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XIAMEN UNIVERSITY NEWSLETTER Centenary Special

Xiamen University Newsletter

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厦門大學 XIAMEN UNIVERSITY

XIAMEN UNIVERSITY
CENTENARY CELEBRATION
1921-2021

Featured Story

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President Xi Extends Congratulations on XMU's Centenary

BEIJING, April 6 (Xinhua) -- Chinese President Xi Jinping on Tuesday extended congratulations and greetings to faculty, students and alumni of Xiamen University as the university marks its 100th anniversary.

Xi, also general secretary of the Communist Party of China (CPC) Central Committee and chairman of the Central Military Commission, made the remarks in a congratulatory letter to the university.

In his letter, Xi hailed the university's glorious tradition and the patriotic, revolutionary and scientific ethos as well as the spirit of pursuing excellence which it has cultivated over its 100 years of existence.

The president also expressed appreciation for the university's efforts in fostering a large number of talents who have made contributions in making the country stronger and more prosperous, bringing happiness to the people and spreading Chinese culture overseas.

He expressed hope that the university will further carry out the CPC's education policy, earnestly concentrate on fostering virtue through education, cultivate talents for the Party and the country, and build itself into a world-class university.

Xi also called on the university to enhance its capability of serving regional development and national strategies and work to consolidate the unity and cohesion of the Chinese nation.

Founded in 1921 by Tan Kah Kee, a renowned leader of overseas Chinese, Xiamen University, in the city of Xiamen in east China's Fujian Province, is the first university founded by an overseas Chinese in the history of modern Chinese education. It boasts over 400,000 alumni.

Xiamen University
Newsletter
Centenary Special

1921-2021 厦门大学 XIAMEN UNIVERSITY

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Xiamen University Newsletter is a publication for alumni and friends of Xiamen University and is produced by the Office of International Cooperation and Exchange. Please feel free to contact us if you have any suggestions. We sincerely appreciate any idea that can help improve the publication.

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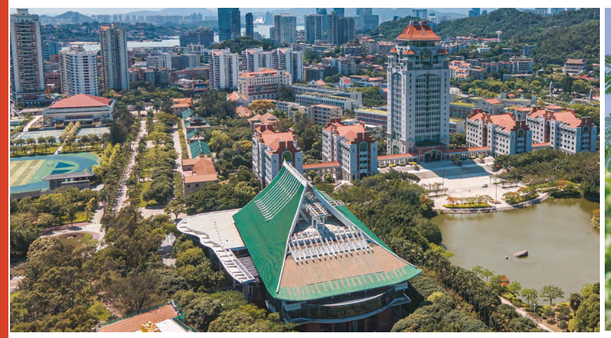

Milestones In A Century Of Discovery 1921-2021

1921

Tan Kah Kee, an overseas Chinese philanthropist, founded the private Xiamen University (XMU).

1937

The university became stateowned, and the renowned physicist, Pen-Tung Sah, was appointed as its first president.

1938

Ya-nan Wang, who later became XMU's first president after the founding of the People's Republic of China, along with an XMU alumnus, Dali Guo, completed the first Chinese version of *Das Kapital*, a significant contribution to the development of Marxian economics in China.

1952

XMU was designated as one of China's 14 comprehensive universities.

1963

XMU became one of the 26 national key universities directly governed by the Chinese Ministry of Education.

1987

The State Key Laboratory of Physical Chemistry of Solid Surfaces was approved. It has been rated as 'Excellent' for five consecutive years in state key laboratory assessments,the only one of its kind in chemistry to achieve this honour in China.

1988

Seven disciplines, including finance, statistics, accounting, higher education, specialized history, physical chemistry, and zoology, were approved as national key disciplines.

1995

XMU was listed among the national '211 Project'.

2001

XMU was listed among the national '985 Project', which aimed at developing worldclass universities.

2016

Xiamen University Malaysia was launched, making XMU the first Chinese university to open an independent campus overseas.

2017

XMU was selected into the national Double First-Class Initiative.

2021

The World Health Organization (WHO) announced the first Chinese Human Papillomavirus (HPV) vaccine developed by Xiamen University and Xiamen Innovax Biotech CO., LTD. got WHO Prequalification (PQ). This is the first China-developed anti-cervical-cancer vaccine that has obtained PQ.

A History Of Discovery Expands Into The Future

A conversation with
ZHANG RONG
President, Xiamen University

Seeking to address national strategic needs and contribute to economic development, we have set development strategies to promote research innovation capacities.

Q: What kind of culture has Xiamen University developed over its 100-year history?

At Xiamen University, we embrace a culture of gratitude, openness, innovation, and harmony. In 1921, underpinned by a belief that education provides a solid national foundation, the philanthropist, Tan Kah Kee, founded Xiamen University. He put his heart and soul into developing the university and we are grateful for his efforts, and the support received from the government and all circles of life over the years.

Because Tan Kah Kee was a renowned Chinese expatriate, we have the tradition of integrating the essence of Eastern and Western cultures, and have had many students and faculty members with overseas experience since the early days. Today, with 400 international teachers and 3,000 international students, we are one of the most active universities in international exchange, with activities ranging from research projects to conferences and summer schools.

With many firsts in China's higher education history, including the first department of aerospace, marine science, and journalism and communication, we strive to set standards. Following an innovation-driven development strategy, we have achieved internationally-recognized original results in chemistry and chemical engineering, biomedicine, marine science, energy, materials science, intelligent manufacturing, and artificial intelligence.

Located in the garden city of Xiamen, on the coast, we also boast a beautiful campus, with harmony between natural and built environments. We encourage diversity, and seek to provide a platform for people with different cultural backgrounds to grow.

Q: How do you promote science and technology innovation at the university?

Aiming at frontier science, and seeking to address national strategic needs and contribute to economic development, we have set development strategies to promote research innovation capacities. We are forging ahead with systemic reforms to ensure our research is guided by objectives and societal needs, is better organized and based on a model of team collaboration. We are also enhancing strategic planning for more forward-looking research and for achieving more breakthroughs in key, cutting-edge, or disruptive technologies.

Another effort is to construct big, integrated platforms, managed with new models, to improve cross-disciplinary integration, and our capacity for major research projects. We are taking part in international big science projects, and domestic projects focusing on research infrastructure construction, so that we can be integrated in national and global networks.

We also emphasize research translation and commercialization to benefit society. This includes building an innovation technology research institute to gather global resources, and several research translation bases to accelerate the application of results. Our efforts on disease control and drug development for HIV/AIDS and hepatitis, for instance, have led to useful technologies and products.

Q: What measures have you taken to enhance faculty teams?

A top-tier faculty team is essential for building a first-class university, and gathering talent has always been our tradition. In recent years, with faculty team-building as a focus of our work, we have emphasized both attracting and cultivating talent. We've hired an average of 110 faculty members from across the world each year, and emphasize personal development, providing space to grow professionally.Training programmes are offered to young teachers, with opportunities for exchange and collaborative research at world-leading universities. To enlarge the talent reservoir, we are also reforming our post-doctoral system, improving compensation and evaluation mechanisms for postdocs. With an emphasis on high-end young talent, we have initiated programmes to support salaries, research funding, lab space and facilities, and housing. We've now gathered a group of people with great potential and innovation capabilities.

Q: What do you promote in education?

We cultivate our students' leadership roles to help them become leading lights in their fields. While emphasizing their specialty knowledge, we endeavour to inculcate within them a strong sense of social responsibility. They also need to be quick learners to keep pace with the times. This means having an open attitude, a global vision, and good cross-cultural communication abilities.

With student education a core mission, we are now promoting educational reform and fostering student creativity and initiative by transforming teacher-centred learning to student-centred, with an emphasis on students' personalized needs. The reform uses new training models that integrate education with research, promote interdisciplinary work and encourage academia-industry collaboration. We also cultivate students' innovation and entrepreneurial spirits, encouraging their independent thinking. To ensure high-quality education, we have also established an assessment system to annually check our training objectives, models, processes and results.

Q: How does the university enhance its global connections?

The university's development is not independent of the global network. We are enhancing multi-channel, multi-level international collaboration. With the 'G50 Strategic Partnership Plan', we have established links with 50 world-renowned universities, and are encouraging various school-level collaborations.

We have leveraged our geographical advantages as the starting point of the Maritime Silk Road by initiating the University Consortium of 21st Century Maritime Silk Road, which comprises 61 universities from 17 countries or regions. With the launch of the Tan Kah Kee research vessel, we are building a platform for training global marine science researchers.

A key step in our globalization strategy also includes the launch of our Malaysia campus in early 2016. As a milestone in Sino-Malaysia higher education collaboration, it has become a key platform for promoting cultural exchanges between China and Southeast Asia, and sets a new model for Chinese universities. As a way to promote educational collaboration and share resources, joint schools are also encouraged. An example is a school in creative arts co-established with the University for the Creative Arts (UCA) in the United Kingdom, a national first of its kind. Despite the challenges of the COVID-19 pandemic, I believe international collaboration is essential for becoming a world-class university.

Q: What are the latest moves for Xiamen University Malaysia (XMUM)?

As the first Chinese university branch campus overseas, XMUM is committed to becoming an international university with first-class teaching and research, a diverse culture, and global influence. With support from governments of both countries, it has made significant progress in academic development, student education and research.

With five schools and more planned, it has set up a multidisciplinary academic framework. In September 2019, it conferred degrees to its first batch of graduates. Among its 6,000 current students from 29 countries, some undergraduates have already published papers in international journals, or won innovation-themed contests. These achievements rely on an international, high-quality, diverse faculty team with nearly 300 dedicated teachers, as well as a fantastic management team. The new campus is already undertaking more than 20 research projects, leading to publications in high-quality journals and multiple academic awards. XMUM is also broadening its international ties and extending its social services, with construction of an expanding infrastructure, research and teaching facilities.

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A Century Of Progress

Championing sustainable growth has been central to this 100-year-old university with award-winning faculties, renowned research results, and advanced infrastructure. It is now poised for greater academic excellence.

In 1921, Tan Kah Kee, an overseas Chinese philanthropist, founded Xiamen University (XMU) in southeast China's Fujian Province. His goal was to improve the well-being of society, and boost the country through enhanced education, so he tried to recruit the best faculty members to ensure academic excellence. His vision is encapsulated in the university motto 'Pursue Excellence, Strive for Perfection', which has been driving XMU's century-long development, according to Rong Zhang, president of XMU.

Now a leading university, XMU is internationally recognized for its multidisciplinary research excellence. With a culture of innovation, it emphasizes enhancing science and technology capacities, and promoting transformation of its results to serve societal needs.

Accelerating science and technology innovation

While focusing on the most cutting-edge issues in science, research at XMU also taps into national strategic development needs. A good illustration is the development of a sounding rocket, Tan Kah Kee-1, first launched in April 2019. The reusable rocket reached an altitude of 26.2km, before returning to the ground. It features a 3D forebody, designed to address shockwave impacts. This rocket can be used for aerodynamic flight tests, and contributes to the national goal of improving nearspace travel, and boosting the aerospace industry. Remarkably, researchers at XMU's School of Aerospace Engineering completed the rocket design in only seven months.

Known as 'the cradle of China's higher education in marine science', XMU covers national sea exploration with the launch of a research vessel, also named Tan Kah Kee (R/V TKK), in honour of the university's founder. As one of China's most advanced and versatile new research vessels, the ship has, since her delivery in 2017, already sailed more than 80,000 nautical miles in nearly 30 research cruises. She accomplished the GEOTRACES-China expedition last year, China's first scientific cruise to study trace elements and their isotopes in the marine biogeochemical cycles. Equipped with advanced laboratories and state-of-the-art instruments, the ship also serves as a training platform for young oceanographers. The 'XMU at Sea' educational programme onboard R/V TKK bonds XMU and its Malaysia campus (XMUM), promoting international exchange and collaboration in ocean sciences.

To improve population health, XMU biomedical scientists work on biotechnologies that bring widespread public benefit. The HIV test kits they developed have been used in more than 40 countries and regions, serving 800 million people. For the control of hepatitis, XMU researchers, after years of research, have revealed structural characteristics of the virus, and developed genetic engineering techniques for large-scale preparation of antigens, leading to test kits and vaccines for hepatitis E. With industry partners, they have also co-developed vaccines for human papillomavirus, along with monoclonal antibodies to many viruses, including the avian influenza virus, enteroviruses, and coronaviruses. Their patents are highly cited, and two XMU professors were listed among *Nature Biotechnology's* top 20 translational researchers in 2016, for the impact of their published work and patents—the first time researchers from the Chinese mainland made the list.

In response to the COVID-19 crisis, an XMU team developed assays for the detection of antibodies or nucleic acids to the SARS-CoV-2 virus, based on a double-antigen sandwich format, along with other reagents. For these test products, they have obtained certification for marketing in China, USA, Europe, and Australia. More recently, they launched the phase II clinical trial for a COVID-19 nasal spray vaccine candidate, co-developed with industrial and academic partners.

Addressing the diverse applications of analytical tools from materials science to energy and bioscience, chemists at XMU have extended to transition metal surfaces for surface-enhanced Raman spectroscopy (SERS), a molecular vibrational spectroscopy with ultrahigh surface sensitivity. The shell-isolated nanoparticle-enhanced Raman spectroscopy (SHINERS) they invented can be used in trace analysis on any surfaces or materials. It enables in-situ investigations of intermediates and dynamic processes of important catalytic reactions, revealing the reaction mechanisms at the molecular level. They developed electrochemical tip-enhanced Raman spectroscopy (EC-TERS) for nanoscale analysis of solid-liquid interfaces with their chemical fingerprints.

In humanities and social sciences, XMU has developed unique strengths in Taiwan studies,Southeast Asian studies, as well as research on higher education, economics, and accounting, with numerous research reports published.

Research innovations at XMU have also improved its rankings. It is ranked 54th among global academic institutions, based on the Nature Index 2020 Annual Tables. And 18 disciplines are ranked among the global top 1%, according to Essential Science Indicators (ESI) field ranking. Within China, XMU's chemistry, marine science, biology, ecology, and statistics disciplines were selected for the national Double First-class Initiative.

Enhancing talent incubation

Cultivating professional talent is a central focus of XMU. As a pioneer in China's higher education, XMU has many firsts, including cultivating China's first doctorate degree-holders in fields from accounting, auditing, and finance, to oceanography and higher education. Since 1921, XMU has produced more than 400,000 graduates, many of whom have become distinguished scientists, educators, entrepreneurs, or social activists. More than 60 members of the Chinese Academy of Sciences or the Chinese Academy of Engineering have either studied or worked at XMU.

With recent efforts to implement education reform, XMU has an emphasis on student-centred learning, to align with rapid technological revolution. Its undergraduates are actively involved in scientific innovation. In China's fourth 'Internet+' competition, held in 2018, XMU ranked first in the number of awards won among participating institutions. It was also selected by UNESCO as a model case for building an effective 'internal quality assurance' system, a catalyst for higher education reform.

