

Winter 2018

TMU spotlight



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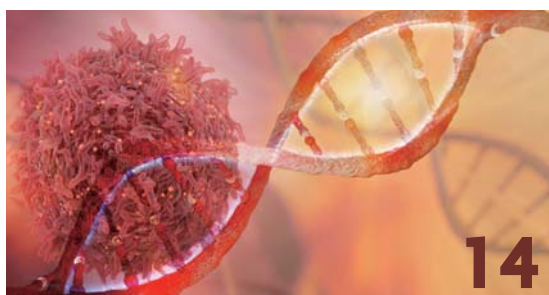
TMU Spotlight

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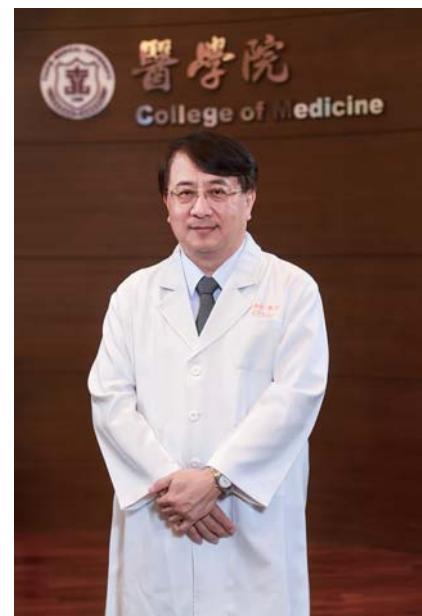
22 Mahidol University study delegation visits TMU



A new dean, A new direction

Accepting TMU's invitation to serve as Medical School Dean made sense after a career spanning three decades at Chang gung memorial hospital. After receiving his medical degree at Taipei Medical College, (renamed Taipei Medical University in 2000), Dean Kuo spent a formative two years studying clinical pharmacology at Imperial College in London. Now Dean Kuo has a plan to increase the depth of research at TMU and improve practice at the hospital with new technology, skills, and ideas.

The goal for the next five years is to put a hundred talented and motivated students on an accelerated track to becoming "practitioners-slash-researchers" by helping students develop scientific and logical thinking, improve their communication skills, and develop a globalized perspective. During a gap year, students on this track can pursue education or research interests that fall outside typical medical education, like law, technology, or computer science. Students following the accelerated track will enter clinical training at the same time as other students.




Dean Han-Pin Kuo, College of Medicine

Dean Kuo's idea for the new educational track began to form about five years ago. Med students traditionally have few chances to get involved in basic scientific research, so combining research and clinical practice can be difficult. Giving students an early opportunity to broaden their academic perspectives is important: "[Med school students] are mostly very good students, and they learn the knowledge well, but their perspective could be limited." Then by the time doctors reach their thirties, the motivation to look beyond a traditional career in medicine can wane. So giving students a chance to broaden their perspectives at an early stage is important. "[Younger people] would have more ambition to explore the outside world. So I think the training should start from when they are younger."

These students will also have the opportunity – and financial support – for lab research and study abroad. "They

will have a good time abroad... And when they come back, they can help make TMU even better," said Dean Kuo. This support is backed by a close working relationship between Dean Kuo and TMU President Chien-Huan Lin, a relationship that might not be surprising considering that President Lin used to be Dean Kuo's PhD student.

The new program will give students the chance to move outside of traditional medical practice. The experience of pursuing educational and research interests in addition to medical training will equip students for expanded career opportunities, for example in business or biomedical technology. With these opportunities growing, fast-track med studies at TMU will give students the capabilities and multidisciplinary skills needed to face the challenges of the future world. 

*"And if they find they're not interested in research, that's fine.
They can continue on to be a physician."*





Since its founding in 1960, TMU has always had a wide-reaching impact on the world through its tens of thousands of graduates who have gone on to careers abroad and research that is useful worldwide.

But the university has been most active in expanding its global connections for more than a decade, with a growing workforce dedicated to internationalization activities on campus. International students have come from around forty nations for degree studies, and partners such as the University of Southern California, Pennsylvania State University, and IIT Madras take advantage of shorter-term internships and learning opportunities.

In addition to this binary of inbound and outbound students, there is a third group: the students who come to TMU and then make use of opportunities beyond Taiwan. These stories explain how faculty generously share their networks in other nations, and build dual-degree programs so their most talented students can work in the most advanced labs in their subfields.

We have a multicultural Taiwanese professor sending students to two famous Canadian laboratories, and a famed WHO blood scientist finding posts for students with former colleagues at the Nobel-winning University of Lille. One student even had a year of training in a German industrial laboratory before her PhD at Lille – and she has gone on to a post-doctoral placement in a world-class lab in Paris.

Spotlight's interviews with these faculty members and their students show that students who come to TMU with a global vision can expect chances to share their work at conferences and in professional publications as they build their career networks, but nothing teaches like immersion in a new culture.

The journey is richer than the destination: TMU sends foreign students onward to global partners

*“As you set out on the way to Ithaca
hope that the road is a long one,
filled with adventures, filled with understanding.” (C.P. Cavafy)*

Although the classic poem Ithaca is more than a century old, it holds a wise message for this age of globalization: movement in one direction is not enough to fuel a lifetime of learning.

That is why TMU is working to give its students the world in new and exciting ways.

If it seems onerous to ask international students to first adjust to Taiwan’s culture and then move on to France, Canada, the United States, Japan, Italy and other destinations, so far it has been a great success for all involved as the students have eagerly mastered these challenges.

The results have cemented dual degree programs as well as advancing research ties. The milestones of this growth process include at least one globe-spanning dissertation defense involving three languages, a handful of Skype screens, and a victory toast of champagne. A TMU professor from France who studied in the US Midwest has sent students from Taiwan and Burkina Faso to Lille, where decades ago he was the first to isolate the human immunodeficiency virus in blood products.

TMU’s American connections are strong as well, with partnerships and a dual degree program in California, plus a handful of programs with Case Western Reserve University in Ohio (see related stories) and Penn State. Students benefit too from TMU faculty and postdoctoral links with research

powerhouse RIKEN, which has welcomed young TMU researchers and faculty to Japan’s top laboratories.

But this story focuses on TMU’s globalization efforts involving institutions in Montreal and Halifax, beginning with a Canadian-Taiwanese TMU professor sending a Singaporean student to francophone Quebec to build on his work on “virus-like particles” that hold promise for cancer treatments.

*“To many Egyptian cities may you go
so you may learn, and go on learning,
from their sages.”*

Shu Hui Wong started her higher education wanting to be a doctor, but after two years of undergraduate biomedical studies “it was immunology that really interested me.” She said, “Doing an honors thesis was what helped me discover and cultivate a passion toward research work; I thoroughly enjoy the explorative and challenging nature of the endeavor,” unlike just learning skills with the goal being a known outcome.

