

NTU



3D Facilitates Cancer Metastasis Prediction Possible

Paving Path Towards
Academic Excellence

Design Your Own Courses

Winner of Otto Schmitt Award

Plant Doctors Tackle Plant Diseases
for Farmers



FEATURES

Students Design Their Own Courses

FEATURES



An Interview with Director of the NTU Press: Paving the Path Toward the Academic Excellence

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HONOR



ORD Vice President Pai-Chi Li Wins IFMBE's Otto Schmitt Award

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GLOBAL OUTLOOK



NTU x Israel Partners Matchmaking Workshop

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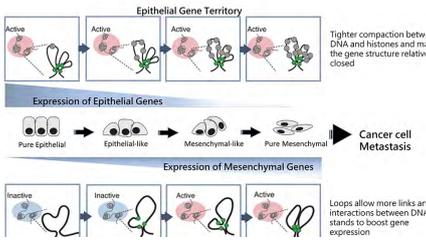


International Students Explore the Potential of the Great South

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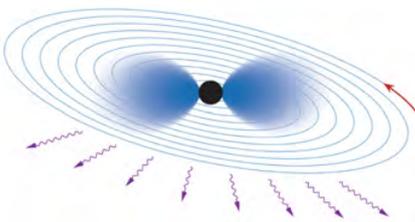
ACHIEVEMENTS



Predicting Cancer Metastasis Through 3D Genome Organization

Cancer metastasis is when cancer cells travel from the initial site to other tissues or organs of the body, forming new tumors. Metastasis is responsible for the great mortality rate in cancer patients and has always been one of the greatest challenges in oncology. The ability to predict metastasis risk would aid early intervention and timely treatment. Though many studies have tried to predict cancer metastasis based on the expression of specific genes, these methodologies are often either not ...

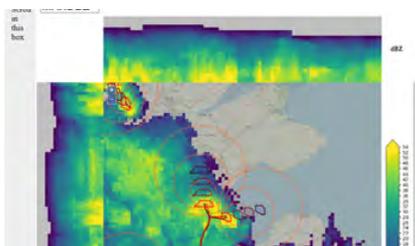
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Yushan Visiting Professor Proposes a Technique to Detect New Ultralight Bosons around a Black Hole with Gravitational Waves

Yushan Visiting Professor Daniel Baumann of NTU's Department of Physics asserted that if the new ultralight bosons exist and form a cloud around a rotating black hole, the presence of such boson clouds would affect the dynamics of the black hole's binary inspirals and their associated gravitational waves (GW) signals. Published on June 2 in Physical Review ...

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New Algorithm Developed to Improve Short-Term Weather Forecasting in the UK

Recently, Assistant Professor Li-Pen Wang of NTU's Department of Civil Engineering collaborated with an international team of researchers from Imperial College London, KU Leuven, and a UK startup Rain++ to develop a new object-based radar rainfall nowcasting system for the UK Met Office. As the Scientific Lead of the project, Prof. Wang guided the team to ...

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TEACHING & LEARNING



Abandoned Space Renovated into the New Generation Sensory Training Classroom

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NTU Gamelan Gita Lestari Performs at Bali World Culture Celebration

NTU Gamelan Gita Lestari joined the first Bali World Culture Celebration at the invitation of Indonesia's Ministry of Education and Culture. The festival, held during July 14-25, 2022, drew a total of 30 Gamelan art communities from around the world. Due to the pandemic, the mesmerizing performances were presented through pre-recorded videos and...



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Theory to Practice: Plant Doctors from NTU Plant Teaching Hospital Have Their Feet Planted Firmly on the Ground

Have you ever wondered how plants receive medical treatment when they are ill? Professor Ting-Hsuan ...

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Ambience Contaminated: An Analysis of the Elusive Characteristics in Contemporary Religions

The appearance of religions in modern society is a question that always attracts much interest. Living in ...

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An Interview with Director of the NTU Press: Paving the Path Toward the Academic Excellence

Three years ago, Professor Chun-Che Chang, former Chair of NTU's Department of Entomology, resigned from his position as a Chair to join the National Taiwan University Press. Since 2020, Chang has served as the Director of the NTU Press. "The work at the NTU Press is closely aligned with the academic research on campus. I love to read, buy books, write, and publish," said Chang, "there is not just pleasure but also meaning in my work."

Founded in 1996, the NTU Press has always been the leading academic press in Taiwan, dedicated to promoting academic development through its publication activity. The NTU Press offers readers the works of experts from a wide variety of disciplines and takes pride in pioneering knowledge demand as well as shaping the pattern of publishing quality books.

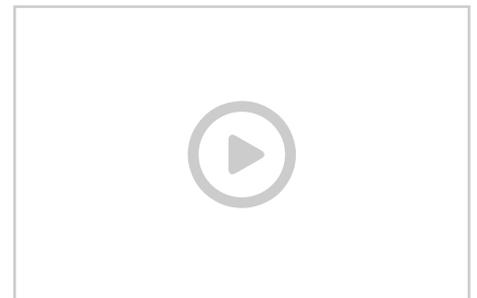
Unlike some other university presses, the NTU Press not only publishes the works of its own faculty members and researchers but also those of experts from all over the world. "There are no geographical limits—any manuscript from the North Pole to the South Pole is welcomed," remarked Chang with a smile. Nevertheless, he hastened to add, "The NTU Press upholds the values of truth, goodwill, and perfection; these values will never be compromised."

The press employs a rigorous reviewing and editing process to ensure the quality of its publications. At the 2022 Taipei International Book Exhibition, the NTU Press impressed the world with the excellence, professionalism, and wide diversity of its publications and souvenirs, demonstrating how academic integrity can offer wisdom and creativity.