Reaching out globally

Building a global university is another goal of XMU, set out at its beginning. "Going global is important for us to gather education and innovation resources," says Rong Zhang. "It allows us to play a greater role on the world academic stage."

With an international vision, and an open attitude, XMU has forged partnerships with more than 250 universities across the world, and has initiated or participated in 14 multilateral platforms. XMU has also co-established 14 Confucius Institutes and 46 Confucius Classrooms in 12 countries and regions.

Expanding from its three campuses in Xiamen, XMU launched XMUM in early 2016, opening a new era for its 'go global' strategy. XMUM aspires to become a university with a distinct global outlook, featuring first-class teaching and research, and embracing cultural diversity. It currently has nearly 6,000 students from 29 countries. Its campus, which will be fully completed in 2023, will boast state-of-the-art facilities and multidisciplinary programmes, strengthening XMU's ties with the rest of the world.

Committed to advancing the frontiers of knowledge, cultivating professional talent, and expounding world cultures, XMU is poised to become a world-class university in its next century. "We are confident of becoming a major force of science and technology innovation, a source of novel ideas, and a base for talent incubation," says Zhang. "We will extend our founder's ambition of advancing social progress."

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01 National Diplomatic Talent Contest for College Students Held at Xiamen University

On 18 July, the 12th National Diplomatic Talent Contest for College Students was held at Xiamen University (XMU). Twelve teams of student from top universities such as Renmin University of China, Nankai University, Tongji University, Lanzhou University, Wuhan University, Sun Yat-Sen University and China Foreign Affairs University participated in the contest.

The contest is a national high-level diplomacy and international politics contest initiated and hosted by the School of International Relations/Research School for Southeast Asian Studies of XMU. Revolving around global peace and development, the contest this year had an in-depth discussion on issues of Water Resources Development and Governance of Mekong River, The Road to Peace in Syria, and Global Climate Change and Response.

Many students previously participating in the contest became diplomats and professionals in this field. XMU and other universities have been listed by the Ministry of Foreign Affairs as key candidate institutions for the campus recruitment program. Liu Xinsheng, former Ambassador Extraordinary and Plenipotentiary of the People's Republic of China to the Republic of Cyprus and scholars attended the opening ceremony of the contest. Teachers and students from various high schools were invited to observe and exchange opinions. In this way, a platform ranging from secondary schools to universities is established to cultivate international professionals, which further enhances students' patriotism and sense of responsibility.

The opening ceremony also announced the establishment of the Xiamen University International Organization Talent Development Association, and the Xiamen University Borui International Talent Education Fund. The fund aims to cultivate international professionals with global vision and patriotism. It also helps young students in different majors to join the international organizations for internships and full-time job.

02 Tencent YouTu Lab and Xiamen University Jointly Released Top 10 Artificial Intelligence Trends in 2021

Recently, the 2021 Global Artificial Intelligence Technology Conference was held in Hangzhou, China. At the Computer Vision Forum, Huang Feiyue, Deputy General Manager of Tencent Youtu Lab, officially announced that Tencent Youtu Lab and the Institute of Artificial Intelligence, Xiamen University released the *Top 10 Artificial Intelligence Trends in 2021* (hereinafter referred to as *the Trends Report*). Based on their long-term research observation on artificial intelligence, especially computer vision, the Trends Report puts forward cutting-edge predictions in several fields such as 3D vision technology, digital content industry, AI deep learning algorithms and AI core chips.

The Trends Report points out that with the further improvement of automation and interpretability of automatic machine learning and the increasing perfection of the entire architecture of AutoML, the construction of a new generation of universal AutoML platform will be promoted, ultimately realizing the popularization of machine learning. In the past few years, the great success of deep learning cannot be achieved without large-scale annotated data sets. However, with the continuous expansion of business scale, the cost of data annotation has become one of the main factors impeding enterprises' cost reduction. Besides, unsupervised and weakly supervised learning will become a new tool adopted by enterprises to address this obstacle.

At the conference, Huang Feiyue said that with the continuous upgrading of algorithms and hardware capabilities, 3D visual intelligence technology will facilitate the development of business and individual consumption. Deep learning is moving towards multimodal fusion, edge computing is integrating with artificial intelligence expeditiously, and the fairness research of AI algorithm will drive the application of AI towards universal benefit.

03 Professor Lu Yonglong Appointed by the UN to Join the Ten-Member Group on Technology Facilitation Mechanism for SDGs

Recently, Professor Lu Yonglong, academician of the Academy of Sciences for Developing Countries, the Academy of Europe, and Chair Professor at Xiamen University, was appointed by the UN Secretary-General as a member of the Ten-Member Group on Technology Facilitation Mechanism (TFM) for SDGs. In the letter to Professor Lu Yonglong, UN Under-Secretary-General Liu Zhenmin expressed, "After a global selection, the UN Secretary-General has finally selected 10 distinguished representatives to form the Ten-Member Group on TFM for SDGs. Congratulations on becoming one of them."

The Group was formed with full consideration to its members' nationalities, and consisted of prominent figures, leaders of international organizations, world-renowned scientists and entrepreneurs.

Professor Lu Yonglong has long been engaged in environmental geography, environmental ecology and sustainable development research. He participated in the scientific assessment of the UN Sustainable Development Goals organized by the International Council for Science and Technology (ICSU) in 2014. In 2016, he was invited by the UN to give the keynote speech at the UN High-Level Political Forum (HLPF) on Sustainable Development, the first HLPF since the adoption of *2030 Agenda for Sustainable Development* in September 2015. From 2019 to 2020, he was selected to serve as a member of the International Assessment Panel of Experts for the "Future Earth" Science Program on global environmental sustainability. Since 2015, he has been a member of the national panel of experts for the construction of the National Innovation Demonstration Zone for Sustainable Development Agenda to promote the implementation of China's Sustainable Development Goals.

(The College of the Environment and Ecology)

04 [China Daily] Xiamen University Teachers Praise Changting's Soil Erosion Fight

Following the Changting experience, the Fujian province county is now known for its green areas. [Photo by Hu Meidong/chinadaily.com.cn]

A group of 13 foreign teachers from Xiamen University recently visited the Changting Science and Education Museum of Soil Erosion Control to study how Changting county in Fujian province has successfully overcome its issue of severe soil erosion.

At present, the world is facing more and more environmental challenges, said Stephan Steinke, a professor at Xiamen University. Changting's successful experience in controlling soil erosion shows that we can deal with these challenges and let the environment return to its original state.

Changting used to be one of the areas with the most serious soil erosion in the red soil region of southern China. At that time, there was almost no grass on several mountains and they were full of loose red soil.

In 2000, the comprehensive control of soil and water loss in Changting was listed as a practical project of the CPC Fujian Provincial Committee and the Fujian Provincial People's

Government.

After more than 20 years of hard work by the local government and people, the former barren mountains have been turned into oases, greatly improving local ecological and environmental systems, as well as contributing to the area's rural revitalization efforts.

File photo shows the formerly barren mountains in Changting. [Photo by Hu Meidong/chinadaily.com.cn]

The Science and Education Museum of Soil Erosion Control details the Changting experience with a large number of materials. Official statistics show that from 1999 to 2020, the area of soil erosion in Changting was reduced from 70,440 hectares to 21,000 hectares, while the rate of soil erosion was decreased from 22.74 percent to 6.78 percent, which was lower than the average level of Fujian province.

Pavlo Dral, a chemistry teacher at Xiamen University, said: Changting's response to soil erosion is good decision-making. This is an example of how a country actually fights against ecological damage to prevent it from falling backwards.

He added that China's experience in environmental protection could also be shared with other countries like Ukraine, his home country, which also faces deforestation issues.

Doctor Sayed Ali Khan, associate researcher at the School of Electronic Science and Engineering at Xiamen University, said that Changting has achieved remarkable results in soil erosion control.

The most important thing is that the government attaches great importance to it and invests a lot of manpower and material resources to fight this protracted battle, Khan added.

In his opinion, a good environment will attract more people to live, and a good ecological environment can also drive the development of industry and economy.

05 XMU Students Won the Undergraduate 2nd Runner Up and Gold Medal in iGEM 2020

The 2020 International Genetically Engineered Machine Competition (iGEM) came to a successful end on 23 November 2020. Because of the pandemic, the iGEM competition-Giant Jamboree was held online this year, which attracts 256 teams to participate from all over the world.

The Award Ceremony was held on 22and 23 November 2020. The team of Xiamen University, XMU-China, won the gold medal once again. More excitingly, they won the second runner-up with 3 awards and 2 nominations (Best Food & Nutrition Project, Best Presentation, Best Part Collection, Best New Basic Part Nomination, and Best Wiki Nomination).

Team XMU-China consists of around 20 undergraduates from various colleges, including the College of Chemistry and Chemical Engineering, College of Materials, School of Life Sciences, School of Informatics, School of Pharmaceutical Sciences, School of Public Health, College of Energy, Art College, and School of Electronic Science and Engineering. Guided by Prof. Fang Baishan from the College of Chemistry and Chemical Engineering, the team proposed the project "AnTea-Glyphosate", which utilized synthetic biology to develop an efficient detection and

degradation method on a frequently used herbicide, glyphosate, in tea and tea products. The project was started in July 2020, the team members worked day and night and showed the world with an innovative project. They also won the tenth gold medal and reached the best competition record in a decade of participating in the iGEM Competition.

Founded by the Massachusetts Institute of Technology, the iGEM Competition is the top international competition in the field of synthetic biology. The teams need to use standard Biobricks to build genetic circuits, establish an effective mathematical model, realize the delicate and complicated Artificial Biosystem prediction, control, and measurement, as well as to complete the tasks by doing social research, field practice, and poster presentations.

06 Students from College of Ocean and Earth Sciences Performed Well in the 2020 International Underwater Robot Competition

The 13th International Underwater Robot Competition (URC) was held in Qingdao from September 21 to 23, 2020. The Underwater Exploration Robot Innovation Club of the College of Ocean and Earth Sciences sent four teams to participate in the competition and won one second place, one third place and two second prizes respectively.

The International Underwater Robot Competition (URC) is a robot competition initiated by the International League of Underwater Robot (ILUR), which has been held for 13 times since 2008. This year's competition was co-organized by the China Simulation Federation, the ILUR and the Qingdao Oceantec Valley Administration, and attracted nearly 400 teams from nearly 60 universities, including Tsinghua University, Peking University, Xiamen University, Harbin Institute of Technology, Nankai University and Northwest Polytechnical University.

This is the sixth time that the Underwater Exploration Robot Innovation Club of College of Ocean and Earth Sciences has participated in the URC, and the club has won five first prizes (including two champions and two runners-ups), one second prize and four third prizes. This year the club signed up for four competitions: the Underwater Robot Engineering Technology Innovation Design, the Surface Litter Cleanup Competition, the Shallow Water Pipeline Inspection Technology Challenge, and the

Deep Water Pipeline Inspection Technology Challenge.

The Underwater Robot Engineering Innovation Design emphasis on the innovative design of underwater robots and the application prospects. Therefore, the club made full use of their marine discipline background and adopted the bionic design concept to design an amphibious robot suitable for mudflat operation, taking the mudskipper as the bionic prototype, which was prized for its ability of mudflat movement that traditional amphibious robots do not have. The Surface Litter Cleanup Competition focuses on the pollution problem of floating litter in small water areas such as artificial lakes, rivers, ponds, and scenic spots, and proposes the need for practical applications of unmanned boats for efficient surface litter cleanup. The club targeted this need and designed a surface litter cleanup boat that is remotely controlled could detect litter automatically using a front-facing camera, locate and collect surface litter based on machine vision, achieving intelligent cleanup of surface litter. In the field demonstration session, the surface litter cleanup boat accurately collected and removed all the litter in a relatively short period of time. The Pipeline Inspection Technology Challenge focuses on the inconvenience of manual inspection for underwater pipelines, and proposes the prospect of using autonomous intelligent underwater robot fish to inspect pipelines. The club used image vision technology, based on the digital features of the underwater images taken by the robot fish, to complete a round of the pipeline inspection and alert to the oil spill. In the competition, the club's inspection robot not only completed a round of inspection, but also accurately detected all the oil spills.

In recent years, College of Ocean and Earth Sciences attaches great importance to the cultivation of students' innovation and entrepreneurship skills, and actively encourages and supports students to participate in various innovation and entrepreneurship competitions related to oceanography. The Underwater Exploration Robot Innovation Club was organized by the College in December 2015 and approved as the Xiamen University Undergraduate Innovation and Practice Platform in September 2016. And its research content integrates

many disciplines such as marine acoustics, information signal processing, robot design, machine learning, etc. The club is dedicated to the development of hydroacoustic functions and autonomous movement of bionic robot fish, used in the field of bionic sonar detection, marine life protection, marine environment monitoring. Since its inception, the club has played an active role in cultivating students' innovative and practical abilities, teamwork spirit, and improving their professionalism.

(College of Ocean and Earth Sciences)

07 XMU Held The International Forum on Humanities and Social Sciences

From 4-7 April 2021, Xiamen University staged International Forum on Humanities and Social Sciences. The forum aimed to make Chinese culture a better contributor to the global cultural community and boost the communication and mutual learning between different cultures. As a platform for dialogues between experts and scholars in the domain of humanities and social sciences, the forum worked to demonstrate XMU's achievements in this field and push forward the establishment of a world-class university with Chinese characteristics and XMU style. The 12-subforums attracted over 1800 experts and scholars from 28 countries with the theme "humanities and social sciences in a community with a shared future for human".

On the afternoon of 6 April, the opening ceremony of the forum commenced. Zhang Rong, president of Xiamen University, delivered a welcome speech, and Yang Bin, the vice president, performed as the host. Attendants included Li Peilin, member of the National People's Congress Standing Committee, Jean-Marie Gustave Le Clézio, the Nobel Literature Prize winner, and representatives of XMU alumni, faculty and students.

President Zhang pointed out that humanities and social sciences represented a nation's soft power and the degree of cultural development. With a long history of the discipline, XUM had, since the implementation of the reform and opening-up policy, taken full advantage of its regional potentials and made "XMU-style" achievements in domains like history and anthropology, economics, accounting, and higher education. In an era of unpresented changes, it would be feasible to improve mankind's wellbeing and achieve sustainable growth through all-range and profound international exchanges and cooperation.

Following the opening ceremony were 12 subforums. Hundreds of experts and scholars of XMU and their peers at home and abroad had focused on significant topics and discussed how to build the discipline of humanities and social sciences in a community of shared future for mankind. Such topics included global humanism, intercultural transmission, climate and energy finance, theory and practice of global legal governance and so forth. Experts and scholars strived to seize opportunities in the course of historic changes and discover, from different perspectives and various fields, ways for international academic communication, collaboration, and mutual learning among different cultures.

