng also mentioned a number of other new development projects, including the upcoming construction of a museum of modern history, the establishment of which is timed to coincide with the 100th anniversary of the May Fourth Movement; major funding for this project has been provided by F.C. Tseng, the vice chairman and co-founder of the Taiwan Semiconductor Manufacturing Company (TSMC) and Prof. Yang Rur-bin of the Department of Chinese Literature.

ⓐ Hocheng Hong (second from left) with the three recipients of the 2019 Outstanding Alumni Award: Chen Ruiyu (left), Jordan Hu (second from right), and T.S. Chang (right).

ⓑ During the convocation Hocheng announced a plan to establish a museum of literature on campus.

ⓒ The ribbon cutting ceremony for the sculpture Dedication honoring the memory of NTHU alumnus Chen Jiren. From left to right: Giga Solar Materials general manager Huang Wenjui, Chen Jiming, Hocheng, former NTHU president Chen Lih-juann, and Jinbu.

In addition, Hocheng announced that the school has recently been allocated 6.4 hectares of land next to the College of Technology Management for the construction of a new building which will house both the College of Education and the College of Arts. The design details are currently being settled, and construction is expected to begin next year. Finally, the school is also planning to build two additional dormitories which will accommodate a total of one thousand students.

A memorial of perseverance

Also as part of the celebration, a sculpture titled *Dedication* was unveiled in honor of NTHU alumnus Chen Jiren. Located outside the Macronix Building and near the replica of Rodin's *The Thinker,* this piece of public art consists of a polyhedron made of rust-colored weathering steel, with one edge inlaid with glossy stainless steel.

Chen Jiren received his bachelor's, master's, and doctoral degrees from the Department of Materials Science and Engineering, and maintained a strong connection with his alma mater. Shortly after graduating he established the Gigastorage Corporation together with a few of his classmates; his company and career prospered, but after many years of constant overwork he fell ill and died. Gigastorage commissioned the cutting-edge artists Chin Chao-tsai, Chang Huiming, Liao Chiyu, and Liao Hanyu to design and produce *Dedication* as a tribute to Chen and his unswerving perseverance and fortitude, and to encourage future generations of Tsinghua students in their pursuit of excellence.

Hocheng praised Chen for being a paragon of what it means to be an outstanding alumnus, eulogizing him with an extract of poem by the Northern Song poet Lin Bu celebrating the quiet beauty of the plum blossom: "sparse shadows slant across the shallow water clear / And gloomy fragrance floats at dusk in hazy moonlight."

Hocheng also said that Chen was a man of few words, and served as a fine example of NTHU's unofficial motto, "Actions speak louder than words," adding that it was placed next to the Main Library so as to serve as a constant reminder to young students of the importance of dedication and perseverance.

During the unveiling ceremony Chen's elder brother Chen Jiming, currently the chairman of Gigastorage, said that the shape, design, and color of *Dedication* combine to form a sculpture which gives abundant expression to his brother's low-key character, and thanked everyone who contributed to its creation.

While the ribbon was being cut a light rain began to fall, and Chen said in a voice choking with emotion that it's on days like this that he especially misses his brother.

The ceremony came to a dramatic conclusion with a rousing rendition of the NTHU school song, led by a group of 50 alumni who graduated 50 years ago from the Departments of Physics, Mathematics, and Nuclear Engineering.

Also present at the event were ten of Chen's classmates from the class 1984, some of whom were also his classmates during graduate school. Amongst these was Hsiao Yuhsiang, who lauded Chen as credit to his school and profession and as a model of fortitude. Chen's classmate Chen Tsuchien exclaimed that Chen would have been greatly pleased with the choice of weathering steel as the material for the sculpture.

Wishing Tsinghua a happy birthday

Alumni Association president Tsai Jinbu extended a hearty welcome to all the alumni attending the celebration, especially those who had come from afar, and encouraged them to visit more often and to also do their best to support their alma mater's various development plans, such as the Tsinghua medical center near the Taoyuan Airport.

The ceremony came to a dramatic conclusion with a rousing rendition of the school song, led by a group of 50 alumni who graduated 50 years ago from the Departments of Physics, Mathematics, and Nuclear Engineering.

UMC PROVIDES FUNDING FOR A WORLD-CLASS CONCERT HALL

ⓐ President Hocheng Hong (left) and UMC chairman Stan Hung displaying the donation agreement.
ⓑ VIPs at the donation ceremony (left to right): Former President Liu Chung-laung, President Hocheng Hong, UMC chairman Stan Hung, and UMC co-president S.C. Chien.

At the beginning of this year NTHU announced a plan to convert the Main Auditorium into a world-class concert hall in honor of former president Shen Chun-shan, who passed away last year. For this purpose the United Microelectronics Corporation (UMC) donated NT$70 million.

The goal of the fundraising campaign is NT$200 million, and UMC has pledged an additional NT$30 million to support the final phase of the project. Thus it has been decided to name the new facility the "Chun-shan UMC Concert Hall."During the ceremony President Hocheng said that UMC is a leading player in microelectronic innovation, and that its generous support of the project will go a long way in enhancing the cultural landscape in Hsinchu and beyond.

Chairman Hung said that when he learned last year about the plan to convert the Main Auditorium into a world-class concert hall in honor of Shen, he immediately decided to spare no effort in supporting this project.

During the ceremony it was also announced that the President of Alumni Association, Tsai Jinbu is also donating NT$32 million to the project, in recognition of which the VIP room will be named after his parents. Moreover, the names of major donors will appear on the walls and seats.

Tsai graduated from NTHU's Department Power Mechanical Engineering in 1981 and is currently the chairman and CEO of the Jipal Corporation. He said that during his time at NTHU the Main Auditorium was used for every major gathering on campus, including the opening ceremony at the beginning of the school year and the graduation ceremony, and even for showing films. He said that he is pleased to have such a fine opportunity to give something back to his alma mater, and encouraged other alumni to follow suit.

President Hocheng thanked all the donors, especially those who spontaneously donated cash as soon as he announced the project during the memorial event held last year in honor of Shen. The renovation plan includes structural reinforcement; replacing the lights, sound system, recording system, stage, and seats; and adding a rehearsal area, a dressing room. With a seating capacity of 1,200, the concert hall will more than meet the standards required by large symphony orchestras, and is destined to become a premier venue for world-class musicians and other performers touring in East Asia.

NTHU

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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
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NATIONAL TSING HUA UNIVERSITY NEWSLETTER
101, Section 2, Kuang-Fu Road, Hsinchu 30013, Taiwan R.O.C.
TEL：03-5715131 · E-mail：web@cc.nthu.edu.tw · http://www.nthu.edu.tw/
PUBLISHED BY OFFICE OF THE SECRETARIAT

PUBLISHER : President Hong Hocheng
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