"I study biology, so you will note a high degree of diversity here. Our publications cover a wide array of disciplines, from liberal arts to scientific research, and we hope to enrich the interdisciplinary landscape in the near future," Chang confided. "Having worked at the NTU Press for three years, I now can fully understand why publication of the truth is power. This is an ever-changing world, yet despite all changes in the publication world, I insist on prioritizing impacts, rather than impact factors."



| Professor Chun-Che Chang.



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| FEATURES

Taking Courses into Your Own Hands: Design Your Program



| Professor Shih-Tong Ding, Vice President for Academic Affairs hosting the University-Level Individually Designed Bachelor's Degree Orientation.

In an age of exploration, innovation, and design, it is crucial that learners can spend their time on campus experimenting with their options and future. To promote a learner-centered “open university,” NTU is now launching a University-Level Individually Designed Bachelor's Degree to offer students the chance to design their own courses and make new discoveries through interdisciplinary studies.

Students who apply for the degree can select interdisciplinary courses from different “Field Expertise” and are no longer limited to conventional course selection constraints. Under this program, students can create a collaborative academic study that aligns with their talents and ambition. Indeed, the autonomy of deciding one's courses opens students' eyes towards new possibilities and empowers them to pursue a vocation that matches their strengths and passion.

Any undergraduate student who has accumulated 12 credits by either completing a field expertise (credit program or interdisciplinary program) or multiple non-major related field expertise courses (Level 3 interdisciplinary courses or credit program courses) is eligible to apply for the University-Level Individually Designed Bachelor's Degree.

Applicants are required to submit a study proposal laying out the details of their course selections. The study must include interdisciplinary courses from four field expertise, internship courses, hands-on courses, and seminars. The name of the applicant's field of expertise will then be decided based on the applicant's course choices. Applicants are also required to visit the NTU Academic Advising Office to schedule a session with advisors. After their learning motivation and study plans are approved, students may submit their application documents to the NTU Center for General Education for review.

This unique degree option demands more self-discipline and an adventurous spirit compared to conventional degrees, yet those who persevere and complete both their major and the University-Level Individually Designed Bachelor's Degree will proudly graduate with a dual major.



| The University-Level Individually Designed Bachelor's Degree Orientation.

| HONOR

ORD Vice President Pai-Chi Li Wins IFMBE's Otto Schmitt Award

Pai-Chi Li, Vice President of NTU's Office of Research and Development and Distinguished Professor of the Department of Electrical Engineering, received the Otto Schmitt Award. The Otto Schmitt Award is presented by the International Federation for Medical and Biological Engineering (IFMBE) to honor biomedical engineers who make exceptional contributions to the advancement of medical and biological engineering. Its nomination criteria include success in innovation, leadership, and seminal contributions. In addition, the nominee must come from an organization that is affiliated with IFMBE.

On IFMBE's official website, Li was recognized for his seminal achievements in biomedical ultrasound and photoacoustic theranostics, as well as the groundbreaking technologies he developed. His contributions facilitated the study of how cells interact with their microenvironment.

Prof. Li was thrilled when he heard the good news, and he expressed his sincere appreciation for the research and academic environment at NTU. It was the longstanding support and funding from the University over the years that empowered him to advance his project and push the boundaries of knowledge. Li also thanked the students from his laboratory and all his research partners on and off the campus. "Interdisciplinary research is challenging, but just as rewarding," stated Li, who is always happy to share the fruit and success of his research with everyone.

IFMBE primarily represents interests in medical and biological engineering. It is a Non-Governmental Organization (NGO) for the World's Health Organization and one of the Ministry of Foreign Affairs' International Non-Governmental Organizations (INGO) in the field of energy technology. The duties of IFMBE include organizing world congresses and regional conferences, publishing journals, and partnering with different communities and groups to organize international seminars and academic events. Through supporting research applications and promoting the biological and clinical engineering contributions of experts like Professor Li, IFMBE continues to impact the world.



Vice President of NTU's Office of Research and Development and Distinguished Professor of the Department of Electrical Engineering Pai-Chi Li.

National Taiwan University

+886-2-3366-2577

No.1, Sec. 4, Roosevelt Road Taipei, 10617 Taiwan

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| HONOR

Dean Wen-Chang Chen of College of Engineering to be Awarded an Honorary Doctorate by UGA

Dean Wen-Chang Chen of NTU's College of Engineering was notified by Université Grenoble Alpes (UGA) on June 22 that he would be awarded an honorary doctorate in recognition of his long-term dedication to both NTU and UGA, as well as his groundbreaking research in recycled materials that are sustainable and green at the French National Centre for Scientific Research (Centre national de la recherche scientifique, CNRS). Additionally, he has made outstanding contributions to international cooperation and academic exchanges. This honor is expected to be delivered by the spring of 2023, and Dean Chen will be the first Taiwanese scholar to be awarded this honor since UGA was founded.

Dean Chen's relationship with UGA began in 2011. With the support of two international collaboration programs (NSC-CNRS and MOST-ANR), he explored the new field of applied research on sustainable green recycled materials and published nearly 20 papers in numerous reputable journals, such as *Adv. Mater.*, *Adv. Funct. Mater.*, *Macromolecules*, and *ACS Applied Materials & Interfaces*. He was also awarded the 2018 France-Taiwan Scientific Grand Prize together with Dr. Borsali in recognition of the excellent achievements through their research and development work. Dean Chen continues to work tirelessly to advance the international cooperation between these universities, most notably by setting up a 5-year program (2021-2025) at the Green Materials Institute with CNRS, UGA, and NTU.