08 XMU Team Once Again Got Top Award in CUPT

On October 16, the 11th China Undergraduate Physics Tournament (CUPT) was held online at Zhejiang University. After heated competition, the Xiamen University Team finally stood out from 63 teams from 62 universities and ranked among the top ten, winning the First Prize again.

The China Undergraduate Physics Tournament is one of the most important university innovation competitions for college students to implement the Outline of the National Strategy of Innovation-Driven Development and the Outline of the National Education Medium- and Long-term Development. The Xiamen University Team has repeatedly won top awards since its participation in 2015.

In recent years, the College of Physical Science and Technology has used the academic competition as a tool to sharpen students' innovation skills. Meanwhile, the college has set up a team of teachers and engineers to offer guidance to the particpating students, optimized the competition mode and incorporated it into the training progams of students' innovation skills. In addition, innovative experimental physics courses have been offered, XMU Physics Tournament (preliminary and final rounds) held twice a year, and excellent students picked out for the CUPT regionals and nationals. At present, the CUPT training system has become one of the entry-level training programs unique of the Department of Physics and is open to all students of the university. Up to now, this tournament has attracted an increasingly number of XMU students across the university from a wide variety of science and engineering majors including physics, astronomy, electronics, aeronautics, electromechanics, power engineering, applied mathematics, chemistry, materials, biology, etc.

09 XMU and Partners Roll Out Covid-19 Test Kits to Speed Up Diagnosis of the Viruses

On February 14, the clinical trial demonstrated higher sensitivity and specificity of the antibody test kit for the detection of COVID-19. The test kit, based on the technique of double-antigen sandwich-based enzyme-linked immunosorbent assay (ELISA), is the fruit of XMU's parnternership with The Third People's Hospital of Shenzhen and Beijing Wantai Biological Pharmacy Enterprise Co., Ltd., a subsidiary of China's YangShengTang Group (hereinafter referred to INNOVAX). Of the 173 confirmed covid-19 patients in this trial, 93.1% were tested positive for antibodies, while none of the 33 healthy subjects were tested positive. This is the first novel coronavirus total-antibody testing reagent that has been put into a large-sample clinical trial. The reagent can simultaneously detect all the novel corona-specific antibodies including IgM and IgG with higher sensitivity, and its specificity is better ensured by the method of ELISA. Another chief merit of the reagent is the rapidity of testing, making it possible for two medical workers to run 1500 tests within 12 hours.

In face of the sudden outbreak of the epidemic, Xiamen University immediately set in motion the emergency scientific research. By joining forces with the Third People's Hospital of Shenzhen and INNOVAX, multiple novel coronavirus antibody test kits have come out one after another, including the ones of total antibody, IgM antibody and IgG antibody.

INNOVAX is now stepping up its efforts to ramp up the production of the novel coronavirus antibody detection reagent based on the technique of ELISA, and in the meantime, the company is applying for the green channel for registration. At present, the production capacity of this month can provide 100,000 Covid-19 tests, and in one month's time, it will be further expanded to provide up to 1 million tests per month. Its subsidiary, Xiamen Innovax Biotech CO., LTD., is switching to the production of the novel coronavirus antibody detection reagent using chemilumineseent immunoassay technology (CLIA). This reagent has been shown to be efficient, high-throughput, and fully-automatic, and thus better preventive of the risk of viral infection among medical staff during operation.

Source: School of Public Health

10 NSFC-BC Researcher Links Workshop of Electrochemistry for Energy Applications Successfully Held

From 10 to 12 May 2021, the College of Chemistry and Chemical Engineering of Xiamen University and the University of Aberdeen jointly organized the NSFC-BC Researcher Links Workshop-Electrochemistry for Energy Applications: Experiment Meets Theory. This workshop was co-chaired by Professor Jun Cheng from Xiamen University and Professor Angel Cuesta from the University of Aberdeen, UK. Due to the COVID-19 and time difference, the workshop took an innovative form consisting of offline sessions for the domestic participants and online sessions for both Chinese and UK speakers. A total of 58 researchers from China and the UK participated in the workshop.

The workshop invited Professor Shigang Sun from Xiamen University, Professor Lin Zhuang from Wuhan University, Professor Michiel Sprik from Cambridge University, and Professor Ismael Diez-Perez from King's College London as academic mentors. During the three-day workshop, 39 researchers from China and the UK gave talks on the following six topics: 1. Energy conversion and storage: Batteries; 2. Electrified Interfaces; 3. Machine learning and robotics in electrochemistry; 4. Electron transport in molecules and connection to bioelectrocatalyisis; 5. Energy conversion and storage: Photoelectrocatalysis; 6. Energy conversion and storage: Electrocatalysis. A round table discussion was then held after each session.

On the topic of battery, researchers discussed the current progress of various battery systems and challenges, such as the thermal stability of solid electrolyte interface (SEI) membranes. In the study of the electrified interfaces, experts discussed the in operando characterization of electrochemical systems using spectroscopy techniques, as well as computational methodologies for modelling electrochemical interfaces. For the topic of machine learning and robotics in electrochemistry, attendees focused on sharing the latest achievements of machine learning in electrochemistry, such as machine learning potentials to achieve nanosecond molecular dynamics simulations of electrochemical systems with the ab initio accuracy. In terms of electron transport in molecules and connection to bioelectrocatalyisis, speakers reviewed the development of single-molecule conductance and how to control electric fields or mechanical forces to manipulate chemical reactions, and demonstrated their latest works. Experts in photoelectrocatalysis talked about the issues of traditional optoelectronic materials, such as low utilization rate of solar energy and challenge in charge separation, the methods developed to overcome these problems, and strategies to screen new materials. The topic of electrocatalysis focused on energy storage and conversion. Several experts introduced their current works, especially in CO_2 electrochemical reductions, and put forward new ideas on the road to CO_2 emission reduction and carbon neutrality.

The participants highly praised the organization of this workshop and its fruitful outcomes. The workshop has promoted the research cooperation between Chinese and UK researchers in the field of electrochemical energy conversion and storage, serving as an important platform for academic exchange and collaboration between China and UK.

⓫ XMU Basketball Team Won the Third Place in the 23rd CUBA

From June 18 to 20, the 23rd China University Basketball Association (CUBA) Final Four kicked off at Suzhou Bay Sports Center. On June 19, XMU defeated Beijing University of Chemical Technology by 93-84, winning the third place, which was the second time that XMU scaled the heights.

Many XMU alumni cheered for the team on-site, creating a home field atmosphere for the team. In the semifinals, in particular, alumni from various cities in the Yangtze River Delta gathered at the Sports Center and cheered for the XMU men's basketball team.

Though the 23rd CUBA is finished, XMU men's basketball team is still on the way towards progress. We believe that they will make breakthroughs and better achievements in the future.

⓬ XMU Held The International Chinese Educational Forum

On 5 April, The International Chinese Educational Forum was held at XMU Science and Art Center. Given the pandemic, the forum entailed both online and in-person channels. Over 40 experts and scholars in the field attended in-person. The discussions were themed on topics "International Chinese Education in a Post-pandemic Era" and "Opportunities and Challenges for the Development of International Chinese Education".

The forum kicked off with two traditional Chinese dances. Mao Tongwen, Deputy Dean of Chinese International Education College/Overseas Education College, addressed the audience firstly, expressing warm welcome and sincere appreciation to the experts and scholars present at the forum. He said that the compound of unprecedented pandemic and profound changes had posed both challenges and opportunities to international Chinese education. As a response, XMU hoped, through the forum, exploring new ways of international Chinese education. The forum also served as part of XMU's efforts to promote international exchanges, promote Chinese cultures, and help build a community with a shared future for mankind.

XUM has a long history of international Chinese education, during which the Overseas Education College was established early in 1956. Ever since then, XMU has been always committed to its founder, Mr. Tan Kah Kee's philosophy of studying profound knowledge, nurturing specialists, and embracing various cultures, and has shouldered the responsibility to boost cultural exchanges, pushing forward the educational communication and cooperation between China and the rest of the world. In recent years, 14 Confucius Institutes and 46 Confucius Classes have been successively co-launched in 12 countries and multiple international cooperation programs expanded. All of this has promoted the development of local Chinese education and cultural communication.

During XMU's centenary, Chinese International Education College/Overseas Education College will carry out activities including International Chinese Educational Forum, XMU International Chinese Education Exhibition and the book release of *the Stories of Confucius Institutes in Xiamen University*.

⓭ XMUM Student Wins National Second Prize at 12th Lan Qiao Cup National Software & IT Professionals Competition

Lin Xinzhi, a senior student from Computer Science and Technology Programme, Xiamen University Malaysia, won second prize (national level) at the 12th Lan Qiao Cup China Software and IT Professionals Competition.

Lin participated in the C/C++ programming category under the supervision of Assoc. Prof. Wang Yiju from XMUM School of Electrical and Computer Engineering. In April 2021, he won first prize in the Fujian province and was qualified for the final competition at the national level. After three months of intensive training, Lin obtained the national second prize with his outstanding performance. "This is my first national-level algorithm design competition," said Lin, "it deepened my understanding of fundamental algorithms, making me more competitive in the future job market."

First launched in 2010, Lan Qiao Cup National Software and IT Professionals Competition is one of the largest contests of this kind in China. Organized by the Ministry of Industry and Information Technology Exchange Center and China Higher Education Student Information and Career Center, the contest has attracted over 40 million participants from more than 1,200 leading higher education institutions, including Peking University, Tsinghua University, Fudan University and Zhejiang University.

Xiamen University Held the Global University Presidents' Forum

On April 5, on the occasion of Xiamen University's centenary celebration, the Global University Presidents' Forum was held at the Science and Art Center, Xiamen University with both on-site and online participants. University presidents and representatives from nearly 50 universities of 21 countries and regions were present in the Forum to cement friendship and seek common development. President Zhang Rong attended the Forum with Vice President Yang Bin, who served as the host. On-site attendees include Li Dejin, Deputy Governor of Fujian Provincial People's Government; Lyu Jian, member of the Chinese Academy of Sciences(CAS) and President of Nanjing University; Fan Liming, President of Shandong University; Yan Chunhua, Member of the CAS and President of Lanzhou University; Song Yonghua, President of the University of Macau; Ding Kuiling, Member of the CAS and Executive Vice President of Shanghai Jiao Tong University; Huang Wei, Member of the CAS, Deputy Director of the Administrative Committee and Director of the Academic Committee of Northwestern Polytechnical University; Wu Xiaolin, President of China University of Petroleum, Dai Minhan, Member of the CAS and Director of the State Key Laboratory of Marine Environmental Science (Xiamen University).

President Zhang Rong delivered a welcome speech on behalf of Xiamen University.He mentioned, COVID-19 has posed new challenges to higher education globally, and the role and responses of universities have become the focus of the world's higher education community. Facing the challenges of the pandemic, universities around the world have worked together to provide scientific and intellectual support for the fight against the pandemic through the innovation of teaching models and international exchanges and cooperation. At this critical turning-point, Xiamen University has also played a crucial role in making contributions in key fields such as educational reform and scientific research. With a century-old tradition of opening up, Xiamen University will continue to implement internationalized strategies, elevate international exchanges and cooperation, integrate itself into the world's higher education landscape in order to collectively address global problems and make further contributions in the new era in terms of exchanges and mutual learning among civilizations and shaping a shared future for mankind.

In his speech, Li Dejin pointed out that, Fujian is not only the starting point of the ancient Maritime Silk Road but also the core region of "the 21st century Maritime Silk Road" initiative. Fujian

Provincial Party Committee and People's Government have always prioritized the development of education, committed to opening up and striving to encourage substantial cooperation with universities all over the world. Expectations on universities, the cradle of talent cultivation and the center of scientific and technological innovation, are high. It is expected that universities will take the initiative to respond to challenges such as deglobalization in the post-pandemic era. Sincere cooperation and close communication will break barriers and bottlenecks and consequently leads to common growth. A global community with a shared future will finally be forged. In the end, Li Dejin invited university presidents to visit Fujian in person, to participate in the Belt and Road Initiative, and to advance friendly exchanges.

Tan Eng Chye, President of National University of Singapore, congratulated Xiamen University on its 100th anniversary and wished the Forum a great success. He pointed out, against the backdrop of the pandemic, climate change and technological advances, the world has witnessed an increase in uncertainty and complexity, which leads to more severe risks threatening all human beings. For universities around the world, it is of paramount significance to concentrate on their own missions, constantly pursue innovation, and make adjustments. Upholding the mission of education, enlightenment and reform, National University of Singapore is committed to cultivating students with strong adaptability and competitiveness. By improving the training model of interdisciplinary talents, strengthening experiential, innovative and entrepreneurial education, enhancing life-long learning methods, NUS is contriving to handle challenges in the post-pandemic era and looking forward to closely cooperate with other universities for in-depth development in the future.

In his speech, Lyu Jian stated, to achieve Chinese rejuvenation in the face of the unprecedented changes in the world, a new round of scientific and technological revolution and industrial transformation is flourishing, bringing unprecedented opportunities and challenges to the reform and development of higher education. Embracing a long history of profound friendship and close cooperation, Nanjing University is willing to cooperate with Xiamen University to further intensify the traditional friendship, uphold the new development philosophy, proceed with high-quality development, and work together to carry forward "Double First-Class" Initiative. Nanjing University is also ready to join hands with all member universities to create a high-quality higher education system, an open self-reliant system for scientific and technological innovation and a support system for cultural soft power so that greater contributions can be made to boost national development and to build a community with a shared future for mankind.

In addition, the Forum witnessed Launching Ceremony of International Programs of XMU. Prof. Dai Minhan introduced the UN Ocean Decade regional cooperation project. Cliff Law, Chief Scientist of National Institute for Water and Atmospheric Research, New Zealand, made an introduction to the international project of Surface Ocean – Lower Atmosphere Study. The SOLAS office was then inaugurated.

After the opening ceremony was the discussion on the theme of "University Mission in the Post-COVID Era and Informatization of World Class Universities". The presidents of National University of Singapore, Newcastle University, University of Macau, Rice University, Chulalongkorn University, Shandong University, Namdi Azikwe University, University of Delaware, Syracuse University and University of Brunei delivered speeches respectively, and Zhang Rong delivered a concluding speech.

The Forum brought together the wisdom of Chinese and foreign university presidents, discussed the mission of universities in the post-pandemic era, explored effective solutions to drive the informatization of world-class universities, and built a sound platform for universities around the world to deepen mutual understanding, learning and communication.