Her original thesis on functional antibody engineering for cancer imaging applications led to her graduation with honors from prestigious National University of Singapore. Aspiring to further her interests in translational cancer immunological research, specifically oncolytic virotherapy which has emerged as a next-generation to treat cancer, she looked for a lab that was strong in this area after her graduation. She read the relevant literature and researched many US and Canadian institutes known for pioneering work on oncolytic virotherapy.

Then, using the International Federation of Medical Students' Associations exchange portal website, she found the publications of TMU Professor Liang-Tzung Lin. She was intrigued by his expertise in virology and recombinant genetic engineering, including with measles virus that showed promise for viro-immunotherapies.

So she sent an email asking about potential opportunities at TMU. By the time she was interviewed in June, Shu Hui had been working in Professor Lin's lab for 14 months, starting with an internship that convinced her to pursue her degree at TMU.

"I like the lab; it's friendly and welcoming, so it was easy to adjust," she said. "I also like that we worked independently but often discuss and learn from each other, especially with my lab coworkers." She said that in her previous scientific experience she'd been the only student in the lab, so there had been less collegiality.

"On top of that, working under the highly driven and supportive guidance of Professor Lin has been truly inspiring to me." Shu Hui said Professor Lin provides her with various learning opportunities and pushes her to read a lot, but hastens to add that this is not a complaint but a compliment – because in her experience it is rare for a professor to have that level of concern about a student's knowledge base.

Now she's working on expanding her background in virology relating to viral pseudoparticles, also called virus-like particles, by producing and experimenting with them. Her goal for her TMU master's studies is to develop strong scientific capabilities and achieve a good publication. And the next stopping point on her journey is a year at Canada's most famous cancer and infectious disease research laboratory at the University of Montreal.

**"Always keep Ithaca in your mind; to reach her is your destiny.
But do not rush your journey in the least."**

Professor Lin's work with viral engineering and recombinant measles virus to make virus-like particles has been widely noted, but he credits his own global path with leading him to share international partnerships with his students. His Taiwanese parents moved from Japan, then to

Taiwan, then to Canada when he was in third grade. So he immediately had to start learning in French as well as English, having already been educated in Chinese and Japanese.

Exposure to extreme demands for language learning and cultural adaptability were not as relevant to his TMU research as his exposure to the best of international scientific research in his four languages. He was trained by prominent virologists in Canada and Japan during his formative years as a scientist, and always sought collaborators from abroad by connecting with researchers around the world because "These kinds of bridges make science more interesting." Now he's planning to send Shu Hui to the Institut de Recherches Cliniques de Montréal (IRCM) because of its retroviral research, which is fundamental to building viral pseudoparticles.

Professor Lin has worked with many overseas investigators and knows the strengths of different labs, and says it's best for students to learn skills in a variety of settings. Since the IRCM already works with his TMU lab to validate leads, Shu Hui is preparing for her Canada year with coursework, French language lessons and a research plan.

Professor Lin hopes that a formal dual degree program will be approved by both universities next spring so more students can make use of this opportunity. "It enhances the research experience of students to bridge with other universities," Professor Lin said. He credited IRCM's commitment of financial support with making these foreign experiences affordable for visiting TMU students.

**"Ithaca gave to you the beautiful journey;
without her you'd not have set upon the road."**

Professor Lin started his lab at TMU in viral infectious diseases and viral oncolytics, emphasizing both international participation and teamwork. "Shu Hui's project is finding better ways to use a viral vector to fight disease," he said. "She's coming up with good ideas."

"It's a booming field," Professor Lin said. "This is the dawn of biological therapies. These viral particles can be tailored to individual patients as a type of personalized

medicine, which is promising given the variations observed in tumor types from patient to patient.” This kind of research isn’t ready for “bedside” treatment applications in Taiwan yet, but a few such treatments have been approved abroad: Oncorine in China and T-Vec in the US, with the latter being a herpesvirus-based vector approved by the FDA to fight melanoma.

He said that his lab is “looking for other opportunities” for international collaboration. “Since TMU is focused on medicine and isn’t a huge university, other institutions can help our students diversify their expertise and interests. Sending students abroad is an excellent way to build their skills -- and to build bridges that will be useful in their later careers.”


Professor Lin is also excited about working with University of Cagliari Professor Enzo Tramontano to develop novel antivirals targeting HIV. This Italian virologist has a world-renowned “antiviral summer school” program that gathers researchers as well as product engineers from industry in this specialty for two weeks of networking and brainstorming. Several TMU students have participated in this event, including Professor Lin’s students.

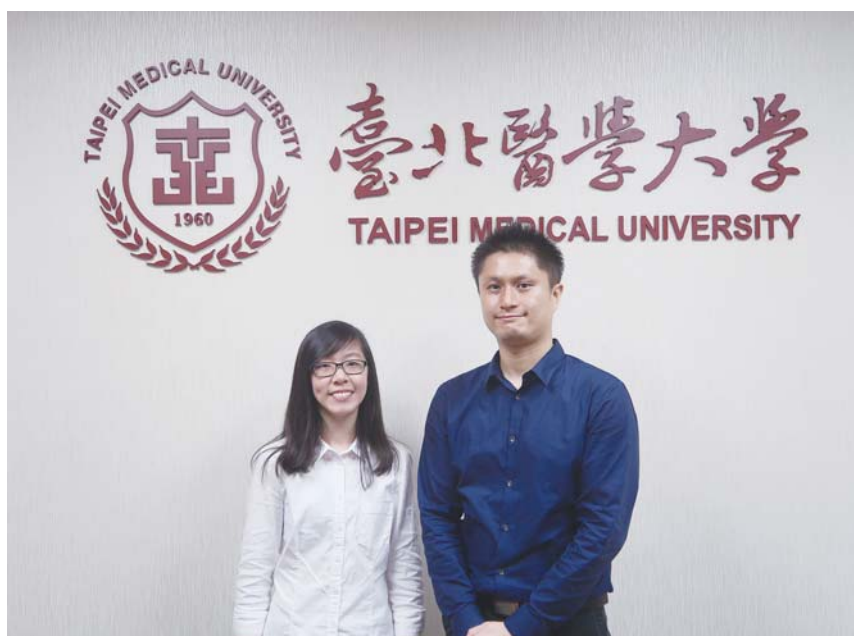
Another promising destination for TMU’s global cooperation is Dalhousie University in Halifax, which has the Canadian Center for Vaccinology, and is a hub to several prominent laboratories developing viral oncolytics. TMU

recently established a joint PhD program with Dalhousie University to help students access these training opportunities, with a MD-PhD student from Professor Lin’s lab currently enrolled.