Dean Chen has a sterling record of academic achievements, including 452 journal publications, 62 patents, and a long list of prestigious awards. Besides engaging in cutting-edge research, he has completed 24 technology transfers to the chemical materials industry for developing high value-added material technologies. UGA is a research university with nearly seven centuries of history. Having produced three Nobel Prize winners and one Turing Award winner, its level of teaching and research ranks among the top in France. It is also a strategic partner university of NTU. Dean Chen is honored to receive an honorary doctorate from this university, and he wishes to express his gratitude for NTU's long-term support and the efforts made by his students. He will continue to dedicate himself to cultivating more specialists in polymer materials for both universities.



| Dean Wen-Chang Chen, NTU's College of Engineering.

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| HONOR

Prof. Katherine A. Kim Honored with Power Electronics Education Award

The IEEE Power Electronics Society (PELS) Award for Achievements in Power Electronics Education was established to recognize the work of engineers who have exhibited a major impact on education in the field of power electronics. This year, the award was given to Associate Professor Katherine A. Kim of NTU's Department of Electrical Engineering.

As the first honoree of the award, Prof. Kim was recognized for pioneering educational videos and online learning in power electronics. The award cites Prof. Kim's groundbreaking contributions, including developing engineering lecture videos and publicly sharing them since 2014. Her YouTube channel titled "katkimshow" has over 76,000 subscribers and some of her lecture videos have over 430,000 views. To make her materials more accessible, she also launched a website called Engineering Spark, providing additional resources on her power electronics course. These videos have received positive comments from learners and industry professionals around the world, stressing how her postings have been invaluable to their studies.

Prof. Kim's innovative spirit is rooted in her dedication to teaching, and she leverages the flipped-learning approach to help students explore alternative learning methods. By building a creative and interactive learning environment, students can gain confidence and acquire the training and technical skills to become leaders who can solve real-world problems.

This is not the first time Prof. Kim has been recognized for her contributions to education. In 2021, she received the Excellent Teaching Award for teaching Power Electronics and Electronic Circuits at NTU. She is a supporter of NTU's Future Classroom and leverages the technology in ways to enhance student engagement. With the recognition of the IEEE PELS Award, Prof. Kim will surely continue with her tireless dedication to her mission as an educator.



Associate Professor Katherine A. Kim from NTU's Department of Electrical Engineering.



Click or Scan the QR Code
to watch KatKimShow on YouTube.



Click or Scan the QR Code
to visit Engineering Spark.

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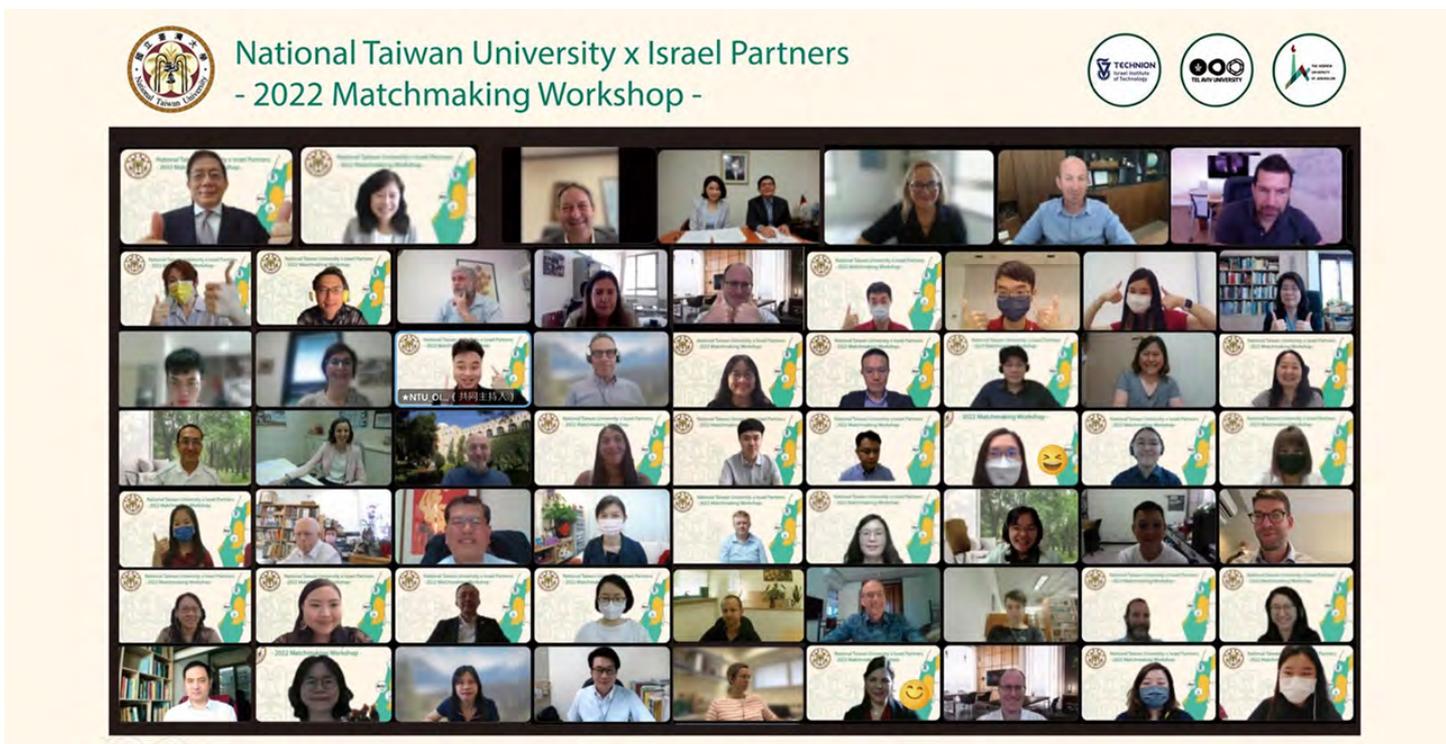
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GLOBAL OUTLOOK

NTU x Israel Partners Matchmaking Workshop



| NTU x Israel Partners Matchmaking Workshop.