Council Meeting of the University Consortium of the 21st Century Maritime Silk Road Successfully Held

On April 5th, the Council Meeting of the University Consortium of the 21st Century Maritime Silk Road (UCMSR) was successfully held at the Science and Art Center, Xiamen University. The meeting reviewed the past achievements of the Consortium and laid out a plan for further endeavors. Mr. Liu Jian, Deputy Director-General of the Education Department of Fujian Province, Prof. Zhang Rong, Chair of UCMSR and President of Xiamen University, and over 60 presidents and representatives from 36 member universities attended the meeting on-site and online. Lisa Yu, Secretary General of UCMSR hosted the meeting.

In his remarks, President Zhang Rong indicated that the Consortium upholds the Silk Road Spirit centered on "peaceful cooperation, openness and inclusiveness, mutual learning and

emulation, and mutual benefit for win-win outcomes", and has steadily increased its influence and popularity thanks to the generous support of the Education Department of Fujian Province and the active cooperation of the member universities. Regarding responses to the COVID-19 pandemic and the stable development of the Consortium, Zhang observed that firstly, we should forge ahead in line with the trend of the time and ride "the boat of cooperation" to spearhead the technological advancement and face up the global challenges; secondly, we should uphold openness and integration and establish "the bridge of cooperation" to promote internationalization and cultivation of high-level talents; thirdly, we should improve the communication mechanism and open "the door of cooperation" to pursue extensive consultation, joint contribution and shared benefits in the post-COVID era.

Mr. Liu Jian pointed out that, as an important platform and carrier for the opening up of higher education, the UCMSR leverages its strength as a higher education consortium and an academic institution, continues to improve its cooperative mechanism and carry out activities, yielding many achievements. Liu expressed

that the pandemic respects no borders, and all countries are in the community with a shared future. The higher education is obliged to make its contribution to defeat the pandemic at early stage through cooperative development, mutual integration, and innovative coordination. Liu proposed that member universities should work together in delivering cooperation in epidemic control and sharing online education resources. He added that the Education Department is about to give unswerving support to the establishment and development of the Consortium so as to promote the development of higher education in relevant countries and regions, writing a new chapter of cultural exchanges and mutual understanding.

In the meeting, Dr. Wang Huiyao, Founder and President of Center for China and Globalization (CCG), delivered a keynote speech on the topic of "Establish the Multilateral Governance Mechanism of BRI, Found the BRI University". He introduced the new achievements of BRI, proposed to shift the bilateral cooperation mechanism towards a multilateral one to promote deeper cooperation with the world, and to build "Belt and Road" Universities to strengthen people-to-people and educational exchanges with countries along the "Belt and Road".

Lisa Yu made a review of the work of the Consortium and announced the new member, Instituto Tecnológico de Buenos Aires (ITBA) to the Consortium. To promote the scientific research cooperation, Xu Zhiduan, Professor of School of Management, Executive Director of the Research Institute for Doing Business in China, Xiamen University, as well as Ji Rongrong, Professor of Xiamen University and Deputy Director of Science and Technology Department, introduced the Research Institute for Doing Business in China and the Institute of Artificial Intelligence of Xiamen University to the participating universities respectively, hoping to carry out cooperation with member universities in fields of business environment research and artificial intelligence. The guests also exchanged their views on topics of UCMSR seminar series, collaborations with other consortiums and institutes, summer programs, addition of Vice Chairmanship, and election of the Chair.

Song Yonghua, Rector of the University of Macao, Jane Falkingham, Vice President of the University of Southampton, Wu Xiaolin, President of China University of Petroleum (Beijing), Lou Yongqi, Vice President of Tongji University, and Tony Browne, Chairman of the Confucius Institute of Victoria University of Wellington spoke on how to leverage the unique strength of the Consortium and the efforts of the members to jointly tackle such global challenges as public health crisis, climate change, and aging . The Council announced the re-election of Zhang Rong as the Chair of the Consortium.

In his closing remarks, President Zhang extended his gratitude to the trust and support of member universities for re-electing him as the chair of the Consortium. He noted that as the Secretariat, XMU will continue to support the development of the Consortium. He added that XMU boasts a profound history and influence in disciplines such as oceanography and anthropology. XMU would like to carry out cooperation in such fields as maritime scientific research, climate change, meteorological disasters and the protection of cultural heritage along the Maritime Silk Road.

Initiated by Xiamen University, UCMSR was established in October 2018 and has now included 66 member universities from 20 countries and regions. Since its establishment, UCMSR has fully mobilized internal and external resources, steadily promoted various work, and has held activities such as President's Forum, International Summer Program and Photography Competition. In the future, UCMSR will further leverage its unique strength and stimulate its vitality to better serve its member universities.

The 11th GU8 Council of Presidents' Meeting Successfully Convened

As one of the important international events of the centenary celebration of Xiamen University, the 11th GU8 Council of Presidents Meeting was successfully convened online on May 19th. The attendees included presidents and representatives from University of Hull, Université du Havre, Otto von Guericke University Magdeburg, Inha University, University Malaysia Perlis and Xiamen University. Yang Bin, Vice President of Xiamen University, attended the meeting on behalf of Xiamen University.

At the opening ceremony, Zhang Rong, President of Xiamen University, delivered a speech to welcome all through a prerecorded video. In the speech, he extended heartfelt thanks to all attendees from the member universities and their best wishes to the centenary of Xiamen University, and also gave an overview of Xiamen University participating in the work of GU8 Consortium.

He expressed that Xiamen University would continue to support the development of GU8 Consortium. Susan Lea, President of GU8 Consortium and University of Hull, delivered an opening speech, in which she congratulated Xiamen University on its centenary, introduced the research results in the field of new energy and their practice in constructing a carbon neutral campus of University of Hull, and appealed to member universities to enhance cooperation and face the global challenges together.

Yang Bin reviewed the centenary celebration of Xiamen University and online summer programs. Vice president of Inha University, President of Université du Havre, the Standing Vice President of University Malaysia Perlis and the representative of Otto von Guericke University Magdeburg made speeches in turn, sharing information of student exchanges, scientific research and online resources etc.

In the meeting, Martine Currie, Secretary General of the consortium, reviewed the development history of GU8 Consortium, made a report on the construction of consortium website, selection criteria of new members, withdrawal mechanism, division of administrative duty, election of vice chairman of joint scientific research and education committee and financial conditions. Through in-depth discussion, the attendees reached a consensus on these issues and identified future directions. Hilary Layton, Director of Office of International Cooperation and Exchange of University of Hull, reported the details of the consortium website, and shared ideas of extending the influence and enhancing the visibility of the consortium. Dan Parsons, Chairman of the joint scientific research committee, introduced the preparing progress of the

International Seminar on Renewable Energy to be held on July 10th and encouraged researchers from universities to actively participate to facilitate scientific research information sharing, realize the potential of joint efforts in scientific research of the consortium and promote global carbon neutrality. Michael Hauchecorne, Chairman of the education committee, gave a report on the signing of student exchange agreements between universities of the consortium, the student exchange programs and GMBA projects. He proposed more online education resources should be provided by universities to compensate students who could not exchange offline.

Philip Gilmartin, Vice President of University of Hull, concluded the conference. He affirmed the achievements made through the meeting and he looked forward to future cooperation. He said that although the epidemic hindered the cross-border flowing of talents, the aspiration for international cooperation among member universities was even stronger, and it was gratifying that the frequency of consortium communication was not greatly affected.

During the conference, it was decided that the GU8 Council of Presidents Meeting would be held again in November this year to enhance cooperation. Yu Hongbo, Executive Director of the Office of Overseas Campus Affairs and Deputy Director of the Office of International Cooperation and Exchange, and other staff, were also present during this meeting.

Online Talks with Dalhousie University

On November 19th, Yang Bin, Vice President of Xiamen University, at the invitation of Matt Hebb, Vice President of Dalhousie University in charge of international affairs, held a video conference between XMU and UDal. Yang Qin, Officer of Intergovernmental Affairs of Nova Scotia government, Yu Hongbo, Executive Director of Office of Overseas Campus Affairs and Deputy Director of Office of International Cooperation and Exchange of XMU, as well as the staff of the Office of International Cooperation and Exchange of both universities, were also present.

Hebb greeted Yang Bin warmly and highly complemented the cooperation relationship between Dalhousie University and Xiamen University. He said, as there had been a solid foundation of cooperation between two universities, the future prospect of cooperation was promising. Since he assumed office, he had put the renewal of the Memorandum of Understanding between two universities, which would create even wider and deeper cooperation and exchange, on the agenda.

Yang said, during the long-time close partnership since the 1980s, Dalhousie University had cultivated many famous professors and management talents for Xiamen University and China. Currently, the accomplishments of cooperation between two universities in the field of oceanographic research were impressive. Thus, Yang hoped that the two universities could further deepen cooperation and exploit the advantages of each other to stimulate the interaction of different fields and disciplines. In addition, Yang briefed relevant information of Xiamen University Malaysia and proposed using its resources to energize future cooperation.

Yang emphasized, against the backdrop of the 14th Five-year Plan of China and long-term Objectives Through the Year 2035, and on the occasion of its centenary, the university would continue to use its international advantages to realize high-level opening up and high-quality development through cooperation with overseas

universities. He also hoped that if epidemic control policy allowed, he could invite Vice President Hebb to attend the centenary celebration of Xiamen University.

After more discussions on future collaborations, in the end of the meeting, both parties decided to set the renewal of the cooperation agreement at the ceremony of Nova Scotia-Fujian Sister-Province establishment.

Fujian Province is one of the three strategic cooperation provinces of Nova Scotia. Having established friendly province relationship already, the two provinces will establish sister-province relationship soon.

New Zealand Ambassador to China Pays Visit to XMU

On October 21, New Zealand Ambassador to China, H.E. Clare Fearnley, along with her delegation, visited Xiamen University and met with President Zhang Rong.

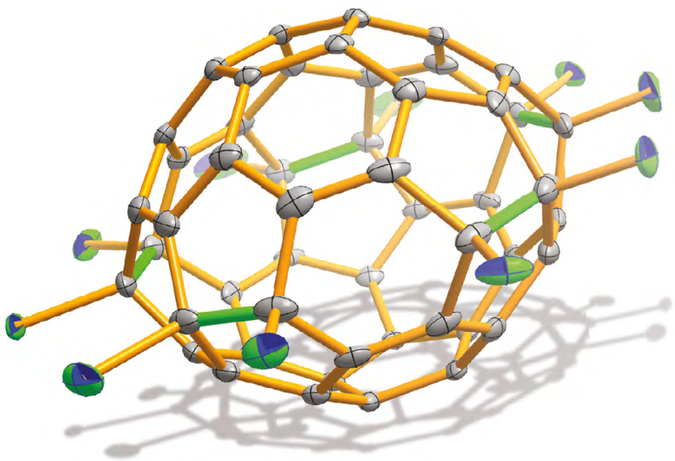
President Zhang warmly welcomed the ambassador, and introduced the history of XMU, especially its history of globalization. He pointed out that Xiamen University has always committed itself to going global, and has garnered fruitful results in exchanges and cooperation with many universities and institutions worldwide. He also mentioned that Xiamen and Wellington have bonded as sister cities, and a Confucius Institute has been jointly established by Xiamen University and Victoria University of Wellington, pushing bilateral ties to new highs. It is hoped that, with the support of New Zealand Embassy in China, the partnership between the two campuses would further develop in areas such as talent training, internationalization, academic research and cooperation in major disciplines to achieve a win-win for both.

Ambassador H.E. Clare Fearnley thanked Xiamen University for the warm welcome. She said that the establishment of the Confucius Institute by Xiamen University and Victoria University of Wellington is a gratifying outcome of people-to-people exchanges between China and New Zealand. The study of China and Chinese language education have become an area of growing importance in Victoria University of Wellington as well as other New Zealand universities, all of which have played a constructive role in cultural and educational exchanges between China and New Zealand. It is expected that this visit will enhance the mutual understanding and friendship between the two sides, and help scale up the cooperation between the two universities with respect to the construction of the Confucius Institute, personnel exchange and student training.

During the visit, H.E. Clare Fearnley also had an informal discussion with representatives from Collaborative Innovation Center for Peaceful Development of Cross-Strait Relations, School of Public Affairs and New Zealand Research Center. After that, she delivered a speech, which was received with warm applause and followed by the session of interaction between her and the students.

Unleashing Chemical Potential

Chemists at XMU are spearheading new research to find vital solutions.



XMU researchers have developed new fullerene series, including the C50Cl10 fullerene.

A founding programme at XMU in 1921, its chemistry department has been a national leader in the field. Thanks to the legacy of the predecessors, including physical chemist and former president of the Chinese Academy of Sciences (CAS), Jia-Xi Lu, and Khi-Rui Tsai, an expert in molecular catalysis and a CAS member, the push for innovation and cooperation is deeply rooted in the culture of XMU's College of Chemistry and Chemical Engineering (CCCE), nurturing generations of faculty members and students.

Dedicated to high-quality education and cutting-edge research, CCCE strives for an inclusive, vibrant and collaborative research environment to address fundamental chemistry problems and urgent societal needs. Carrying on Lu's tradition in physical chemistry, it houses the State Key Laboratory of Physical Chemistry of Solid Surfaces (PCOSS), which has been ranked at the highest level in all national appraisals since its foundation in 1987. PCOSS has profound influence on CCCE's research, ranging from experimental and computational methods for studying complex chemical systems, and synthetic chemistry for making novel molecules and materials, to technological innovations for meeting world challenges.

Tackling complex chemistry

Physical chemists at CCCE excel at harnessing instrumental and computational techniques to study surface and interface chemistries. The globally leading group for SurfaceEnhanced Raman Spectroscopy (SERS) has developed operando instrumental methodologies. They also led the construction of China's first Infrared Free Electron Laser (IRFEL) facility, which enables detailed investigation of chemical processes. Beyond revealing molecular reaction mechanisms, research at CCCE also covers chemical dynamics and kinetics, with applications in fuel cells, batteries, and electrochemical nanomachining.

CCCE's analytical chemists develop new methods and devices to solve measurement problems in biomedicine, materials, environmental, and energy sciences. Focusing on improving sensitivity, selectivity, and spatio-temporal resolution of analytical signals from target analytes, they have designed new functionalized molecules and supramolecular assemblies, built new physical and chemo-biological interfaces, and developed novel instruments, providing new tools for biomolecular recognition and sensing, single cell analysis, and disease diagnosis. Particularly, their mass and fluorescence spectroscopy technologies have improved surface-imaging performance. Their novel microfluidic systems allow for biomolecular detections, capturing and releasing circulating tumour cells for liquid biopsy, and enable genetic analysis of foetal cells using peripheral blood samples.

Making advancement in everything from chemical reactions to materials design requires powerful computational tools. An example is the Xiamen Valence Bond (XMVB) software programme for electronic structure calculations. Designed to explore the nature of chemical bonding and mechanisms of reactivity, XMVB is useful for predicting material properties, and is widely used by global researchers. Excited state calculation and quantum dynamics methods developed at CCCE open the door to studying photophysics and photochemistry of complex systems.