Professor Lin also recently completed a pilot project on viral oncolytics with Case Western Reserve University, arguably TMU’s most important global partner. Case Western Reserve University has several areas of expertise that complement TMU’s research endeavors, Professor Lin said.

TMU continues to increase the numbers of domestic students it sends abroad for international training opportunities, as well as the students from Burkina Faso, Singapore and other nations who first landed to pursue their studies in Taipei but have been placed in research institutions worldwide. For some people, repeated adjustments to new cultures may sound like an ordeal, but these young scientists find it rewarding.

“I want to move as much as I can in my career,” Shu Hui said. “If you stay too long, you stagnate.” She has been home twice in her 14 TMU months, and says her family is supportive of her self-sufficient and independent path toward a scientific research career: “I don’t expect to get rich, but this is a way to do what I love.” 



Prof. Liang-Tzung Lin (right) and Shu Hui Wong

The French connection: TMU dean sends African, Taiwanese students to learn from Lille labs

Professor Thierry Burnouf is a globally noted blood scientist whose accomplishments include devising a low-cost Ebola treatment regime as well as the first successful treatment of blood products to kill the human immunodeficiency virus (HIV) that causes AIDS.

But even before he landed in the Nobel-winning lab that isolated HIV in the early 1980s, the Frenchman was a foreign student himself, studying grain with the US Department of Agriculture in the US midwest. He says this made a huge difference in his subsequent research and teaching career.

Now Professor Burnouf is helping TMU expand dual-degree programs by sending students to the University of Lille, which is known for advanced studies involving blood products. Recently Spotlight interviewed the professor in Taipei and two of his students, Mr. Ouada Nebie and Dr. Natalie Chou, who now conducts research at INSERM (the French equivalent of the National Institutes of Health) on a scholarship from the French Medical Foundation.

Joint neuroscience center to debut

These exchanges are being further formalized in November, when a Lille delegation has come to Taipei to discuss a closer neuroscience partnership with TMU. In fact, the parties have already agreed to found a joint neuroscience center, but it has not yet been formally launched.

The real-world benefits of these international collaborations are tangible and noteworthy, beginning with the three joint patent applications from Dr. Chou's work based on 50/50 ownership between the two universities of

potential platelet treatments for neurodegenerative diseases.

Professor Burnouf says promising results using brain-derived neurotrophic factor to treat Parkinson's and amyotrophic lateral sclerosis (ALS) are shedding new light on autism as well.

Even successful international researchers long for home after years away, and Dr. Chou is already looking past her postdoctoral studies toward her return home to Taiwan, where she wants to continue to do research but also hopes to teach.

On master's versus doctoral studies

Professor Burnouf strongly urged students to consider combining MS and Ph.D. studies at one institution to increase their chances of success and timely degree completion. He said this continuity is helpful to professors as well, because knowing the student is important in judging what they might gain from onward or outbound study.

These successful Ph.D. exchange students started as master's students who proved themselves before being selected for the French study year: "We shouldn't neglect recruiting and supporting master's degree students ... It's much more challenging to work with fresh Ph.D. students, because they only have three or four years.

"It's good to start with master's students because they have two more years to ramp up and show what they are capable of doing," Professor Burnouf said. "We can help them deliver better work on the same topic, and the professors know them." This longer-term strategy can deliver a better chance of success in terms of publication, in terms of completing degrees and in terms of less pressure on advisors.

Conversely, Professor Burnouf said that young researchers have brighter futures if they build a specialized research record with useful skills by attaining a doctorate, rather than entering the job track after master's studies.

Asked what the doctorate gives that the master's degree cannot, he notes that "It's difficult to go onward [without a Ph.D.]. Longer-term studies can give the additional time for students to build their personal brands within the very competitive field of research. They may need more things to give value" to their experience beyond the degree.

"Ph.D. students by definition have faced challenges and solved problems on their own. They have skills and flexibility that master's graduates don't."

Standing out from the pack

Professor Burnouf said that it's not easy to stand out, even with good grades from degree studies. "Students should ask themselves: what's your value? What skills can you offer? If you don't have your own expertise, you need to become unique. You can build on the master's skills and can network more, with conferences, to develop a personal brand with useful strengths."

Foreign work experience and colleague networks certainly stand out as distinguishing credentials for postdoctoral researchers, he said. Employers too are looking for people who are ready to take risks, and that these students were willing to go abroad and work with people from a different culture is a good indicator.

"We don't want people who look like they have only a standard experience," Professor Burnouf said. "With some students, it's clear from the first day" that they are suited for this kind of challenge.

But it's not all challenge – a foreign lab may even be a shortcut, so students don't have to spend years learning to do what another lab is already expert at. "Lille is known to be

strong in its work with tau proteins, so instead of Mr. Nebie trying to develop this expertise in the lab here, he can go there," Professor Burnouf said. "This experience is a tremendous asset, and makes his chances of a strong postdoctoral appointment much better."

Francophone African finds Lille ideal

Not that Mr. Nebie needed much persuasion – the TMU student was so excited when Professor Burnouf asked him if he'd like to study in France that he shouted "Yes!" twice. He is studying platelets and Alzheimer disease with David Blum, a Lille professor who also spends time on the TMU campus and at Academia Sinica, thanks to support from Taiwan's Ministry of Science and Technology and the French Office in Taipei.

Professor Blum also works with the College of Medical Sciences and Technology, advising Candy Ting-Yi Renn as well as two prior TMU students. Mr. Nebie has received six months of research stipend funding and his travel expenses from University of Lille, plus a comfortable dorm near the lab with a private bath.

It does help that French is a national language in his native Burkina Faso. The young researcher is eloquent in English as well as he explains his unusual degree progress: "I arrived in Taiwan as a master's degree student at Taipei Medical University. Over 2 years I have learned a lot from the courses I have taken and from the advice of my mentor, Professor Thierry Burnouf.

"Since my career goal is to be able in the future to work as a researcher at a university or a research center, I decided to do a Ph.D. degree. I personally believe this could open doors to special high-tech research positions. Therefore, after graduating in 2017, I applied for a Ph.D. degree at the Graduate Institute of Biomedical Materials and Tissue Engineering, where I have been selected."



French year adds value to studies

Mr. Nebie said that the Lille opportunity was a huge incentive to continue with TMU for a second degree: “The director of GIBMTE has shared with us the opportunity to undertake a dual diploma program between Lille University and TMU. I realized that it is another opportunity for me to increase and extend my potentialities.

“Therefore I decided to apply based on the collaboration that exists between Lille University and TMU. My application was sent through Lille University’s online system for preselection. This step was followed by my project’s approval both by Lille University and TMU, and an agreement has been signed. I have been finally admitted to preparing a joint doctoral thesis at the University of Lille and Taipei Medical University.