NTU's Office of International Affairs hosted the NTU x Israel Partners Matchmaking Workshop on May 18, 2022, with President Chung-Ming Kuan delivering the welcome speech. The Representative of the Israel Economic and Cultural Office in Taipei, Omer Caspi, Taiwan's representative to Israel, Ya-Ping Lee, as well as the Vice Presidents of the Hebrew University of Jerusalem (HUJI), Tel Aviv University (TAU), and Israel Institute of Technology also joined the workshop and gave warm speeches.

Prof. Hsiao-Wei Yuan, Vice President for International Affairs, shared the prospects for academic collaborations between NTU and Israel, as well as inviting the representatives from the participating universities to share their insights on Israel's educational environment and international cooperation. The workshop, attended by 80 faculty members and students from Israel and Taiwan, opened a new chapter for both countries.

The workshop focused on research exchanges among faculty members. The participants were divided into seven groups based on different fields of study, including Buddhist studies, Chinese studies, food, biomedicine, management, law, and life sciences. The Buddhist

studies group focused on philosophy, discussing views on Asian philosophies and religions. The discussions in the Chinese studies group were led by Hungdah Su, Dean of NTU's College of Social Sciences, addressing the international relations and politics in Taiwan and Israel in depth with TAU faculty, as well as economic and technological development under the pandemic. As researchers in both countries have made outstanding achievements in medicine and biotechnology, the participating universities also discussed the possibility of establishing an inter-university research center. Last but not least, NTU's College of Law and College of Management have been running a student exchange program with HUJI for many years. With the goal of enhancing collaborations in research among faculty members, NTU and HUJI will continue to create more opportunities for interactions in different research fields.

The workshop was successfully held via video conference to break through the limitations of space and time. The group discussions allowed all the participating professors to share the fruit of their research and engage in in-depth exchanges, which also served as the best warm-up for future bilateral collaboration.

| GLOBAL OUTLOOK

International Students Explore the Potential of the Great South



| Sales Vice General Manager of ARGO Yacht Club Arthur Hu (first from the right) introducing the marine leisure industry in southern Taiwan.

During May 13-15, 2022, the Office of International Affairs (OIA) at NTU led 35 students from over 18 countries, including France, Japan, Korea, India, Vietnam, Mexico, Guatemala, and Paraguay, on a tour of industrial sites in central and southern Taiwan. This tour offered the international students a precious opportunity to observe how multiple industries in diverse fields have been thriving in southern Taiwan, spurred by the government's Great South, Great Development policy in recent years.

During the visit to ENERCON, ENERCON Taiwan Managing Director Bart Linssen told the students about the development of wind energy technologies in Taiwan, comparing onshore versus offshore wind technologies. Students even climbed up a wind turbine model to experience the working environment first-hand. Derryadi Angputra, an Indonesian student from NTU's Institute of Industrial Engineering, was inspired by what he saw during the visit—and looks forward to his future three-month internship at ENERCON.

Arthur Hu, Sales Vice General Manager of ARGO Yacht Club, introduced the trends and outlook of the marine leisure industry in southern Taiwan using architectural models. Hu personally took the students for a sail on a yacht so they could better understand the business model of the yacht industry. Samael Antonio Morillo Guardado, a Honduran student from NTU's Department of Finance declared that he just might have found a future career path in the yacht industry.

Students also had the chance to immerse themselves in the rich local culture and natural scenery of Chiayi County. The tour, organized by the Ministry of Education's Youth Development Administration (YDA), included visits to the Youth Travel Spots in Meishan, Alishan National Scenic Area, and the Southern Branch of the National Palace Museum.

Elena Quiroga-Fernandez, a Spanish student in the Taiwan International Graduate Program for Earth System Science between NTU and Academia Sinica, was so strongly attracted by the



ENERCON Taiwan Managing Director Bart Linssen (left) and Derryadi Angputra (right) in front of the wind turbine model.



NTU international students visiting Taiping Suspension Bridge.

scenic sites and local hospitality that she decided to return to Chiayi for a second visit. According to Johnny Wu, OIA's Head of Global Relations and member of the Committee of YDA: "We want to do more than help international students find a job here in Taiwan, we hope these in-depth tours can help them understand the potential of the job market in southern Taiwan and explore opportunities outside of Taipei." Thanks to the NTU International Mentorship Program, over 3000 international students from 70 countries have gained invaluable knowledge and experience in internship programs, career workshops, and visits to industrial sites in Taiwan.



NTU international students at the Alishan National Forest Recreation Area.