Mastering synthetic chemistry

Aiming to develop new synthesis methods to solve challenging chemical problems, inorganic chemists at CCCE are recognized for their achievements in cluster chemistry, and surface and interface chemistry of nanomaterials. They study new carbon, rare earth, and noble metal clusters to improve controllable synthesis and stabilization. Their novel clusters have applications in photovoltaic conversion and catalysis, along with molecular magnetism and chiral recognition. They have also characterized structures of fullerenes, a family of all-carbon clusters with wide applications, and developed new fullerene series. Their continuous combustion method enables the production of tonnes of fullerenes annually.

Engineering nanocrystallites to enhance structural diversity, CCCE inorganic chemists have also proposed a new theory to explain the growth of nanocrystals, and established an effective strategy to control their surface structure. By revealing the molecular mechanisms underlying complex surface and interface behaviours of major functional nanomaterials, they have developed multifunctional catalysts for industrial use. Their hydrogenation metal nanocatalysts, with almost 100% selectivity, can reduce polluting emissions during chemical processes.

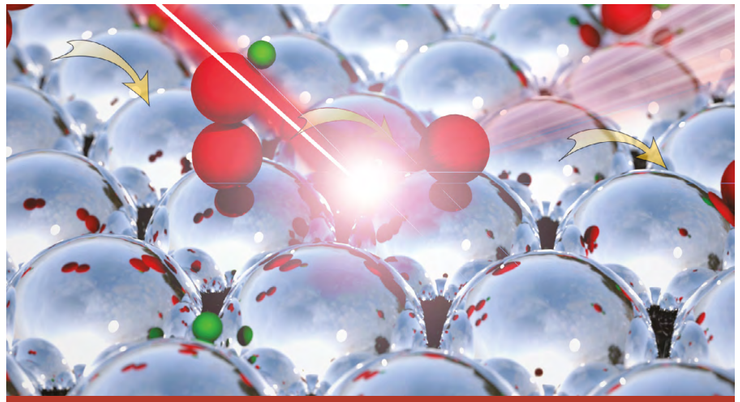
In organic chemistry, CCCE researchers have developed methods for efficient, direct, and selective transformations of amides and amines, presenting a new frontier for chemoselective synthesis. Used by researchers across the world, their approach has proved practical and ubiquitous.

They are also pushing limits on the number of metal-carbon bonds that can be built on one metal centre, a central issue to organometallic chemistry. They synthesized 'carbolongs', namely, long 'carbon scarfs', by forming several metal-carbon bonds based on extended carbon chains. These complexes boast diverse properties, including broad absorption of light of different wavelengths, and good photothermal/photoacoustic performance, ideal for use in photoelectric materials and biomedicine.

Driving interdisciplinary Innovations

The emphasis on fundamental chemistry has helped CCCE identify emerging fields that cross boundaries with traditional disciplines. It was the first in China to offer undergraduate training in chemical biology, in 2003, and energy chemistry, in 2016.

CCCE's exploration of new catalytic methods and materials for sustainable utilization of carbon resources started with the founding of the XMU Catalysis Institute in 1958, one of China's earliest to focus on energy chemistry. Its recent efforts include transforming C1 molecules with one carbon atom into multi-carbon chemicals of higher value. Their photocatalytic approaches to make use of biomass show promise for producing fuels from renewable carbon resources.



Operando and *in-situ* spectroscopic techniques help reveal reaction mechanisms at a molecular level.

They have also developed in-situ electrochemical techniques to monitor electrocatalysts real-time as they operate in batteries. This led to a cheap, noble-metal-free electrocatalyst with record-high power density for fuel cells.

In chemical biology, CCCE researchers are developing tools for in-depth life sciences studies. By exploring phosphorus chemistry, a team proposed important ideas about the origin of life, including the role of N-phosphoryl amino acid in co-evolution of nucleic acids and proteins.

Bridging biochemistry and engineering, another team developed a nano-flow cytometry technology, capable of measuring the count, size, composition, and phenotypes of nanoscale biological particles with enhanced sensitivity and accuracy. The technology has been commercialized, becoming a popular biomedical tool. Other innovations include a single-cell RNA sequencing tool combining microfluidics and DNA barcoding, new magnetic resonance imaging (MRI) probes for *in vivo* deep-tissue imaging, and multifunctional probes within organelles for *in-situ*, real-time optical tracking.

CCCE: Sparking chemical brilliance

Global recognition:
Ranked among the global **5‰** in chemistry, according to the Essential Science Indicators (ESI) field ranking

Cross-disciplinary research:
Nine sub-disciplines including inorganic chemistry, organic chemistry, analytical chemistry, physical chemistry, polymer sciences, chemical biology, energy chemistry, chemical engineering, and biological engineering

World-class faculty team:
Seven CAS members, and **20** recipients of the National Science Fund for Distinguished Young Scholars

A leader in chemical education:
Among the **first** to obtain state approval for offering undergraduate, graduate, and postdoctoral programmes

Looking to the future

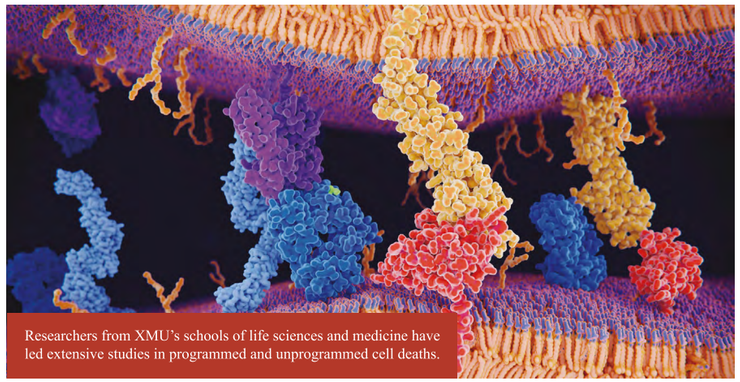
CCCE researchers also develop instruments to explore the potential of single molecules for next-generation electronic devices. Their intelligent and ultra-sensitive instruments can detect electrical signals of individual molecules.

Another new technology explored at CCCE is liquid gating, which was selected as one of the Top Ten Emerging Technologies in Chemistry by the International Union of Pure and Applied Chemistry in 2020. This new strategy for gating micro/nanopores opens possibilities for designing smart liquid systems in future.

CCCE researchers are also integrating machine learning technologies by developing automated experiments and computational workflows to accelerate materials discovery.

Milestones In Biomedical Advances

Researchers at XMU are pioneering targeted health innovations in basic science and new therapies.



Researchers from XMU's schools of life sciences and medicine have led extensive studies in programmed and unprogrammed cell deaths.

Advances in basic life sciences and medical research have been driving biomedical innovations and powering healthcare applications. At XMU's schools of life sciences and medicine, researchers have unveiled molecular and cellular mechanisms, shedding light on new treatment strategies.

Uncovering mechanisms of cell death

Cellular necrosis, a form of cell death typically associated with physiological and pathological changes in the body, has long been considered as an unprogrammed accidental process. XMU professor, Jiahuai Han, was among the first to identify RIP3, a protein kinase which controls necrotic cell death and could work as a molecular switch between necrosis and apoptosis, a predefined cell death for maintaining body function.

The discovery, published in *Science* in 2009, has laid the foundation for the concept of necroptosis, a programmed necrotic cell death. Since then, necroptosis has been intensively studied worldwide, and is known to play a role in the initiation and progression of various inflammation-related diseases, from acute pancreatitis and liver cancer to viral infection.

Han's laboratory contributes significantly to elucidating the molecular mechanism of necroptosis. They have found a specific RIP3 phosphatase PPM1b that negatively regulates necroptosis, identified an RSK-mediated caspase-8 inactivation mechanism that promotes necroptosis, and showed molecular details for RIP1/RIP3 phosphorylation and oligomerization, and MLKL translocation to cell membrane.

They also revealed the role of necroptosis *in vivo* in disease models of atherosclerosis, sepsis, and inflammatory bowel disease (IBD). The team is also among the first to identify a protein, GSDMD, as the executioner of pyroptosis, a pro-inflammatory type of cell death. These studies have led to publications in leading journals, and the key regulatory molecules of necroptosis have become important targets of drug development.

Joining XMU in 2014, Wei Mo discovered a novel intrinsic signal of necroptotic cell death. Collaborating with Han, Mo's team found that RNAs of reactive retro-elements in genome can be sensed by the protein, ZBP1, which in turn forms necrosome, a supermolecular complex mediating necroptosis, in intestinal stem cells. This pathway plays a critical role in the pathogenesis of IBD. This finding, published in *Nature* in 2020, suggests a potential treatment strategy for severe IBD by targeting necroptosis of intestinal stem cells.

Mapping molecular routes for diseases

For XMU professor, Shengcai Lin, his team is interested in molecular mechanisms underlying metabolic regulations. Their recent research has been focusing on how AMPK, an enzyme known as an energy sensor in a cell, is activated in response to glucose starvation. The team is also interested in how lipid absorption and synthesis is regulated.

In a study published in *Nature* in 2017, they found that the lysosomal AMPK pathway senses the availability of glucose. They also identified that aldolase, a glycolytic enzyme, works as a sensor of glucose availability, and regulates AMPK. Their work demonstrated that glucose starvation activates AMPK without changing the energy status in the cell or animal tissues, challenging the traditional view that AMPK activation strictly depends on increased AMP levels. This discovery was selected as one of China's top 10 advances in life sciences in 2017.

Based on the signalling pathway, Lin's team has screened chemicals that mimic glucose starvation to trigger AMPK activation. These chemicals may have potential therapeutic benefits from reducing weight, lowering blood glucose level, to suppressing tumour growth. The patented technology has been licensed at 20 million yuan to a biotech company for developing drugs targeting metabolic diseases and cancers.

Further research with implications to drug discovery is led by Dawang Zhou, vice president of XMU and dean of the School of Life Sciences, who focuses on the Hippo signalling pathway, which controls organ size by regulating cell proliferation.

Zhou's team has been investigating how the Hippo pathway regulates the size, development, and regeneration of organs, particularly, the liver, and has uncovered the mechanisms and roles of many Hippo-associated proteins in organ development and cancer.

In a paper published in *Cancer Cell*, they identified that lack of protein kinases MST1 and MST2 (MST1/2), which are central components of the Hippo pathway, will lead to liver enlargement and even liver cancer. They also explained how deficiency of the effector gene, YAP, causes apoptosis and liver failure.

With his colleague, Xianming Deng, the team identified a small-molecule inhibitor targeting MST1/2, which has been proven efficient to promote tissue repair for liver and intestinal damage, and has been successfully licensed.

Zhou has also collaborated with other teams to improve drug delivery using nanotechnology.

Advancing therapeutic discoveries

Developing therapeutics in response to the national strategy of boosting original drug discovery has been the aim of Deng's team. They are engaged in chemical biology research, focusing on identifying untargeted kinases and validating their pharmacological effects.

Besides developing the MST1/2 inhibitor, Deng's team is also recognized for their studies to understand and target cancers driven by mutations of the RAS family of genes.

RAS proteins act as molecular switches, regulating signalling pathways and other cellular interactions, and when mutated, can cause cancer, including melanoma.

With collaborators, Deng's team has identified a protein kinase, STK19, which regulates NRAS function, and characterized the mechanism by which it works. Based on this discovery, they have designed an STK19 inhibitor that prevents NRAS activation and the development of NRAS-driven melanoma. This finding provides a promising strategy for treating melanoma, as well as other RAS-driven cancers. Research by Deng's team has led to 12 patent applications, and five technological licensing agreements, opening application possibilities for kinase-targeted drugs in cancer treatment and regeneration medicine.

Breakthroughs in targeted therapy have also been made by a team led by XMU professor, Qiao Wu, who has been studying Nur77 (also called TR3), a member of the nuclear receptor superfamily that modulates a variety of physiological functions. Nur77 dysfunction is found to be associated with a range of diseases, including diabetes, cardiovascular diseases, inflammation and cancer.

Wu's team has revealed different signalling pathways and mechanisms by which TR3/Nur77 induces cell death and exerts its anti-inflammation, anti-diabetes and anti-tumour functions. Based on this knowledge, Wu proposed TR3/Nur77 as a drug target, and explored its various functions. They identified lead compounds that can reduce inflammation, blood glucose, and inhibit tumour progression through targeting and modifying TR3/Nur77's functions. Their results have led to journal publications, provincial awards, and invention patents.

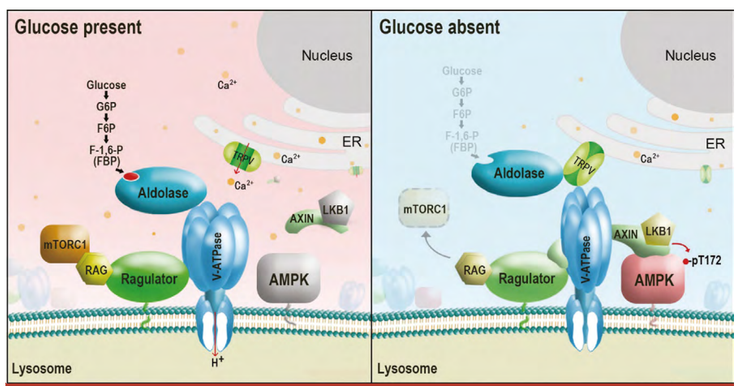
Wu's XMU colleague, Xiaokun Zhang, dean of School of Pharmaceutical Sciences (SPS), studies a combined therapy of Nur77 and celastrol, a natural chemical extract from the root of an ivy-like vine.His team discovered that celastrol specifically targets the immune function of Nur77, and controls inflammation.

Another SPS professor, Ziyan (Chimeng) Tzeng, leads a translational medicine research team that explores using CAR-T technology to treat T-cell malignancies and adenocarcinoma. They identified the target antigens for developing CAR-T cells, demonstrating a viable approach for treating T-cell leukaemia and GBM.

Focusing on Alzheimer's disease (AD), XMU neuroscientists have identified new protein targets and revealed biological mechanisms underlying AD. Their studies provide new strategies for drug development, and informed relevant immunotherapy and gene therapy strategies.

Besides drug discovery, Zuguo Liu, director of the Eye Institute of Xiamen University, has been focusing on corneal tissue engineering technologies. In 2012, he successfully treated a patient by transplanting stromal lamella tissue derived from porcine cornea. This approach brings hope to patients with corneal disease, reducing dependency on donor-derived tissues for replacement therapies.