“I have chosen to study in France because its educational quality is internationally recognized and it offers students opportunities for international exchange. We all remember Louis Pasteur, a well-known French scientist. Pursuing studies there could certainly add value to our experience.”

World-class research laboratory

“My research project is related to traumatic brain injury. With the aid of my advisor in TMU, I have since April 2018 joined a world-class research laboratory”: UMR Inserm UMR-S1172 at the Jean-Pierre Aubert Research Centre studying Alzheimer’s disease and taupathies, or diseases involving tau proteins.

“I work with researchers interested in molecular, cellular and physiological aspects of tau biology, neuro-inflammation and related physiopathology. The team belongs to the DISTALZ Excellence Laboratory (Development of Innovative Strategies for a Transdisciplinary approach to ALzheimer’s disease) and to LICEND (Lille Centre of Excellence for Neurodegenerative Disorders).

“In this center, researchers are working with clinicians to facilitate the translation of their findings. It is a great opportunity for me to join this excellent laboratory. Without any doubt, it will bring more value to my career.

“I am therefore encouraging other students to join these kinds of programs. For those who are interested, I would ask them to be curious and less shy.

“The beginning is not always easy. For example, you have to be accepted first by the university, and next be interviewed by Campus France, where you must defend your project and convince them that you will be able to communicate fluently in France, at least in English.

“However, if you are well-prepared, things will certainly go smoothly. There are many things to learn from the others, specifically in Europe. The research field is more advanced in these countries.”


Industry offers alternate research venues

Students seeking international research experience may want to follow Dr. Natalie Chou’s footsteps in another European direction: toward industry. Professor Burnouf arranged for her to gain experience in a German company’s laboratory, and has much to say about the role of business in cutting-edge research:

“Natalie’s German working visa was possible because my lab works with industry. We evaluate the quality of products for various companies from Japan, USA, France or elsewhere. I involve students in these projects so they can understand better” the real-world context of science.

His own path benefited from going back and forth between business and academic life: “I did my [1980s] work with HIV inactivation in cooperation with the Pasteur Institute. This was a mix of academics and business, since the boss was a professor of hematology. Then I was with a medical device company for three years in the 1990s, and I did come to Taiwan to discuss building a possible blood products fractionation plant between 1995 and 2000.

“Blood is interesting; now our lab can follow GMP (Good Manufacturing Practices) and produce blood products for various applications. Our work has been targeted for a product to treat patients ... coming from this background, practical results outweigh basic science.”

So Professor Burnouf continues to build bridges between compatible labs to leverage each institution’s specialties in ways that benefit treatment innovations as well as student learning and career prospects. “Devising products requires this knowledge that there’s a prospect of clinical applications. Otherwise the research is just words.” 



We Bring Creativity to *L!fe*



Taipei Medical University International



Neuroscience Research at Taipei Medical University

With more than 200 neuroscience physicians and researchers, Taipei Medical University's Taipei Neuroscience Institute (TMU-TNI) is the largest of its kind in Taiwan. The institute also is among the nation's most experienced in robot-assisted surgery. Focused on key areas of neuroscience research such as neuro-oncology, degenerative disease, spinal and peripheral nervous disorders, neuropsychology and cognitive function, TMU-TNI provides the best possible solutions to neuro-medical conditions through translational research that links new findings to treatments.

Be part of
TMU's neural
creativity



[http://oge.tmu.edu.tw/research/
research-highlights/neurosciences](http://oge.tmu.edu.tw/research/research-highlights/neurosciences)



臺北醫學大學
TAIPEI MEDICAL UNIVERSITY

Ministry honors TMU's Marshall Islands medical mission

After receiving an award from the Ministry of Foreign Affairs in June 2015 to affirm its efforts, the Shuang Ho Hospital medical team was once again honored at a Friends of the Foreign Service ceremony for promoting international medical assistance.

Taiwan's technological and medical progress has enabled the country to lead and help other nations. Shuang Ho Hospital's management of the Taiwan Health Center has built a good collaborative relationship with the Marshall Islands Department of Health and Public Services as well as with Majuro Hospital. These institutions work together to improve public health and achieve sustainable development goals.

To improve the health of Marshall Islanders, Shuang Ho Hospital stations resident physicians as well as public health experts at the mission. These professionals carry out youth nutrition and health education plans, community screening

activities and diabetes prevention plans. A referral system in cooperation with the Department of Health allows chronic patients to be referred for treatment in Taiwan.

The Shuang Ho team also helped to improve medical information systems. Through community health education, resident physicians help train local professionals to improve medical care standards. In 2017, an internship program was implemented to establish a local medical education system.

Shuang Ho Hospital's Marshall Islands medical mission is acclaimed by the local government and the public, and continues to contribute to Taiwan's role and visibility in international medical collaboration. The Friends of the Foreign Service Award from the Ministry of Foreign Affairs recognizes the hospital's role in providing resources for health education and supporting Taiwan's global role as well as world health. 

Did you know?

The Taiwan Health Center has served the Marshall Islands for 10 years, and since 2013 the Ministry of Health and Welfare has been run by Shuang Ho Hospital. The mission's areas of action include health worker training and provision of health services for youths and others, medical management, public health and medical services, upgrading health information systems, and exchange and collaboration.

In 2014, the Marshall Islands' largest hospital in Majuro became Shuang Ho Hospital's partner. A memorandum of cooperation with the Department of Health allows Marshall Islanders to use Taiwan medical services. Enhanced academic and practical exchanges also bolster Taiwan's ties with the island nation.



◀ Consultation and surgical services are offered by Shuang Ho Hospital through Taiwan's Marshall Islands medical mission.



► TMU President Chien-Huang Lin speaks upon receiving the award and appears with Foreign Minister Jau-Shieh Joseph Wu (at right) and Shuang Ho Hospital Superintendent Mai-Szu Wu.

Top orthopedics journal showcases TMU cancer study

Although medical advances are helping stage-4 cancer patients survive longer, bone metastases cause serious and difficult-to-treat pain. In January 2014, TMU became the first Asian medical institution to employ MRI-guided conformal thermal therapy.

Since then, TMU hospitals have successfully treated 120 cancer patients with bone metastases, the highest number of patients treated worldwide. Their treatment results were published in the *Journal of Bone and Joint Surgery*, ranked first in the orthopedics field.


The research was led by Prof. Jeng-Fong Chiou, TMU Taipei Cancer Center executive deputy superintendent and TMU Hospital radiology director.

The team analyzed bone metastases in 63 breast, prostate and colorectal cancer patients, comparing responses to traditional radiation therapy with those of the new technology. They found that the rate of treatment response to MRI-guided conformal thermal therapy during the first week equalled the response rate of one to three months of traditional treatment, thus demonstrating superior pain relief in the thermal therapy group.