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ACHIEVEMENTS

Co-Shaping the English Future on Campus

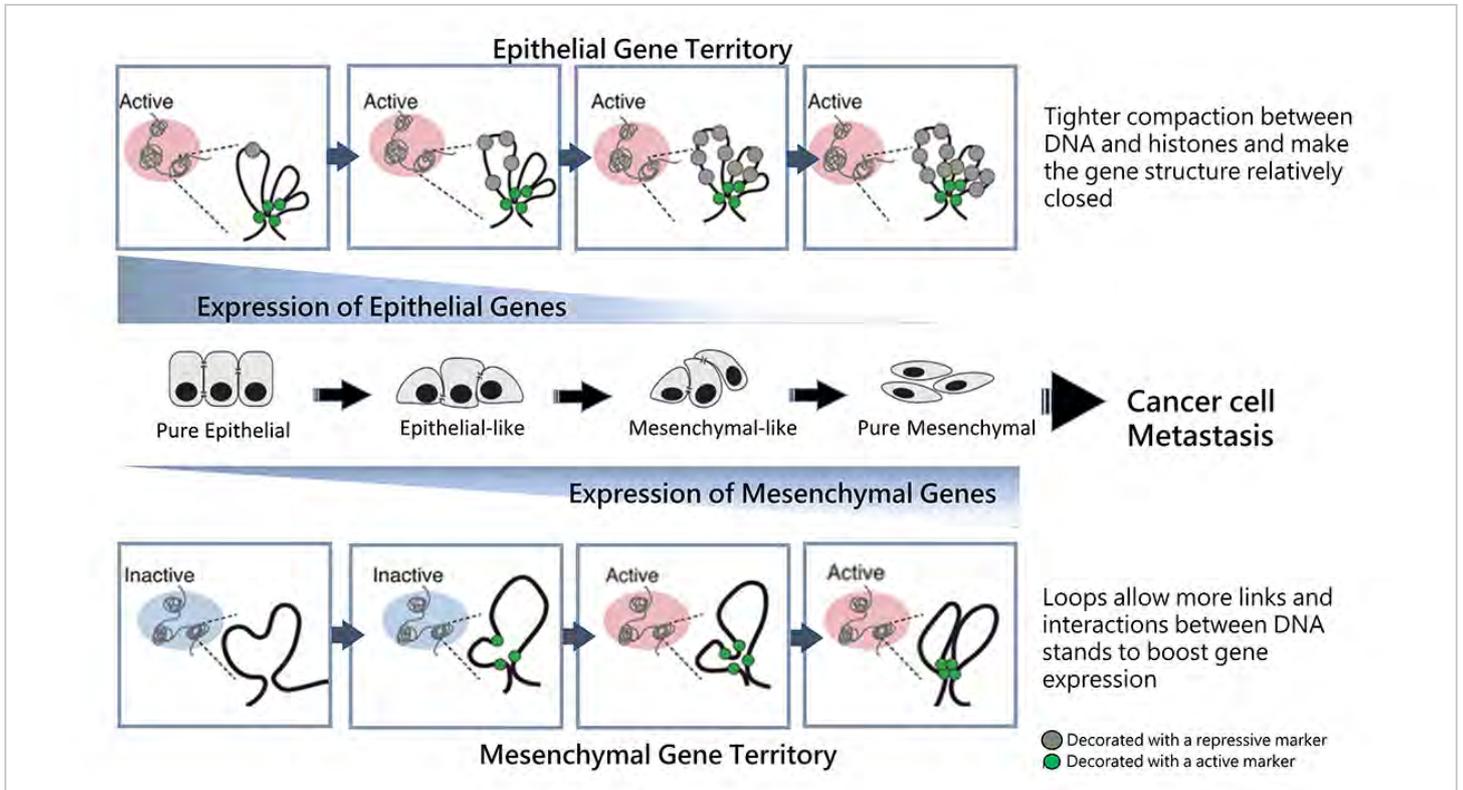


Illustration of 3D genome structure and epigenetic landscape changes in the epithelial and mesenchymal gene territory during different EMT states along the EMT spectrum.

Cancer metastasis is when cancer cells travel from the initial site to other tissues or organs of the body, forming new tumors. Metastasis is responsible for the great mortality rate in cancer patients and has always been one of the greatest challenges in oncology. The ability to predict metastasis risk would aid early intervention and timely treatment. Though many studies have tried to predict cancer metastasis based on the expression of specific genes, these methodologies are often either not holistic enough or inapplicable to a pan-cancer setting.

Recent research led by Professor Ruby Huang from NTU School of Medicine discovered evidence of architectural changes of the cancer cell genome at the three-dimensional (3D) level during the epithelial-mesenchymal transition (EMT) process. EMT is a fundamental step to embryonic development and wound healing, yet it is also leveraged by cancer cells to enable metastasis. The discovery was published in *Genome Biology* and sheds new light on cancer metastasis prediction and tumor progression.

With the support of researchers from the National University of Singapore, Prof. Huang's team used high-dimensional capture of

chromatin conformation (Hi-C) to discover how cancer cells have different states, including "pure epithelial" cells, "pure mesenchymal" cells, or "hybrid epithelial-mesenchymal" cells—forming an epithelial-mesenchymal transition spectrum (EMT Spectrum).

During the EMT process, the "pure epithelial" cells will reduce epithelial gene expressions and form slightly less compact "epithelial-like" cells. These "epithelial-like" cells will further promote the expression of mesenchymal genes to become "hybrid epithelial-mesenchymal" or "mesenchymal-like" cells. Eventually, the epithelial genes are completely suppressed to become "pure mesenchymal" cells. Huang discovered that during this process, the cancer must modify the cell's genomic structure to facilitate DNA strand interactions.

With the single-cell Hi-C method, Huang not only observed the heterogeneity of cancer cells but also revealed that metastasis can be predicted through detecting 3D conformational changes of chromosomes 2 and 10. This major discovery unveils the complexity of EMT and opens the door to predicting cancer progression.



Click or Scan the QR Code to read the journal article.

| ACHIEVEMENTS

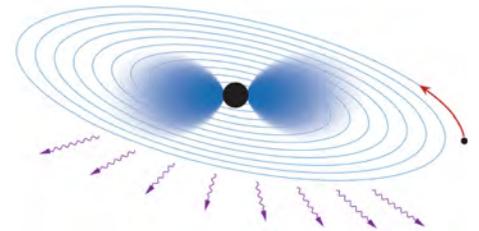
Yushan Visiting Professor Proposes a Technique to Detect New Ultralight Bosons around a Black Hole with Gravitational Waves

Yushan Visiting Professor Daniel Baumann of NTU's Department of Physics asserted that if the new ultralight bosons exist and form a cloud around a rotating black hole, the presence of such boson clouds would affect the dynamics of the black hole's binary inspirals and their associated gravitational waves (GW) signals. Published on June 2 in *Physical Review Letters* with a synopsis, the research was conducted in collaboration with his team at the University of Amsterdam and Harvard University.