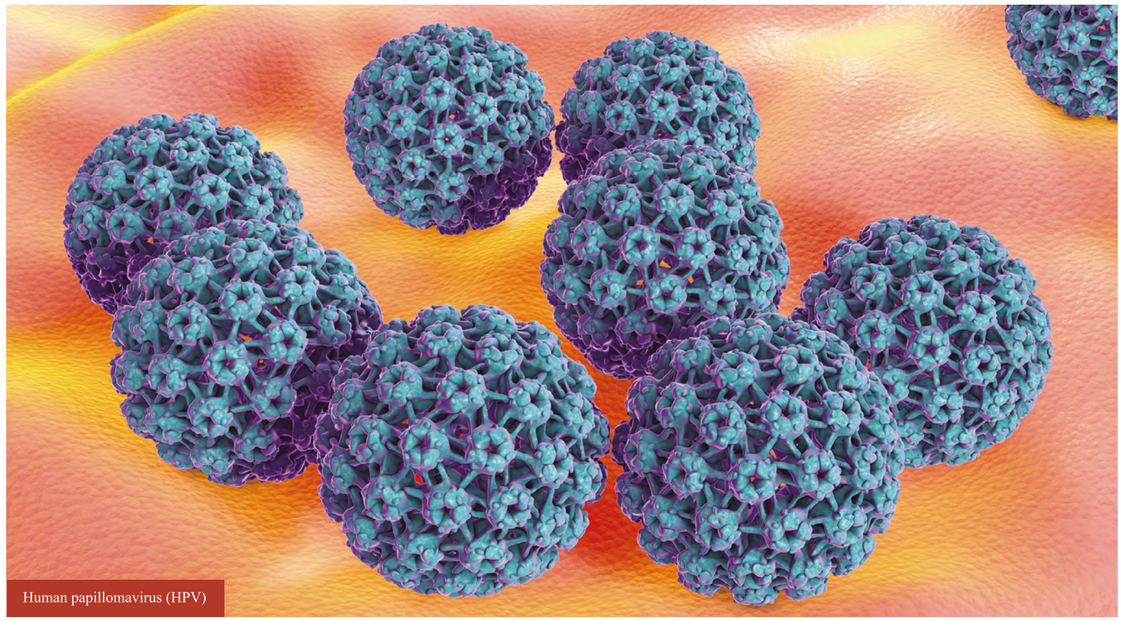
Liu's colleague, Wei Li, developed tissue engineered corneal epithelium from clinical grade human embryonic stem cells, paving the way for treating severe ocular surface diseases.



Shengcai Lin's AMPK studies highlight the effect of glucose starvation.

Safeguarding Public Health

Addressing public health crises, XMU researchers are dedicated to advancing medical research and promoting life-saving strategies.



Human papillomavirus (HPV)

Researchers at XMU's School of Public Health (SPH) have combined field studies and experimental science to translate their research into strategies that improve population health. From hepatitis vaccines to HIV test kits, their medical innovations have contributed to the sustainable development goal of promoting good health and well-being.

Leading the race for vaccines

Pushing the frontiers of vaccine development, which is essential for the control of many infectious diseases, a team of researchers led by SPH dean, Ningshao Xia, has been studying virus-like particles (VLP) as potential vaccine candidates. These multi-subunit protein assemblies contain viral proteins, but not the viral genome, and are therefore non-infectious.

Among their discoveries is a new-generation human papillomavirus (HPV) vaccine. HPV has more than 200 viral types, some of which can lead to cervical or other cancers, while others may cause genital warts. HPV vaccines offering broader protection are needed, but providing wider protection on the currently available nine-valent HPV vaccine is challenging.

By studying structures of 20 HPV types, Xia's team has identified a molecularly modified chimeric VLP, which offers cross-protection against three viral types. They revealed the VLP's structure and the mechanism of its cross-protection. Their molecular design strategy has been used to identify other triplet-type chimeras, suggesting broader applicability. The technology has been awarded 14 patents, including nine international ones, and there are plans for a phase-III clinical trial for the next-generation HPV vaccine.

More recently, based on deeper understanding of the assembly of VLPs, the team has designed a capsomere-hybrid VLP that simultaneously provides protection against multiple HPV types. The assembly technique, combined with the chimeric VLP approach, paves the way for developing pan-HPV vaccines that may cover all 200 viral types. The technology also sheds light on designing vaccines that target multiple pathogenic variants, and antigen-targeted cancer vaccines.

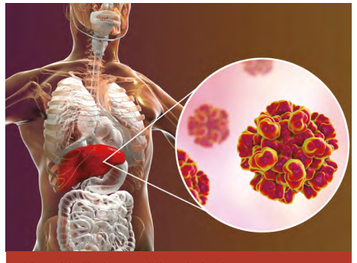
Work by Xia's team has also led to China's first domestically-made bivalent HPV vaccine, developed by using VLPs derived from E. coli.

SPH's use of *E. coli* in vaccine development began with preparing VLPs for vaccines against the hepatitis E virus (HEV). Researchers genetically modified a strain of *E. coli* and produced a protein that can stimulate the body's immune system to fight against HEV. This attempt, led by Xia and his long-time SPH collaborator, Jun Zhang, proved the feasibility of developing VLPs from *E. coli*, providing a cost-effective approach for vaccine production. Their work led to the world's first HEV vaccine, launched in 2012. The achievement attracted attention from global media, and was recognized by multiple national awards.

Accelerating accurate diagnostics

SPH's vaccine research informs diagnostic methods for viral infections. Based on the revelation of the HEV structure, for instance, SPH researchers have developed a novel reagent for HEV antigen tests. Their approach has improved accuracy of diagnosis from 60-70% to more than 95%.

For another liver condition, hepatitis B, the SPH team has developed quantitative blood tests based on antibody against HBcAg (Hepatitis B core antigen). Their exploration using genetic engineering techniques revealed a highly stable HBcAg, which became the basis for a novel test kit that detects and quantifies antibody levels. The study significantly improves the reliability of HBcAg detection.



Hepatitis E virus and liver infection

The SPH team is also globally recognized for the development of a urine-based immunoassay cassette for HIV tests. This non-invasive kit has been continually refined to enhance simplicity, speed, privacy and safety, without compromising accuracy, making it ideal for patient self-testing. It was approved by Chinese regulatory bodies for marketing in 2019.

Studies on HIV antigens by Xia's team can be traced back to their collaboration with Beijing Wantai Biological Pharmacy Enterprise in 1996. They co-developed various HIV test kits, including China's first third-generation and fourth-generation HIV diagnostic reagents, and obtained WHO prequalification in 2016. Now their products are used across the world, contributing to the control of HIV/AIDS.

This year, the SPH team has responded rapidly to the COVID-19 pandemic by developing reagents for antibody tests. They began by working with hospitals to measure the kinetics of antibody development after infection. Their studies showed that total antibody test, which detects levels of IgM, IgG, and IgA antibodies against SARS-CoV-2, has higher sensitivity and specificity than tests for IgM, IgG alone, or for both IgM and IgG. "It can be an effective supplement to the nucleic acid tests," says Zhang, who led the study. The nine test kits developed by Zhang's team are widely used across the world now.

Broadening the public health safety net

Studies on infectious diseases should look beyond treatment of individuals, according to Xia, who emphasizes the importance of integrating perspectives from sociology and public administration. This is also illustrated in studies on ageing, from chronic diseases, to disability services, led by SPH professor, Ya Fang, who makes links between health and economic policies to improve elderly care.

In the past five years, Fang's team has undertaken more than 60 research projects, leading to more than 100 published papers, many of which informed policy-making. In one study, they surveyed elderly people who had lost their independence. The study identified accidental injury as a major cause of their disabilities and adverse economic circumstances. Based on the finding, the local government enhanced its safety net for the elderly.

Another research focus at SPH explores the health effects of environmental exposure to chemicals. A team led by Zhongning Lin has leveraged the school's interdisciplinary strengths in molecular toxicology, environmental epidemiology, and bioinformatics to conduct toxicology studies. They have revealed the regulatory mechanisms by which cellular communication signals mediate the toxic effects of exogenous substances, informing the design of early and targeted intervention strategies, and toxicological risk assessment of new materials.

DIGGING DEEP AND REACHING FAR

Established in 2011, SPH specializes in subjects from epidemiology and health statistics, to nutrition and food sciences, and health management. Its multidisciplinary research is supported by 44 full-time faculty members, and two national-level research platforms.

- **State Key Laboratory of Molecular Vaccinology and Molecular Diagnostics:** Established in 2013, it focuses on fundamental studies and R&D of vaccines, diagnostic reagents, therapeutics, molecular imaging probes and medical devices. It has undertaken 147 national key projects, in addition to provincial, municipal and enterprise-funded projects, with an average annual research budget reaching ~55 million yuan. It has obtained 153 domestic and international patents.

- **National Institute of Diagnostics and Vaccine Development in Infectious Diseases:** Housing >**200** researchers, it has developed a chain of technologies for vaccines, diagnostic reagents, and biologic therapeutics, contributing to disease control.

Research accomplishments:

- Published >**700** papers in leading international journals, including **85** papers in journals with an impact factor greater than 10

- Obtained **two** certifi cates for national class-I new drugs, **three** approvals for clinical trials, and **77** medical device registration certifi cates

Reservoirs Of Knowledge Lead To Improvement

Exploration through oceanology, and environmental and ecological sciences by XMU researchers has led to innovations to improve marine ecosystems.

Qingshun Quinn Li and his team have revealed the reproductive mechanisms, and restorative strategies for mangroves.

Central to the agenda of climate change discussions is the role of the ocean as Earth's largest active carbon pool. Integrating geological, environmental, biological, ecological and chemical sciences, researchers at XMU's College of Ocean and Earth Sciences (COE) and College of the Environment and Ecology (CEE) have introduced new theories and models that inspire global solutions for improving marine and coastal ecosystems and beyond.

Bringing new insights on ocean carbon cycles

Influenced by land-ocean-atmosphere interactions, coastal ocean carbon cycling is an important component of the Earth's climate system. However, mechanistic understanding of the coastal ocean carbon cycle is limited, and the question of why some coastal systems are sources of atmospheric CO_2, while others are sinks, remained unanswered. Studies by XMU marine scientist, Minhan Dai, a member of the Chinese Academy of Sciences (CAS), have addressed this, making progress in understanding and modelling the role of the coastal ocean in the global carbon cycle.

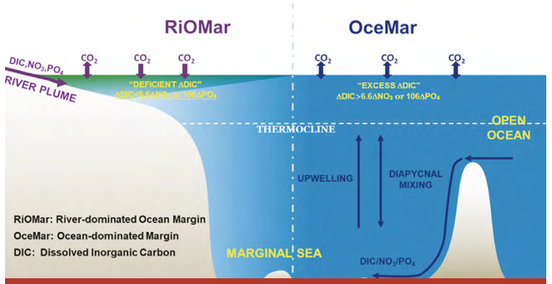
Dai's team started by synthesizing spatial and temporal variations in air-sea CO_2 fluxes in the South China Sea and East China Sea. They identified the former as the carbon source, releasing 13.3 million tonnes of CO_2 into the atmosphere annually; while the latter is a carbon sink. Extending these studies, they integrated carbon flux data of 58 marginal seas around the world, and estimated that as carbon sinks, these marginal seas sequester 360 million tonnes of CO_2 per year.

Based on interdisciplinary studies, Dai's team found that both land input and exchange with the ocean influence CO_2 fluxes in the coastal ocean. Accordingly, they proposed a semi-analytical framework to explain the mechanisms underlying carbon cycles of marginal seas. In his framework, they classified ocean-dominated margin (OceMar) and river-dominated margin (RiOMar), with carbon and nutrients sourced from the ocean and land, respectively. The framework is used to diagnose CO_2 dynamics and fluxes in marginal seas globally.

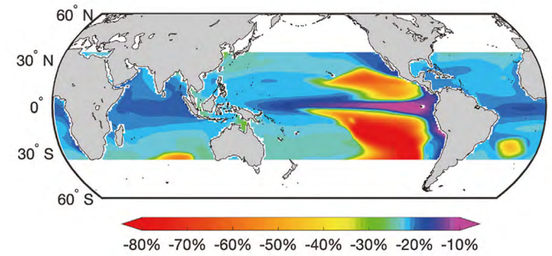
Oceans hold a tremendous reservoir of dissolved organic carbon (DOC), approximately 95% of which resists microbial degradation, known as recalcitrant DOC (RDOC). It plays an important role in carbon cycling and climate change. A team led by an XMU professor, Nianzhi Jiao, also a CAS member, proposed a new mechanism called Microbial Carbon Pump (MCP) that unravels the mysterious processes underlying the formation of the vast oceanic RDOC reservoir.

Through generation of intrinsic RDOC (RDOCt) under specific environmental conditions, as well as derivation of diverse organic molecules at extremely low concentrations (RDOCc), the MCP links the seemingly contrary 'intrinsic recalcitrance hypothesis' and 'dilution hypothesis', and provides a framework for testable hypotheses linking microbial activities with the behaviour of organic compounds for future studies into carbon sequestration in the ocean.

Based on the MCP theory, new approaches regarding carbon sequestration and water quality can be designed. A recent work led by Jiao has shown that MCP-based artificial upwelling in aquaculture areas help increase aquaculture output and remove excessive inorganic nutrients from the water, providing protection against algal blooms, oxygen depletion, water acidifi cation, and CO_2 emissions.



Minhan Dai classified OceMar and RiOMar in his semi-analytical framework that explains the mechanism of marginal sea carbon cycles.



Projected Trichodesmium N2 fixation potential from the 1990s to 2090s

Quantifying environmental effects on water systems

Excessive nutrients, such as nitrogen and phosphorus, are key factors affecting coastal marine ecosystems. Trying to quantify these effects, Wenzhi Cao, a CEE professor, has led a team to measure the fluxes of dissolved inorganic nitrogen (DIN) over the past five decades in China's major rivers. They found that given increased human activity, DIN fluxes are increasing over time, having a detrimental impact on estuary and coastal environments. They lead to more frequent red tides (toxic algal blooms), which can harm marine life. Cao's team also studied nitrogen cycling in mangroves, which can help alleviate the harm caused by excessive DIN. They found that the mangrove ecosystem equilibrium is threatened by the increasing nutrient input, triggering responses.

Nitrogen cycling is studied more extensively by Shuh-ji Kao's team at XMU's State Key Laboratory of Marine Environmental Science, who explores the microbial process of nitrogen removal, and how that is compounded by global warming. By differentiating temperature sensitivity between denitrification and anammox (anaerobic ammonium oxidation), two major microbial pathways of nitrogen removal, they illustrated how temperature increase may weaken anammox, but stimulate sediment denitrification, which releases N_2O, and exacerbates warming.

Based on these findings, they predicted significant increases of N_2O production, informing better understanding of climate feedback mechanisms.

In addition to global warming, increasing atmospheric CO_2 can also trigger responses in phytoplankton, which seeks to adapt to the multifaceted environmental changes. A team led by CEE professors, Banqing Huang and Dalin Shi, has revealed mechanisms underlying those responses, including changes in phytoplankton's key physiological-ecological processes, such as nitrogen or carbon fixation.