In the 21 patients who received MRI-guided conformal thermal therapy, 71% showed alleviation of pain or reduced painkiller dosages after one week, compared with the 26% response in radiation therapy patients during the same period. After one month of follow-up, thermal treated patients showed 81% effectiveness in pain alleviation, compared with 67% in radiation therapy patients.

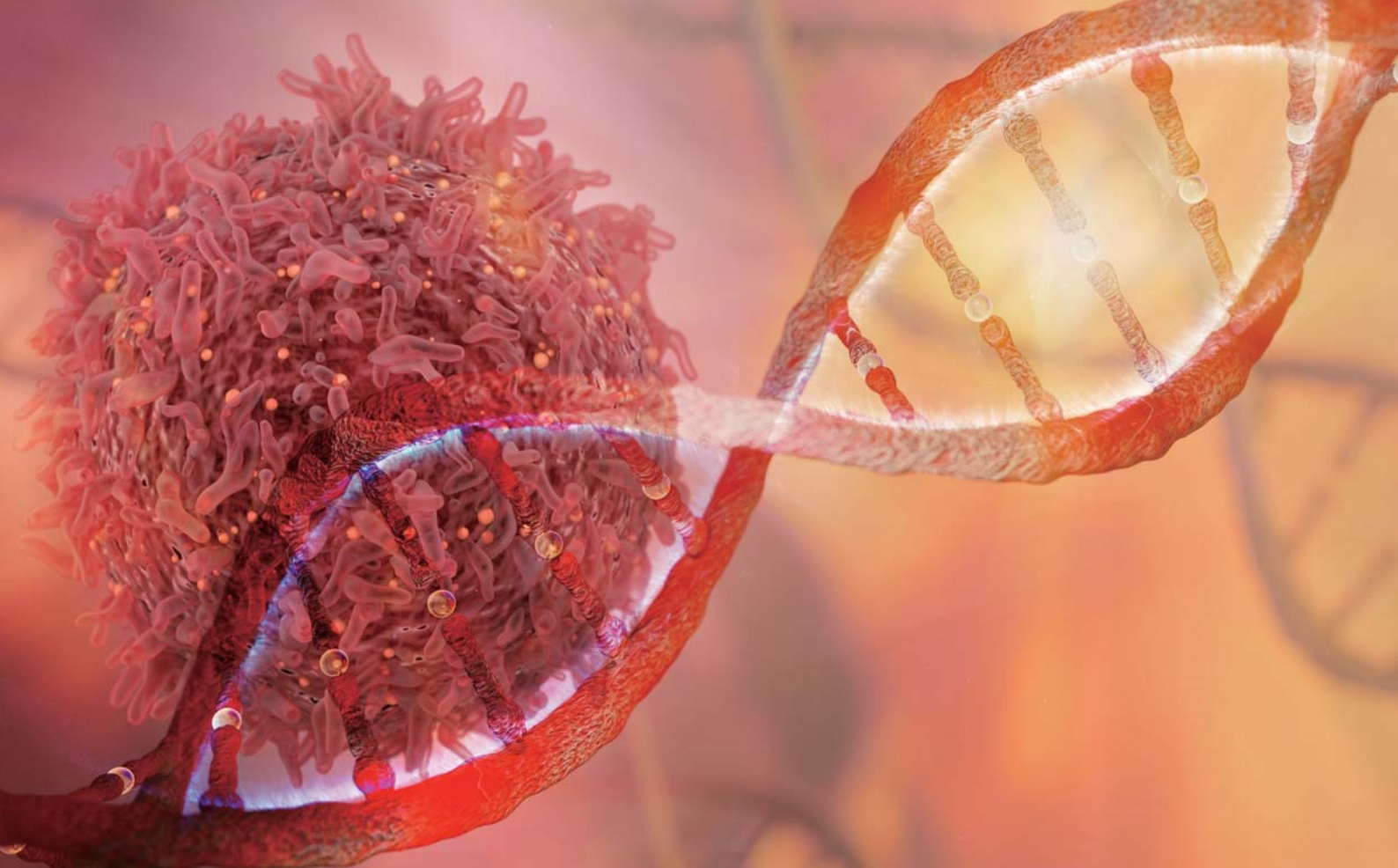
Did you know?

Thermal therapy and radiation therapy can both kill cancer cells that have metastasized within bones, but thermal therapy can also help reduce the pain detected by nerves on the periosteum that the metastatic cancer cells have invaded. With the additional effect of blocking the nerves, pain relief comes just one to three days after treatment begins, while pain relief in radiation therapy only comes after approximately a month of treatment, with ten to fifteen treatments needed to accumulate sufficient radiation dosage to reduce tumor size. MRI-guided conformal thermal therapy accurately pinpoints metastases as well as the nerves being invaded. Supersonic waves focus and generate heat higher than 60 degrees to reduce the target tumor and achieve pain relief. During the process MRI images allow technicians to monitor temperatures in real time to ensure safety. This is the only high-temperature treatment technique approved by the U.S. FDA for patients with bone metastases.

Prof. Jeng-Fong Chiou says cancer patients who receive traditional radiation treatment have a close to 30% chance of relapse in the same location, while patients who undergo thermal treatment have an extremely low chance of relapse, typically less than 5%. After TMU Hospital introduced MRI-guided conformal thermal therapy, it also received national quality certification. The team will continue their research and expand thermal therapy for new indications such as to osteoarthritis and neuropathy. 



◀ During thermal treatment (left), MRI-generated images allow technicians to monitor temperatures in real time (right) to ensure safety.



TMU leads Taiwan in systemic cell therapies and regenerative medicine

Although TMU triumphed over 20 universities to host Taiwan's Regeneration Technology Development program, it has many partners in this exciting new field. TMU's Center for Cell Therapy and Regeneration Medicine cooperates with five U.S. universities and one U.S. company, four Taiwan companies, a Korean university and hospital, two top Japanese universities, and both Hong Kong University and the Duke-NUS Medical School, according to center director Prof. Rita Yen-Hua Huang.

In contrast to controversies surrounding cell therapies elsewhere, Taiwan's government has supported TMU research into mesenchymal and "small blood" stem cells

instead of embryonic stem cells. The nation's progressive regulatory environment also supports research teams as they develop new applications and technologies.

The center's work so far ranges from basic research through pre-clinical animal studies, with a triple focus on 1) stem cells and regenerative medicine, 2) use of these techniques in translational medicine, and 3) development of ethical outreach and educational services for industry and society. The translational focus combines the work of doctors, scientists and businesses to find safe and effective new techniques that address unmet medical needs.