Black holes are widely believed to consume all forms of matter and energy around them. However, if there are new, very low-mass bosons exist in nature, black holes also produce such bosons through a process known as "superradiance" to form a large boson cloud around the black hole, creating so-called "gravitational atoms."

The team found that although gravitational atoms are much larger than real microscopic atoms, their structure is strikingly similar to that of a real atom, in which a cloud of electrons surround a nucleus composed of protons and neutrons. If another black hole spirals into the gravitational atom, which eventually merges with the black hole, the ultralight boson cloud will absorb the kinetic energy of the black hole binary inspirals and dissociate, in the same way that light shining on metal in the photoelectric effect will dissociate electrons.

This process may significantly alter the progress of the double black hole circling. Besides accelerating the merger of the two black holes, the dissociation of the ultralight boson cloud is enhanced when the two black holes are separated by a certain distance. This feature appears in the gravitational waves emitted by the circling binary black holes. If observed by the new generation of gravitational wave interferometers in the future, it would provide unique evidence for the existence of this ultralight boson.



Detecting new bosons around the black hole with gravitational waves.



Yushan Visiting Professor Daniel Baumann of the Department of Physics, NTU.



Click or Scan the QR Code to read the journal article.



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| ACHIEVEMENTS

New Algorithm Developed to Improve Short-Term Weather Forecasting in the UK

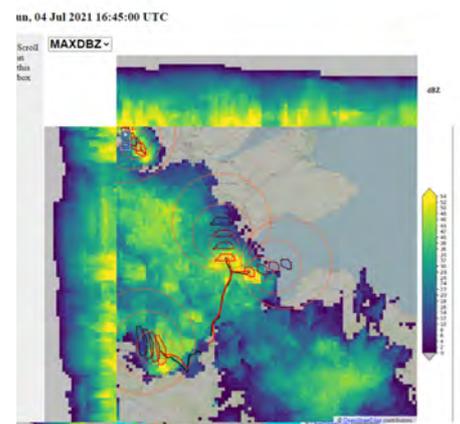
Recently, Assistant Professor Li-Pen Wang of NTU's Department of Civil Engineering collaborated with an international team of researchers from Imperial College London, KU Leuven, and a UK startup Rain++ to develop a new object-based radar rainfall nowcasting system for the UK Met Office. As the Scientific Lead of the project, Prof. Wang guided the team to develop and prototype the core nowcasting algorithms. The team has devised a new algorithm that can better isolate and associate convective rainfall entities and deliver reliable and detailed motion estimates. This system will be used by the UK Met office's forecasters in predicting the movement of convective rain cells in real time.

While on the one hand, Radar nowcasting is a widely-used technique to predict the precipitation fields and variation in rainfall within the following 0 to 6 hours, depending on the type of precipitation; on the other hand, object-based nowcasting is mainly used to predict the motion of convective storms due to their clustering nature, which usually constitutes two components: tracking and prediction. Tracking focuses on tracking the recent movements of the rain cells while the latter extrapolates the potential position of the rain cells in the following few hours via derived movements.

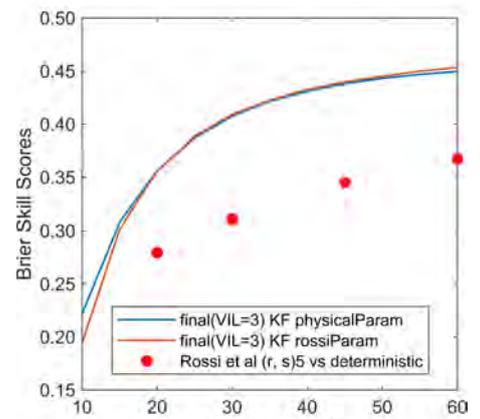
In the latest improved system, the new tracking component was implemented based on an innovative algorithm proposed by Prof. Wang and his colleagues from KU Leuven in 2018. The algorithm was selected for this project by the UK Met Office's scientists in view of its feasibility of real-time and real-world operation. Tracking accuracy was significantly improved thanks to new optical flow techniques incorporated in the rain cell tracking process and the algorithm was further adapted to make it compatible with the UK Met Offices' new 3D radar composite product.

The prediction component was developed using the Kalman filter-based method, and the key parameters were obtained via the analysis of historical rain cells and their development. Moreover, these parameters can adapt during nowcasting, leading to better and more informative prediction results.

Wang's new algorithm not only improves the accuracy of the Met Office's forecasts but serves as a basis for further applications such as storm nowcasting and long-term stochastic spatial and temporal rainfall generation.



Case study July 4, 2021 16:45 UTC – lead times 10, 20 and 30 min. A snapshot of the newly-developed object-based storm nowcasting system.



A comparison between the Brier skill scores (BSS) of the two Kalman filter models' parametrizations (lines) and the Rossi et al model's round markers from 2015.



Click or Scan the QR Code to read the 2018 algorithm in *Atmospheric Research*.

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| TEACHING & LEARNING

Abandoned Space Renovated into the New Generation Sensory Training Classroom

NTU launched the “New Generation Sensory Training Classroom” project in December 2020, providing a new direction for academic research and enhancing the practical application of industry-academia collaboration through scientific sensory training methods. The well-designed classroom is equipped with high-tech equipment. Not only does it support such functions as teaching, analysis, and scientific training to complete the tea making scent map, but it also further integrates an electronic nose system to make the tea making process predictable and stable, eventually setting accurate and objective flavor standards for tea products.

The project leader, Assistant Professor Shu-Yen Lin of the Department of Horticulture and Landscape Architecture, said that most of the research conducted at the College of Bioresources and Agriculture is focused on agricultural products. The NTU team has had great success in tea quality research, and sensory evaluation is crucial for evaluating the quality of agricultural products. Traditional sensory training is

usually focused solely on the evaluation and training for different types and qualities of tea. However, after combining with the equipment of the New Generation Sensory Training Classroom, the sensation of the moment can be accurately mapped out in correspondence with the compounds in the tea, connecting scientific data with the sense of smell.