Shi's studies have shown that seawater acidification will inhibit nitrogen fixation of *Trichodesmium*, known as sea sawdust, countering findings from previous experiments. They confirmed the result in field experiments, and explained how the inhibition works. Their simulation studies predicted that ocean acidification, by the end of this century, could reduce nitrogen fixation potential of *Trichodesmium* by 27%.

Ecological effects of ocean acidification can be more multifaceted, according to Kunshan Gao, a XMU marine environmental scientist. His studies have shown that acidification, while reducing primary productivity of the ocean, can promote nearshore seaweed growth. It will reduce the carbon fixation capacity of algae by reducing calcification and strengthening the negative effect of UV on algae.

By influencing metabolic processes of phytoplankton, acidification also leads to increased intracellular toxic substances, which can be passed up along the food chain to animals that graze on these plant-like organisms.

Driving sustainable aquaculture

Coastal environmental pollution threatens sustainable aquaculture development. Tackling antibiotic pollution, a team led by COE dean, Kejian Wang, are developing safe and effective alternatives to avoid bacterial resistance caused by excessive antibiotic use. They have identified novel antimicrobial peptides from marine fish and crabs, including new peptides Scygonadin and SCY2 purified from the seminal plasma of edible mud crab. Their research has led to 15 invention patents, and their production and processing techniques have been commercialized.

XMU is also known for its research on abalone genetic breeding. A team led by COE professor, Caihuan Ke, has collected rich germplasm resources of abalones for breeding. Using selection and hybridization, they have developed new abalone varieties with improved properties.

Focusing on coastal wetland protection and restoration, CEE dean, Qingshun Quinn Li, and his colleagues, Hailei Zheng and Wenqing Wang, have studied adaptability of wetland plants for developing ecological restoration technologies. They revealed the molecular and genetic mechanisms of salt and flood tolerance in mangroves, along with their unique reproduction process, known as vivipary, in which embryos grow outwards into seedlings while attached to the mother plant.

Along with CEE professor, Yihui Zhang, they also revealed the ecological and genetics mechanisms of a coastal invasive plant, *Spartina*, which threatens Chinese coastal ecosystems. Wang's team has established a holistic system for coastal ecological restoration that integrates mangrove restoration and weed control, with bird habitat building, and shellfish farming.

For the control of harmful organisms, like those causing toxic algal blooms, a CEE team led by Mindong Bai has created effective and safe control technologies based on hydroxyl radical (OH). Shortening processing time, Bai's technology also reduces energy consumption, by-products, and system complexity.

Powering Innovation

Studies by XMU physicists and energy researchers pave the way for a better future.

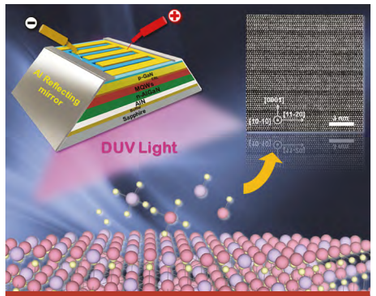
Research into some of the most complex issues in physics and energy science defines Xiamen University (XMU) College of Physical Science and Technology (CPST) and College of Energy (CoE). Their laboratories have supported original fundamental findings, as well as new energy technologies.

Transcending physical limits

Stars, galaxies, and black holes are the focus of XMU astrophysicists. A team led by Weimin Gu proposed using China's Large Sky Area MultiObject Fiber Spectroscopic Telescope (LAMOST) to search for stellar-mass black holes, leading to the identification of multiple candidates. Their analysis suggests that hundreds of stellar-mass black holes can be found this way. Using space telescopes, Taotao Fang's team detected absorption of X-rays by oxygen atoms, and helped locate the universe's so-called 'missing baryons'. XMU astrophysicists, led by Tong Liu, also study intergalactic, interstellar star formation, and physical mechanisms of gamma-ray bursts and fast radio bursts, shedding light on neutron stars and black holes.

Physicists at CPST have also been advancing fundamental theories, including the EinsteinPodolsky-Rosen Paradox, proposed in 1935 to demonstrate inherent contradictions in quantum theory. Extending this experiment, which gave an example of quantum entanglement, CPST's Lixiang Chen and his team produced pairs of entangled photons with radial position and radial momentum, which were found to be correlated in measurements. The radial properties of photons could be harnessed with other entangled variables for applications in quantum communication and optical micromanipulation.

Based on studies of entangled photon pairs, Chen's team has also developed a facial recognition technique that finds matches by looking for correlations between light beams imprinted with image information.



Revealing the underlying structure of group III nitrides for their potential

Practical applications are also central to research by CPST's Junyong Kang, who leads a team that studies group III nitrides and their potential as semiconductor materials. To enable wider applications of deep ultraviolet (DUV) light-emitting diodes (LEDs) based on aluminium gallium nitride (AlGaN), they proposed a new mechanism for regulating the wave vector of DUV light, solving the problem of poor light-extraction efficiency. They also developed a super-lattice structure that enables high magnesium doping efficiency in p-type AlGaN semiconductors, achieving record-low electrical resistivity. These results are promising for developing AlGaN-based optoelectronics for industries ranging from IT to biomedicine.

Pushing new frontiers in energy studies

Energy efficient LEDs have also attracted the attention of CoE researchers. One team explored the use of near-UV LED as the light source to excite red-green-blue (RGB) tri-colour phosphors and form white light. Using rare earth materials, they developed an RGB phosphor that can be excited with the same LED, achieving high quantum efficiency. The patented technology has led to high colour rendering warm-white LEDs, which avoid leaking harmful blue light.

CoE's irradiation effect research team developed Xiamen Multiple Ion Beam In-situ TEM Analysis Facility, a national first. This advanced multi-beam facility consists of a transmission electron microscope (TEM) coupled to a 400kV implanter, and a 50kV hydrogen/helium coaxial ion source for *in-situ* irradiation studies. It enables characterizing irradiation effects and evaluating material radiation damage, supporting the development of radiation-resistant nuclear materials. It has potential applications in the development of spacecraft, nuclear medicine, semiconductors, and energy catalysts.

As a renewable energy source and abundant raw material for various chemical products, biomass is studied at CoE. A team seeks to maximize the socioeconomic value of biomass by developing scalable cascade utilization strategies. They proposed a holistic system from pre-treatment to highvalue products for lignocellulosic biomass to allow efficient use. Their series of techniques for fractionating biomass into its main components of cellulose, hemicellulose, and lignin, and further chemical and biological conversion have led to publications and patents, as well as production lines for dietary fibre products, bulk materials and biofuels.


as semiconductor materials

Transforming The Material World

XMU scientists are developing a series of fundamental and practical innovationswhich bring impressive engineering feats.

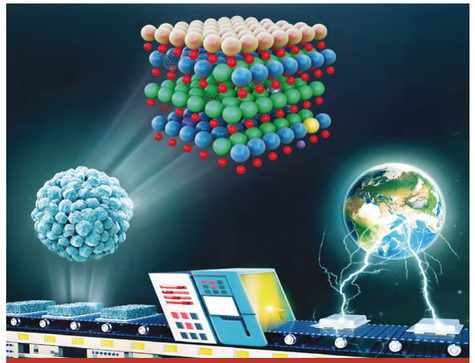
Materials scientists and civil engineers at XMU's College of Materials (CoM) and School of Architecture and Civil Engineering (SACE) are committed to creating a safer and greener world. Pushing the limits of traditional and new energy materials, and ensuring structural safety of infrastructures, they have turned challenges into opportunities for engineering feats.

Improving material fabrication

Consolidated from multiple departments in 2007, CoM has since transformed many of its findings into industrial applications.

Dongliang Peng, its current dean, has been leading a team to improve the energy density and safety of lithium ion batteries, a central pursuit for the rise of electric vehicles. Peng's team focuses on high-capacity Li-rich layered oxides (LLO), which are considered a promising cathode candidate. In conquering the inherent limitations of LLO cathodes, they have devised effective strategies based on defect engineering to enhance the initial Coulombic efficiency, promote the rate capability, and suppress the capacity degradation and voltage decay. Their simple and low-cost approach to improve the comprehensive electrochemical performance of LLO cathodes has enabled large-scale synthesis(>2.0 kg) of LLO cathode materials in a single run, paving the way for LLO-based advanced lithium-ion batteries.

Peng's CoM colleague, Lifu Chen, leads a team to improve technologies for preparing continuous ceramic fibres, which, combining high strength with elasticity, and resistant to heat and corrosion, are popular structural materials in high-temperature applications. Chen's fibre materials can maintain stability at ultra-high temperatures of 1,600°C. Such tolerance makes ideal fibre-reinforced ceramic composites for heat exchangers, high-temperature gas filtration and gas engines. Chen's team has also prepared wave-transparent fibres with good heat tolerance and very low dielectric loss, promising for antenna window materials. Their wave-absorbing fibres are good candidates in electromagnetic wave shielding applications.


LLO cathodes with enhanced comprehensive electrochemical performance can be synthesized on a large scale.

Using breath figure (BF), an efficient self-assembly method for forming porous polymer films, a CoM team led by Lei Li has fabricated polymer films with light-regulated patterns, carbon nanotubes, and microsieves. Their static BF process, in a closed space, cancels airflow and humidity disturbance. This improves reproducibility, allowing for low-cost, large-scale production of ordered porous films.

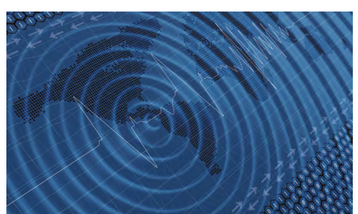
Optimizing health checks for structural safety

To monitor and mitigate structural damage caused by disasters, SACE's Ying Lei has led a team that integrates physics and information science to build intelligent identification and control systems. Based on data integration, new Kalman filter methods proposed by Lei's team have enabled simultaneous identification of structural systems and unknown inputs, substructural identification, decentralized structural control, synthesis of identification and vibration control, and identification of nonlinear characteristics of model-free dampers. Their diverse applications include displacement monitoring of longspan bridges and multi-scale structural damage analyses.

Applications of their research are also demonstrated in a corrosion sensor based on fibre grating, used in the Xiang'an subsea tunnel, and studies of typhoon properties based on observation data from Xiamen, informing wind-resistant structural design.

Based upon computer simulation, SACE's Dongdong Wang specializes in developing robust numerical methods to analyse structural failure caused by disasters.

Focusing on mesh-free methods in computational mechanics, which are ideal for modelling large deformation structural failure, Wang's team has improved computational efficiency and accuracy, balancing the needs for large-scale computation and fine-scale simulation in the analysis of complex engineering structures. Their numerical approaches are capable of accurately estimating multi-scale structural damage and failure caused by disasters.


Improved computational e ciency and modelling enable precise estimates of structural damage caused by earthquakes.

Soaring Ahead In Aerospace Discovery

XMU's breakthroughs in advanced aerospace engineering are thrusting China's industry into the limelight.

With the launch of Tan Kah Kee-1, XMU became the first university in the world to have built and flown its own double waverider.

From high-speed aircraft flight testing to near-field electrospinning technology, XMU's School of Aerospace Engineering (XSAE) is committed to cutting-edge research to advance aerospace technologies, leading to novel theories, designs and techniques that have boosted industry in China.

High-speed aircraft exploit the compression lift effect and ride on their own shockwaves. This design needs an accurate understanding of the 3D curved shock fl ow field, which has been a bottleneck in the development of this technology. One XSAE team was the first university group to build and operate a double waverider, the 'Tan Kah Kee-1', which rides on two shockwaves, one underneath, and the other in the inlet of its engine. XSAE's second-order curved shock theory addressed the problem, leading to improved aerodynamic performance and tactical capabilities of high-speed aircraft.

To improve wind tunnel testing, another XSAE team has developed a novel way to support and manipulate aircraft models using flexible cords as a kinematic chain. This intelligent support system enables integrated static and dynamic tests, expanding capabilities.

Carbon fibre reinforced polymer (CFRP) is a critical material in modern aircraft, given its advantages in weight, strength, and corrosion resistance, but is prone to defects. XSAE researchers have developed a non-destructive technology for revealing defects. A team has tapped eddy currents, generated by a specially designed probe, to find flaws. They calculated the general conductivity tensor and used 3D finite element analysis to overcome the difficulty of low electrical conductivity of carbon and the complexity of electrical anisotropy. Their inspection tool shows improved efficiency and effectiveness.

Aiming for precise processing of spiral surface components, which are central to aircraft compressors, XSAE researchers have developed new techniques of segmented grinding, based on a mathematical model to calculate the cutter location points. The technology reduces the error of rotor tooth profile to below 0.02mm, allowing for precise use of large screw rotors on conventional grinders.

The team has also developed fitting and redesigning technology based on digital graphics to reduce errors for grinding. Successfully commercialized, the technology yields more efficient and energy-saving rotary-screw compressors.

Another XSAE team focuses on improving processes for preparing porous metals which are promising for aerospace applications.

They have developed unique multi-tooth cutting tools to produce ultra-long metal fibres of 80-120 micrometres. This technique has resulted in a high daily yield, making it commercially viable. Using low temperature and selective laser sintering technologies, the team has also developed technologies to convert fibres of copper and stainless steel into porous metals that can be wicking structures in heat pipes, allowing for scaled-up manufacturing.

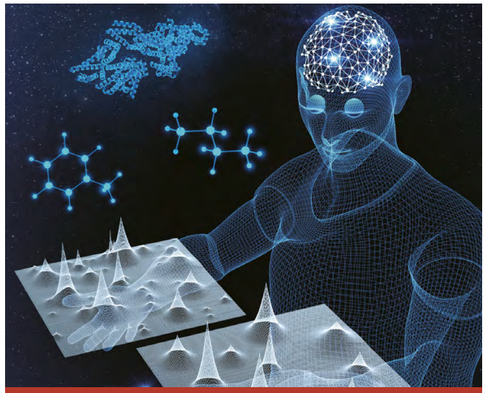
Additive manufacturing is another frontier in aerospace engineering. An XSAE team is developing micro/nano-additive technologies, which create materials with unparalleled precision and functionality.

Having devoted sustained efforts to understand a microscale electro-hydraulic coupling mechanism, spray jet formation and whiplashing, and material deposition behaviours, the team made major advances in electrospinning technologies. They developed a near-field electrospinning process, which uses electro-hydrodynamic phenomena to create continuous micro and nano fibres, enabling controlled depositing of solid nanofibres.

They also proposed a method for an integrated process to manufacture graphene from graphite blocks, and then create micro devices.

Super-Charged Technological Innovation

Optical and AI discoveries at XMU help advance big data.