The center's basic research studies niche and embryonic pluripotency, stem cell immune modulation and

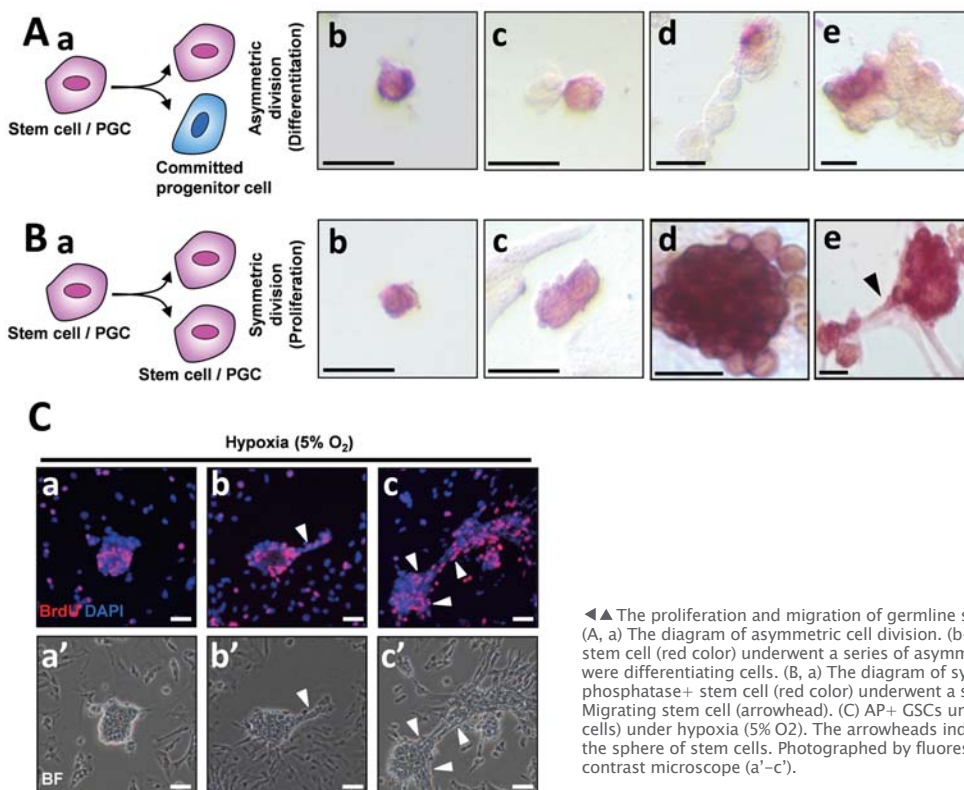
epigenetics, and nanodrug and cancer stemness. Promising clinical applications are tested with preclinical studies in which stem cells and immune-related mechanisms are being used to treat cancer, pressure ulcers (bedsores), burns and multiple sclerosis.



Center innovations closest to clinical trial stage involve guided bone regeneration in implant surgery and a patch to heal diabetic foot ulcers; Taiwan's Food and Drug Administration is reviewing a proposal to use small blood cells in dental implants. Prof. Huang noted that this technology is very promising for Taiwan's aging society, where many elders endure the discomforts of dentures.

In contrast, the field of regeneration therapies is very young; Prof. Huang said that as of 2017, only 55 cell therapy products had been approved on world markets, with Japan providing 4 and the US more than 20. Of two immune-based cancer therapies under development, one uses natural killer cells, a non-stem cell type, and is in Phase 1 trials. The current three-year grant will cover finishing this phase next year, with the next phase tentatively scheduled for 2019. If this trial goes well, the therapy will be offered for industrial development to support the costs of Phase 3 testing. The principal investigator retains patent ownership on behalf of the research team under Taiwan laws, so industrial development can lead to further support for the TMU laboratory and its work.

◀ GTP core laboratory of TMU Center for Cell Therapy and Regeneration Medicine



◀▲ The proliferation and migration of germline stem cells (GSCs).

(A, a) The diagram of asymmetric cell division. (b-e) Alkaline phosphatase+ (AP+) stem cell (red color) underwent a series of asymmetric division. The colorless cells were differentiating cells. (B, a) The diagram of symmetric cell division. (b-e) Alkaline phosphatase+ stem cell (red color) underwent a series of symmetric division. (e) Migrating stem cell (arrowhead). (C) AP+ GSCs underwent cell proliferation (BrdU+ cells) under hypoxia (5% O₂). The arrowheads indicate GSCs were migrating out from the sphere of stem cells. Photographed by fluorescence microscope (a-c) and phase contrast microscope (a'-c').

TMU devoted to developing in Southeast countries



As Taiwan's government and institutions have promoted a New Southbound Policy in recent years, the healthcare sector has been an important part of this effort. In particular, economic and trade cooperation, talent exchanges and resource-sharing can facilitate development of health-related initiatives as well as biomedical industry supply chains.

Guided by this policy, Taipei Medical University (TMU) has been working with countries including Vietnam, Indonesia, the Philippines, and Malaysia for collaboration. Targeted efforts in teaching, research and clinical training have boosted student interest in education opportunities, and short-term programs have facilitated interactions with these nations in medicine, nursing, health care management and other key areas. Furthermore, training programs have also been arranged with local hospitals through TMU's participation in regional academic alliances.

TMU currently has approximately 310 students from ASEAN countries, particularly Indonesia, Vietnam and Malaysia. In view of these nations' enormous demand for specialized medical education and training, TMU introduced its International Postgraduate Program in Medicine in 2015, which successfully attracted many

Southeast Asian students. Five master's degree students from the first cohort have already completed their studies and returned to share their new skills with their homelands. Meanwhile, TMU has collaborated with the University of Medicine and Pharmacy Hospital of Ho Chi Minh City, Bach Mai Hospital, Hai Phong University of Medicine and Pharmacy, Quang Ninh Province's Health Department and other institutions since 2017. So far TMU Healthcare System has arranged for thirty Vietnamese health professionals to attend clinical training, and 21 of them have completed their programs already, providing the participants solid support in their professional development.

In response to the New Southbound Policy, Taiwan's government has also set aside funding to support outreach efforts by higher education institutions. As a result of our quality proposals, TMU has been awarded five different grants between 2017 and 2019, totaling more than 30 million NTD, including the New Southbound Talent Development Program, the New Southbound Elite Scholarship Program, the Taiwan Connection Project, the New Southbound MOOCs Project from the Ministry of Education, and New Southbound Project for Collaboration and Industry Development in Medicine and Health the Ministry




of Health and Welfare. TMU is the only Taiwan institution with multiple New Southbound MOOCs project grants, which shows the university's leadership and commitment in building regional cooperation.

These New Southbound projects have helped TMU promote collaboration with India, Thailand, Singapore and other nations by sharing expertise in medical research, advanced nursing skills and oral medicine practice. Students also experienced Taiwan's culture through the university's topical training and skills courses, holiday programs and other special short-term opportunities. In addition, TMU students also participate in medical internship programs in ASEAN countries. The College of Public Health has collaborated with Thailand's Mahidol University since 2017, enabling eight students so far to receive internship training abroad. These activities have broadened Taiwanese students' global perspectives and knowledge of healthcare systems elsewhere while creating stronger ties with ASEAN institutions.