Professor Shih-Torng Ding, Vice President for Academic Affairs, and Dean Hsu-Sheng Lur, College of Bioresources and Agriculture, had a very similar experience when visiting the University of Bordeaux in France. They recommended the model of collaboration between the local wine research center and university there. With the full support of President Chung-Ming Kuan, a similar sensory training space based on industry-academia collaboration was set up on the NTU campus, allowing the students to apply the theories they learn as well as gain a deeper understanding of the differences in the quality of agricultural products.



| Ribbon-cutting Ceremony for NTU's New Generation Sensory Training Classroom.

Located behind the College of Life Science, the New Generation Sensory Training Classroom was just an abandoned classroom. The new advanced classroom was completed in June 2021, but only opened its doors at the beginning of this year due to the COVID-19 pandemic. Excluding the cost of various precision scientific instruments, the classroom design and infrastructure cost about NT\$6 million.

The Sensory Training Classroom is divided into three parts: Professional Sensory Evaluation Classroom, Sensory Evaluation Training Room, and Scientific Evaluation and Analysis Room. The Professional Sensory Evaluation Classroom is a teaching space that adopts a non-color-shifting and adjustable light source, with adjustable temperature and humidity. It is also a demonstration

area for hands-on evaluation. The Sensory Evaluation Training Room is a space without outside disturbance, where the training staff can work independently. The Scientific Evaluation and Analysis Room is equipped with high-resolution gas chromatography coupled with a mass and olfactory (GC-MS/O) instrument to accurately create a map of scents based on science and research.

Professor Lin gave an example of the advanced classroom's practical application for industry-academia collaboration: experienced tea masters can explore the change of tea scent in the process of tea making. Coupled with the New Generation Sensory Training Classroom, the tea master's sensory experience can be linked to the scent particles, deconstructing the context of scent brought about by the interactions of various compounds. Last but not least, the tea leaves prepared by various processes are graded by professional tea tasters to further analyze the composition of the scent compounds of the tea leaves. The aforementioned process has become the foundation of the world's first "tea scent map for partially fermented tea making," adding an element of predictable scientific process to the art of tea making. This space connects the sensory experience of tea masters and the evaluation capacity of tea tasters with cutting-edge instruments to create an amazing sensory feast.

NTU has further collaborated with the Agricultural Technology Research Institute and the Department of Power Mechanical Engineering of National Tsing Hua University to transplant human experience and senses into an electronic nose system to convert the scent map into an automatic navigation system. "Shadow Tea Maker Technology" was developed on this basis, to provide more accurate information in the field of tea making and provide better tools for the future development of the tea industry.

In the future, the New Generation Sensory Training Classroom will prioritize supporting existing NTU courses, such as sensory evaluation of tea, red wine, coffee, cocoa, and chocolate, so as to provide an optimal setting for teachers and students, as well as international academic exchanges in this field. It is also hoped that the classroom can work with domestic industries to develop and conduct sensory evaluation education and training, thus contributing to the development of Taiwan's agriculture.



Assistant Professor Shu-Yen Lin of the Department of Horticulture and Landscape Architecture, Director of the New Generation Sensory Training Classroom.



Professor Lin's research team.

National Taiwan University

+886-2-3366-2577

No.1, Sec. 4, Roosevelt Road Taipei, 10617 Taiwan

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NTU Gamelan Gita Lestari Performs at Bali World Culture Celebration



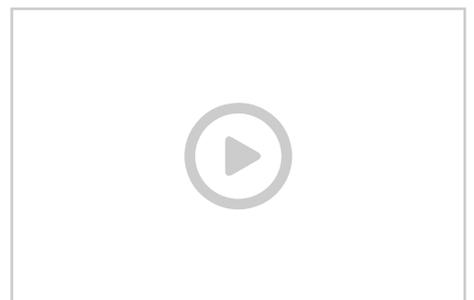
NTU Gamelan Gita Lestari performing I Nyoman Windhs' famous work Puspanjali at the 2019 music festival. The four dancers (from left to right) are Ni Nyoman Somawati, Maile Hood, Mahealani Hood, and Anastasia Melati.

NTU Gamelan Gita Lestari joined the first Bali World Culture Celebration at the invitation of Indonesia's Ministry of Education and Culture. The festival, held during July 14-25, 2022, drew a total of 30 Gamelan art communities from around the world. Due to the pandemic, the mesmerizing performances were presented through pre-recorded videos and broadcasted online.

NTU Gamelan Gita Lestari's performance commenced with a 15-minute introduction to the development of Gamelan Gita in Taiwan, as well as elements of Taiwan's aboriginal music and Han music. For the next 45 minutes, the video presented a captivating performance by the group at a music festival in June 2019. This 60-minute video was supervised by NTU Graduate Institute of Musicology, produced by New Aspect, and sponsored by NTU's Office of International Affairs.

The Bali World Culture Celebration featured a star-studded lineup of world-class artists, including leading contemporary Balinese music composer I Nyoman Windha and his wife, dance artist I Agung Warsiki, renowned Javanese dancer Didik Nini Thowok, Professor Made Mantle Hood from Tainan National University of the Arts and his wife, dance artist Ni Nyoman Somawati, and Yogyakarta court dance artist Anastasia Melati. Other participating Gamelan artists included Yonashiro Towako, Nagamine Ryoko, and Nakamura Yumiko from Okinawa, Professor Ching-Huei Lee from Taipei National University of Arts, and Assistant Professor Hsin-Wen Hsu from National Taiwan Normal University. Inspired by the legend of the Chinese princess in Bali, the artists from Indonesia, Okinawa, and Taiwan collaborated in creating a masterpiece of dance, which they debuted during the festival.