Xiaobo Qu's convolutional neural network for NMR spectra reconstruction

With a strong background in semiconductors and radio physics, scientists at XMU's School of Electronic Science and Engineering (SESE) and School of Informatics (SI) are developing new technologies to advance optics and data sciences, which are also transformative for everyday applications.

Optical devices are vital for imaging, detection and sensing technologies. An SESE team led by Huanyang Chen applies conformal transformation optics, which provides a simple scheme for manipulating light rays, to their design of optical tools with special functions. By studying how light transmits in virtual and physical spaces, they have devised geodesic lenses, which provide perfect imaging between two points on a curved surface. In this work, Chen studied conformal lenses using inverse transformation optics, which exploits the topological advantage in virtual space to improve the flexibility of beam bending in geodesic lenses.

Chen's SESE colleague, Baoping Zhang, studies vertical-cavity surface-emitting lasers (VCSELs), which, due to their high optoelectronic performance, have wide applications in displays, highspeed optical communication systems, printers, and 3D imaging. Zhang's team focuses on using the third-generation semiconductor material, GaN, to create green VCSEL, which, with shorter wavelength than the traditional infrared or red VCSELs, is resistant to high temperature and radiation. Having developed several techniques and tools, Zhang's team became one of the first to produce green VCSELs with wavelengths of around 500nm and longer. Using the quantum-dot technique, they extended the wavelength and achieved room-temperature continuous-wave lasing. They have also made use of quantum wells to obtain the highest output power for green VCSELs.

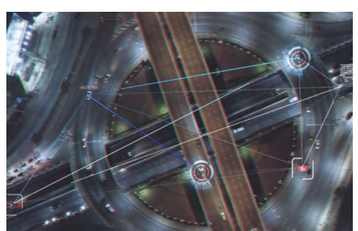
SESE researchers are also using AI to accelerate nuclear magnetic resonance (NMR) spectroscopy, a powerful tool for analysing organic compounds. To shorten data acquisition time, modern NMR experiments often sample only a fraction of data, so a reliable spectra reconstruction method is needed to quickly restore the lost information. To solve this, Xiaobo Qu has developed a deep learning method using the exponential-inspired convolutional neural network, enabling high-quality, reliable, and fast NMR spectra reconstruction from limited experimental data. His system shows strong reconstruction performance, with a much shorter computation time.

AI technologies are also explored by SI researchers, and one application is real-time analytics of massive visual data. Focusing on improving efficiency, Rongrong Ji has developed a novel compact vision system, which reduces computation and storage redundancy by mining golden data and parameters, enabling broad applications that require timely processing of massive visual data.

To fully explore the potential of deep neural networks, Ji's team is a pioneer in weakly supervised methods that support highly efficient model training and inference. Their theories and tools on neural network compression and network architecture search have been widely used by academic colleagues and AI industries to solve real-world challenges, including cyberspace security.

Another example is the use of AI and big data to improve emergency responses to natural disasters. Cheng Wang's team was among the first to embed the technology of spatial crowd-sensing in an emergency response system.

Based on data collected from multiple sources, including ground vehicle trajectories, high-precision spatial mapping, and satellite imagery, they proposed methods to identify changes in the natural environment. Their work established multidimensional spatial-temporal modelling, enabling real-time, low-cost risk evaluation and monitoring of damage caused by natural disasters. The study is already being used by the municipal government to inform disaster prevention and control.



Cheng Wang's AI emergency response system embedding data from ground tra_x001D_ c and high-precision spatial mapping

Accelerating Economic Research For Global Progress

Economic, business and legal researchers at XMU are driving cross-disciplinary studies, promoting real-world applications, and nurturing international talent.

Summer school of Xiamen Academy of International Law

Targeting national strategic needs and the globalized business world, XMU consistently produces impactful socio-economic research and well-rounded graduates. Thanks to the support of multiple national platforms, it is also attracting international talent to drive innovation.

A hub for established and emerging economists

XMU has one school and two associated institutes dedicated to economic research and education: the School of Economics (SoE), the Wang Yanan Institute for Studies in Economics (WISE), and the Gregory and Paula Chow Center for Economic Research (Chow Center).

The history of economic research and education at XMU can be traced back to 1921, the year the university was founded. The SoE, established in 1981, is the first of its kind after China's major economic reform. WISE, founded in 2005, is a research-oriented institute with the goal of modernizing economic research and education in China. The Chow Center, supported by the generous gifts of the Gregory and Paula Chow Foundation, was launched in 2016 to further advance economic research, train world-class economists, and support global recruitment and exchange.

SoE, WISE and Chow Center have an international faculty with almost 100 PhD graduates from the world's top universities, and offer English language undergraduate and graduate courses for students. They host programmes, such as the International Research Training Groups, in collaboration with the Center for Applied Statistics and Economics at Humboldt University of Berlin, and the Erasmus Mundus Joint Master in Economics of Globalisation and European Integration, with six universities from the European Union. These two programmes were selected as 'International Cooperative Program for Innovative Talents' by China's Ministry of Education respectively in 2018 and 2019. In November 2019, Essential Science Indicators listed XMU's research field of economics and business in the world's top 1%. According to the QS World University Rankings in 2020, its research field of economics and econometrics has ranked among the world's top 150.

Econometrics and statistics, in particular, are among XMU's strongest fields and their results have consistently ranked among the top in China. The founding director of WISE, Yongmiao Hong, is internationally renowned for developing a new spectral tool suitable for both linear and nonlinear time series analyses, revealing valuable insights behind cyclical economic data such as business trends and cycles. XMU also hosted the 2019 Asian Meeting of the Econometric Society, the first time it took place in mainland China. As the global academic centre for economic studies, it has attracted Nobel laureates and other top academics to its conferences, seminars and summer schools.

Bridging management theory and practice

The School of Management (SoM) was formally established in 1999 from the consolidation of departments, including business administration, accounting, tourism management, and system science. It is among 70 business schools worldwide that concurrently received accreditations by the Association of MBAs (AMBA), the European Quality Improvement System (EQUIS), and the Association to Advance Collegiate Schools of Business(AACSB). Of its diverse faculty, 84% are selected for nationwide talent projects at various levels.

Driven by this network of international academic, business, and policy experts, SoM has been leading projects with government bodies and international NGOs on initiatives from energy to tourism. Apart from gleaning insights from big data and statistics with its XMU Data Mining Research Centre, another of its research centres, dedicated to optimizing China's investment environment, has been providing consultancy services for national and regional-level government offices. SoM's accounting department has also set up a dedicated thinktank, whose research has been pivotal for improving national accounting standards.

Two notable projects are testament to SoM's research excellence. A first for academics from China, two SoM professors, Hanwen Chen and Yanyan Wang, published in *The Journal of Accounting Researcha* paper that examines the borrower-lender relationship and accounting conservatism for a sample of Chinese companies and banks. They compared state-owned enterprises (SOEs) and private firms, and found evidence to support their hypothesis that SOEs adopt less conservative accounting methods. Their findings were outlined in *Financial Accounting Theory* by William Scott.

Another international project co-led by Chaopeng Wu became the first in the field of finance and accounting selected as a major programme of the National Natural Science Foundation of China. Published in *The Review of Financial Studies*, it investigated the effect of intellectual property (IP) rights protection on innovation in China with the privatization of SOEs. Using the statistical technique 'difference in differences', it measures the differential effect on the targeted group versus the control group. The results have supported theoretical arguments that IP rights protection strengthens innovation incentives, and influences the private sector firms more than SOEs.

2019 Asian Meeting of the Econometric Society


XMU's School of Management

New perspectives on legal studies

Following its rapid expansion since 1926, XMU's School of Law (SoL) has become one of the top law schools in China with emphasis on a globalized curriculum and local context. SoL is the only project member selected in mainland China for the G-15 Law School Pilot Project led by the United Nations Conference on Trade and Development. It has also published a Chinese-language journal about international economic laws. In addition, SoL's Centre for Legislative Studies, launched in 2015, was also the first to represent China in joining as a member of the International Association of Legislation in October 2019.

Among its talent development initiatives, SoL's Xiamen Academy of International Law was established in 2005. Its president, Jiuyong Shi, is a former president of the International Court of Justice of the United Nations. It has held 14 seminars, attended by more than 100 experts of international law, and 1,600 students from around the world. It has also published a Chinese-language journal about international economic laws.

The vision of SoL's cross-disciplinary approach is exemplified by its research centres. One of them combines legal studies with neuroscience and psychology. Its executive director, Xuyang Wu, along with SoL's current dean, Fangqing Song, has designed and conducted experiments for new theories on cognitive influences on judges and jurors, and on the philosophies of law.

How Ordinary Fragments Piece Together A Picture Of The Past

Weaving diverse socio-cultural studies, XMU's humanities and social science researchers have brought new perspectives from land and sea.

A series of pioneering studies by Chuanchao Wang yields genetic information on Asian populations.

The rich historic, cultural, and geographical diversity of southeast China offers great opportunities for humanities and social science researchers, fostering the growth of academic programmes at XMU. With renowned strength in historical research, archaeology, and anthropology, generations of XMU scholars have developed new methodologies and theoretical frameworks, and unravelled valuable resources, contributing to regional cultural heritage.

Breaking new ground in historical research

XMU is renowned for its emphasis on local historical documents for studying Chinese history. The tradition started in 1940s when the late historian and XMU professor, Yilin Fu, discovered some deeds from a local villager's home. Fu found these rich sources for studying socio-economic history of the Ming and Qing dynasties, and launched a new field for Chinese socio-economic history, based on fieldwork evidence.

Carrying on this tradition, Fu's student, Zhenman Zheng, an XMU professor of history, is keen to unravel clues from local historical documents, from genealogy records and commericial contracts to local drama scripts. "They reflect the everyday reality of life," says Zheng. "This provides an alternative perspective from the official history, and helps reveal the mechanisms for Chinese socio-historical development."

Zheng led a key project on local historical documents and cultural inheritance in 2004, in which he surveyed folk documents for their preservation status, along with their contextual history. He established a framework and methodology to study local documents systematically. His research has led to many books, and a dedicated centre was established to organize research and train students in this field.

The growing archives and materials demand new technologies and strategies for classification and conservation, leading to the rise of digital humanities at XMU. Since 2009, in collaboration with the Fairbank Center for Chinese Studies at Harvard University, Zheng's team has built databases, including on deeds and historical geographic information systems, facilitating multidisciplinary studies on Chinese local history.

A wealth of data is collected from fieldwork, which Zheng says is not only the source of materials, but also of new ideas. "Fieldwork for humanity scholars is like a laboratory," says Zheng. "We test our ideas in fieldwork, as being on site helps interpret historical events." Since 1996, XMU history department has organized student field trips to villages and towns in Fujian and Jiangxi provinces to collect rich first-hand materials.

The value of local documents and fieldwork has also attracted international scholars interested in Chinese history. International conferences, scholar exchanges, and joint research projects have been organized to explore this field, while Zheng has conducted fieldwork and co-authored with international collaborators. Recently, a study camp programme was established with Harvard University to train young scholars to interpret local documents.

Bringing submerged stories to the surface

Located in southeast China's port city of Xiamen, XMU has developed a traditional strength in maritime archaeology. Studies on maritime cultural history have been emphasized since the 1930s. From research into maritime transport history of the South China Sea islands in the 1950s, to excavation of shipwrecks from the Song dynasty and exploration of historical exports of Chinese ceramics in the 1970s, the maritime archaeology programme has flourished at XMU. As advanced technologies for underwater archaeology emerged in the 1990s, relevant courses were set up, attracting master's and doctoral students.

In 2004, XMU established the Center for Maritime Archaeology, the only one dedicated to this subject among Chinese universities. It has led multiple national-level social science projects, including exploration of the association between Chinese ceramics and maritime civilization, and excavating and studying shipwrecks in China's seas. Archaeological exploration in Southeast Asia and the Asia-Pacific region has investigated aboriginal culture and seafaring history. The studies have deepened understanding of the heritage of the Maritime Silk Road.

Fieldwork by XMU archaeologists led to the discovery of relics in a 3,000-year-old settlement on Pingtan Island in Fujian. It reveals insights on southeast China's maritime culture, along with the origin and historical development of Austronesian languages in the region.

The site was set up as a training ground for undergraduates to hone fieldwork skills. XMU researchers have also uncovered relics of ancient city walls in Ningbo, more than 800 km north of Xiamen, informing understanding of local architectural history and port city evolution.

Advancing social and anthropological studies

For anthropologists at XMU's School of Sociology and Anthropology (SSA), genomic tools can be integrated with archaeology to explore population history. A team led by Chuanchao Wang, director of SSA's Institute of Anthropology, is dedicated to unravelling genetic information on East Asian populations, which is poorly understood due to the lack of DNA data.

In a study recently published in a preprint paper, Wang and a large group of international colleagues analysed genome-wide data from 191 individuals of different East Asian populations dating to 6000 BCE – 1000 CE. This is the largest ancient genome study for East Asia to date. They also reported microarray typing data of 383 samples from 46 present-day ethnic groups, along with data obtained using carbon-14 dating techniques.

Pioneering work using ancient DNA to trace East Asian population history over the last 8,000 years, the study offered insights on origins, ancestry lines, migration routes, and linguistic affinities, from Yamnaya culture across Russia to Jōmon people of Japan. "It's a result of cross-disciplinary collaboration, and marks a step forward for the study of ancient genomics in China," says Wang.

SSA researchers are also interested in exploring contemporary societies. Transformations in rural China, brought by rapid industrialization and economic reform, have attracted Rong Hu, the dean of SSA, who is renowned for his study on village governance.

Following the fieldwork tradition of XMU's sociological and anthropological studies, Hu has led his students to villages in Fujiang and beyond to collect raw materials. In one study, they used large-scale survey data to investigate farmers' appeals to authorities, and what these say about their trust in governments.

The study showed that petitions are associated with the loss of political trust, highlighting the importance of institutional reform to improve the system that safeguards the interest of farmers.

Interested in the influence of social capital and other factors on farmers' political participation and trust, Hu has also investigated village committee elections, which serve as channels for villagers to articulate their interests. Many of his studies have policy implications, enabling actionable strategies for local government bodies.

Studies by Hu's SSA colleagues on Southeast Asian ethnic groups and aboriginal minority groups of Taiwan have also informed relevant policy-making, in addition to improving understanding about sociocultural history of those populations.

Ongoing studies by SSA researchers have presented new sociological approaches tailored to explore contemporary Chinese society, while providing new ideas for international academic exchanges.

a. Shipwreck archaeology at Quanzhou Beach, 1973

b. Underwater archaeological studies reveal new insights into maritime cultural history.

c. Michael A. Szonyi (central left) and Zhenman Zheng (central right) established a studio for archiving local documents in the Yongtai County of Fuzhou, the provincial capital of Fujian province.

d. Rong Hu (right), the dean of SSA, leads field research into Fujian villages.