For more than a decade, TMU student service groups have volunteered in India, Nepal, Cambodia and other South and Southeast Asian countries. In 2017, TMU's FLYoung International Service in the Kingdom of Cambodia and Taipei Medical University Service Overseas (TMUSO) in Nepal received silver and bronze awards respectively from the Education Ministry's Youth Development Administration for their work in-country and the positive outcomes they brought to local communities. TMUSO sent 14 dentists and 14 dentistry students to Nepal in the summer of 2018 to conduct oral cavity screening and treatment service as well as health education programs, winning praise from President Tsai Ing-wen on her official Facebook page.

TMU also continues to expand its global medical treatment capabilities. TMU Hospital set up an international medical center in countries including Indonesia, Myanmar, Malaysia, Cambodia and Vietnam; it also offers international one-stop medical services and a consultation space. These services have helped 11,000 patients in the past three years, providing another pathway for New Southbound exchanges.

Beyond clinical skills training, TMU has been entrusted by Taipei's city government to manage the Ho-Yi Assistive Technology Center, which focuses on clinical and industrial innovations in partnership with TMU's Research Center of Rehabilitation Engineering and Assistive Technology. These efforts promote the Made in Taiwan brand through the soft power of health-related devices and applications. Taiwan's health and medical influence in ASEAN countries will continue to expand through these initiatives and related networking and cultivation of talent. 



TMU joins ‘Malaysia’s Oxford’ for partnership-building

Scientific discuss stem cells, tropical medicine advances, and education collaboration

A TMU delegation of 8 professors and 5 Global Engagement staff promoted Taiwan’s New Southbound Policy by expanding educational links with Malaysia’s leading institution of higher learning, the University of Malaya (UM).

TMU professors were the largest cohort of guest presenters at a stellar Stem Cell and Cancer Symposium on October 17 and 18. This event also drew speakers from noted institutions in Switzerland, India, Hong Kong, England and Singapore.

A parallel Infectious Diseases/Tropical Medicine (IDTM) Symposium gathered three TMU parasitologists and six UM scientists. TMU Assistant Professor Ting-Wu Chuang discussed new methods for accurate prediction of dengue outbreaks using maps and weather data, Associate Professor Po-Ching Cheng shared his work toward a vaccine for deadly rat lungworm (*Angiostrongylus cantonensis*), and Distinguished Professor Chia-Kwung Fan discussed a mechanism linking Alzheimer’s disease to canine roundworm, which is extremely



common in humans but rarely tested for.

The Stem Cell and Cancer Symposium drew scores of participants to the UM Medical School, where TMU Prof. Hung-Cheng Lai took the stage the first morning to discuss “Oncogenic ten-eleven translocation 1 (TET 1) in ovarian cancer.” Prof. Lai met a potential collaborator, UM Prof. Dr. Sy Lay Khaing, at a concurrent poster session.

TMU Distinguished Professor Rita Yen-Hua Huang gave the October 18 keynote lecture on “Niche modulation in cancer stemness and stem cell therapy.” TMU Associate Professor Shian-Ying Sung spoke on “The role of protein-protein interaction in cancer metastasis,” and TMU Associate Professor Ming-Heng Wu discussed “Stromal galectin-1 regulates inflammatory tumour-microenvironment and cancer malignancy.”

Finding common ground

Distinguished Professor Yuan-Soon Ho from TMU gave an overview of the university’s cancer research to officials and faculty at a UM-TMU Joint Collaboration Forum on October 19. Prof. Ho and the cancer research team at TMU have been awarded the Taiwan Ministry of Science and Technology’s largest scientific research grant for the past several years.

Prof. Ho and Prof. Huang discussed TMU research and facilities relating to cancer and stem cells, and Dr. Chuang did the same for infectious disease studies. The University of Malaya team in turn discussed the Faculty of Medicine’s strategic research plan focusing on ageing and regenerative medicine, cancer and drug discovery, and parasitology. The TMU team received tours of several labs and learned about UM’s state-of-the-art research facilities, including labs for mosquito breeding and medical microbiology.

TMU Office of Global Engagement Dean Pei-Shan Tsai joined the UM networking meeting to give feedback on areas of common interest. She expressed TMU’s strong



interests in working with YBhg Professor Dato’ Dr. Adeeba Kamarulzaman, dean of the UM Faculty of Medicine, to expand educational and research collaborations that began with a UM group’s 2009 visit to TMU.

Dean Kamarulzaman, a signatory to the first agreement between the universities in 2010, noted that during her team’s visit to Taiwan, “TMU stood out [during a tour of Taiwan hospitals]... It’s not fancy, like some medical tourism hospitals here, but it’s very functional. We have a lot to learn from you.”

The University of Malaya is Malaysia’s leading university, and was founded in Singapore by British colonists as King Edward VII College to train doctors in 1905. Some 30,000 students are enrolled in ten colleges on a verdant 304-hectare main campus. A handful of administrative and student exchanges have ensued between the two schools’ medical and public health faculties.



Participants in the University of Malaya’s stem cell conference came from Germany and the United Kingdom as well as from Singapore and Taiwan.


Sin Chew Daily offers support

In addition to scientific discussions with Malaysian researchers, the TMU delegation also visited Sin Chew Daily, Malaysia's largest Chinese-language news provider, to explore potential collaborations between the two organizations. Meetings at the 90-year-old media firm's headquarters focused on interviews with the TMU team and presentations about both institutions.

This was followed by a discussion of possible synergies that could help Sin Chew's 1.3 million readers benefit from TMU's educational and clinical resources. General Manager Tan Kim Chuan praised Taiwan's advanced medical education and research development, noting that it provides excellent-quality care at lower prices than those of unevenly regulated Malaysian hospitals. The GM also said Taiwan

outshines Malaysia in medical tourism, thanks to affordable packages for families accompanying patients as well as more humane admission and payment policies.

Because the Sin Chew organization uses readers' donations to provide emergency funding for applicants with acute medical conditions who cannot afford treatment, Mr Tan suggested a collaboration scheme to send patients with special needs to TMU hospitals. Sin Chew also offers scholarships to encourage students from lower-income backgrounds to pursue university educations and indicated interest in working with TMU to provide scholarships for Malaysian students.

Whether scientific, educational or charitable, clearly TMU's Malaysian partners were interested in the delegation's ideas for cooperation opportunities, and the October events were a great success. 



▲ TMU's Malaysian delegation was fortunate to meet with Sin Chew Daily leaders in Kuala Lumpur to discuss health and business initiatives.