NTU Gamelan Gita Lestari led by Distinguished Professor Ying-fen Wang, was founded by NTU Graduate Institute of Musicology in 2022, spurred by the Government's New Southbound Policy. Its members come from numerous backgrounds and nationalities, fully embodying the diversity of the artform. Through a series of Asian art programs and collaborations with international artists, students have the opportunity not only appreciate the richness of Taiwan's neighboring cultures, but also share Taiwan's cultural beauty with the world.



A performance at the opening ceremony of "2021 NPM Asian Art Festival — Indonesian Month" at the Southern Branch of National Taiwan Museum.



Videos from Bali World Culture Celebration.

PEOPLE

Theory to Practice: Plant Doctors from NTU Plant Teaching Hospital Have Their Feet Planted Firmly on the Ground



Ting-Hsuan Hung, President of NTU Plant Teaching Hospital on a leafy vegetable health management workshop held for local farmers.

Have you ever wondered how plants receive medical treatment when they are ill? Professor Ting-Hsuan Hung of the Department of Plant Pathology and Microbiology has the answer. As the President of the NTU Plant Teaching Hospital, he trains the next generation of plant doctors by making sure that the students are taken into the fields by the faculty to offer medical treatment to plant "patients" all over Taiwan.

Based in NTU's Yunlin branch, resident plant doctor trainee Huai-Jung Cheng and Tsung-Han Lee strive to help farmers solve problems while keeping an eye on food safety for consumers. For example, Lee has assisted the farmers in discovering the reason for unusually small peanuts this year. It turned out the problem was low nitrogen-fixing bacteria rates in the soil. Thanks to the dedication of the plant doctors over the years, contacts of the Plant Hospital can now be found in 20 towns in Yunlin, which offer free personalized farm visits, building friendships between the plant doctors and local farmers.

Taiwan's climate and intensive farming methods exacerbate the problem of plant diseases and pests. As the world-leading expert on Citrus Huanglongbing, President Hung has found many solutions to improve the quality of this locally grown citrus. "If you take things seriously, people will take you seriously." This is Hung's motto as well as the lesson he learned from helping the farmers for over a decade. Besides personalized farm visits, NTU Plant Teaching Hospital organizes workshops to help the farmers reduce the amount of pesticide they use. A farmer once told him: "You helped me reduce my pesticide use by two thirds!"

President Hung's ultimate goal is to train more agricultural generalists to cross the gap between theory and practice. He believes going into the field is vital for taking good care of the land while improving farmers' livelihood. "We can only choose to tackle the agricultural problems, or the farmers will suffer," he insists. So far, there are about 100 plant doctors serving farmers all over Taiwan. The positive feedback from local farmers is what motivates them to carry on. Appreciating that plant medicine research is intertwined with real life, the doctors will continue their outreach.



Professor Hung and students from Department of Plant Pathology and Microbiology on a farm visit.

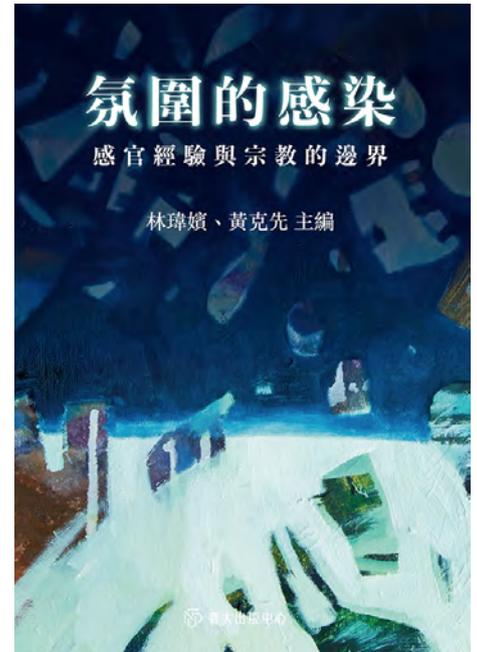
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Ambience Contaminated: An Analysis of the Elusive Characteristics in Contemporary Religions

The appearance of religions in modern society is a question that always attracts much interest. Living in the 21st century, we may observe that religions today appear to be increasingly more complex and fluid, making it difficult to decode them with traditional theories. Although they still attract many devout believers, the “religions” that rely on clearly-defined institutions, specific rituals, and clear symbols seem increasingly distant from us. In contrast, the religious or spiritual experiences that cannot be clearly separated from our daily life seem to be closer to the contemporary mind. How can we understand this shift and its implications?

Ambience Contaminated: Sensory Experiences and the Frontier of Religion introduces the concept of “ambient religion” to analyze the elusive qualities of contemporary religions. Ambient religion is a kind of religiosity floating in the senses and space of consciousness. It creates an ambience that converses with our senses through the material and emotional effects of the medium, summoning our emotional and religious imagination in a fleeting aura. The five articles in the book take Taiwan and China as examples to explore how ambient religion hides on the frontier between religion and non-religion, connecting to wider cultural and natural experiences through our empathy and resonance. Such a process not only enables religions to break through the control of politics and attract more adherents, but it also generates religious and spiritual experiences with more layers than traditional religions.

The chief editors of this book are Wei-ping Lin and Ke-hsien Huang. Wei-ping Lin is a Professor in the Department of Anthropology, specializing in religion, kinship, and imagination. Ke-hsien Huang is an Associate Professor in the Department of Sociology, specializing in sociology of religion, urban underclass studies, qualitative methods, and microsociology. His research topics include the development of religion in Chinese society, the relationship between church and state, Christianity and urban fringe groups.



The book explores how religion hides on the frontier of religion and non-religion, connecting to wider cultural and natural experiences through empathy and resonance.

National Taiwan University

+886-2-3366-2577

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