Overflow crowd joins Malaysia reception sharing TMU's scientific, educational and clinical offerings

A networking reception on Saturday, October 20, capped the university's Malaysian outreach events with scientific and educational presentations. Aided by publicity from the Sin Chew Daily, the world's largest Chinese-language media corporation beyond Taiwan and China, the event drew a large and enthusiastic crowd to the newly opened Ibis KL City Center hotel.

The co-host of the event, Datuk Dr. Tang Yong Chew, is a TMU alumnus with close links to the Chinese communities in Malaysia. His warm hospitality and wide network of friends of Taiwan greatly aided the TMU team as they sought to expand ties with the Southeast Asian economic powerhouse in keeping with Taiwan's New Southbound Policy.

Registered participants received a TMU information pack while fruit, pastries and hot snacks as well as beverages were served throughout the afternoon. Many participants lingered for hours after the scheduled closing to speak with TMU Associate Professor Ming-Heng Wu following his inspiring talk, "Cancer: No Longer a Death Sentence."


Other participants surrounded Associate Professor Shian-Ying Sung, who had given an overview of exciting TMU research and the role of clinical trials, in addition to the introduction to TMU's PhD Program for Translational Medicine.

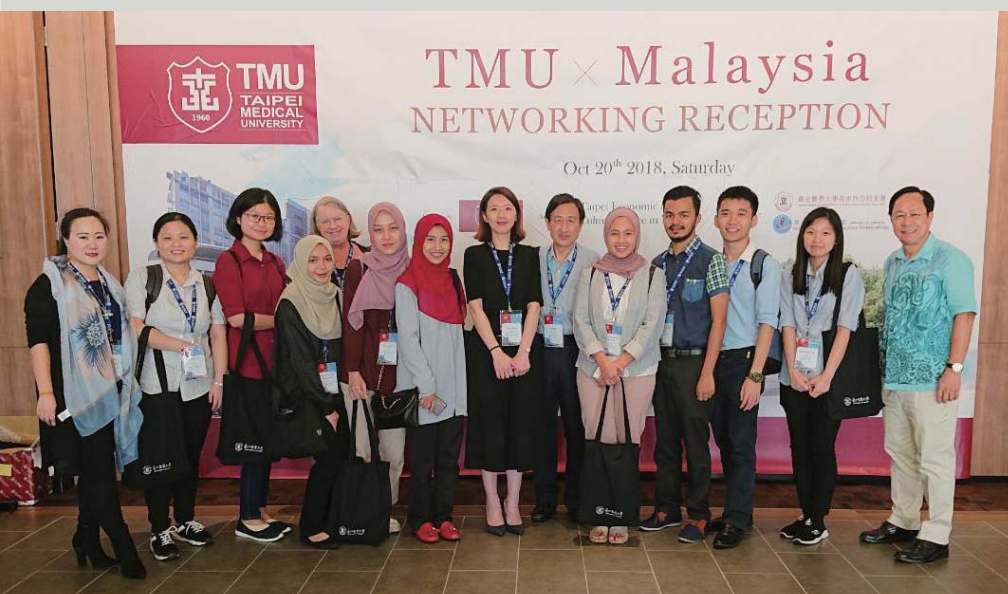
With those scientific and clinical bases covered, a presentation on educational programs by Vice Dean for Global Engagement Dawn Chen led to dozens of questions from prospective students with avid

interest in joining TMU for research internships and future studies.

The networking event attracted around 200 participants including local scholars and their students, TMU alumni residing in Malaysia, business representatives, diplomats and members of the public who were interested in learning about the university's cancer research and treatment options.

One participant shared his experience with TMU's Shuang Ho Hospital. He praised the integration of traditional Chinese medicine with high-tech Western medicine there and called this a rare combination, as most medical institutions worldwide favor one approach but not both. The three original hospitals in the TMU Healthcare System all have sophisticated, full-service Chinese herbal dispensaries as well as physician-staffed clinics offering acupuncture and moxibustion – approaches that have been shown to help cancer patients better tolerate Western-style chemotherapies. TMU's other efforts in cancer treatment and prevention, including the introduction of IBM Watson for Oncology as well as cancer screening measures to supplement cancer diagnoses, also drew attention from the audience, with many regarding TMU staff members highly for their commitment to finding better solutions to health issues of the people.

With the much-valued support of the Datuk and the university's Malaysian Alumni Association that he leads as president, TMU will continue to expand its links with regional partners to create synergies in education, research and health care. 





Mahidol University Study Delegation Visits TMU

In a move signaling Mahidol University President Banchong Mahaisavariya's increased emphasis on internationalization, a staff delegation from Mahidol University paid a visit to TMU this September. By learning about operations at TMU, the delegation hopes to expand strategies and mechanisms for development and give staff a chance to build an internationalized view on work, while learning more about Taiwan at the same time.

Mahidol has sent smaller groups abroad in the past, but this time a total of 44 staff made the trip to Taiwan, led by Acting Vice President Professor Choakchai Metheetrairut, M.D., Acting Vice President for Human Resources Associate Professor Thanya Subhadrabandhu, M.D., and Acting Assistant to the President for Student Affairs and Alumni Assistant Professor Chatchai Kunavisarut.

Enthusiasm for learning about TMU best practices and adapting them for use in Thailand was clear. During presentations, Mahidol staff eagerly engaged TMU representatives about ISO certification processes, IT outsourcing, emergency services, accounting, and alternative energy use. Other topics for discussion included student affairs, internationalization, teaching and research, as well as strategic




▲ Assoc. Prof. Thanya Subhadrabandhu, Acting Vice President for Human Resources, Mahidol University (left) and Prof. Chwen-Ming Shih, Chief Secretary, Taipei Medical University

planning and development of the university. This interaction reflects the delegation's goals of improving staff capacity, presentation and management skills, and gaining experience communicating in a foreign country.

Mahidol staff brought up TMU's strengths in worker mindset and organization as something they could incorpo-

rate in their jobs back home. They saw TMU staff as tidy and organized in their workspaces, as well as having diligent, self-disciplined, and hardworking attitudes. TMU staff's ability to communicate in English was also praised as being helpful and going a long way towards running international activities smoothly. Mahidol staff also appreciated TMU's modern research facilities, as well as the atmosphere of the iCollege area that gives students a place to take a break and relax when free from classes.

The delegation's visit to TMU was a great opportunity for staff from both schools to learn more about each other, and for Mahidol staff to find new ideas to help them meet President Mahaisavariya's goal of increased internationalization and intercultural expansion. TMU Vice President Wu hopes that this cooperation visit can help "develop a wider scope of cooperation and create another chapter of collaboration" for future academic and research alliances.

Building on the close working relationships shared between the two institutions, this visit will help bring Mahidol University and TMU closer than ever before. 





TMU Spotlight

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