

ShanghaiTech Highlights

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ShanghaiTech Holds First Undergraduate Commencement

On June 16, ShanghaiTech celebrated a momentous occasion, as the university's first class of undergraduates graduated, along with the third class of master's degree students and the first class of PhD students jointly cultivated by ShanghaiTech University and Chinese Academy of Sciences.

University Council Chairman Zhu Zhiyuan presided over the ceremony, which was held in the ShanghaiTech gymnasium and attended by ShanghaiTech University's Governing Board members, university leadership, faculty committee, directors of CAS affiliated institutes, government officials, representatives from companies and high schools, as well as the graduates' family members.

After a video presentation by the undergraduate class of 2018 shared memories from their years at ShanghaiTech, the ceremony began in earnest. President Jiang Mianheng took to the podium to address the graduating students. He congratulated them on their achievements and then reviewed ShanghaiTech's initiatives to closely link education and research. Jiang urged the students to take responsibility and work to effect positive change, not only for themselves, but also for the nation's development. He told the students how much he appreciated their trust and understanding in choosing ShanghaiTech during its initial stages of development and expressed his pride in all of their achievements. He also expressed gratitude for the support of Shanghai

Municipal Government, CAS institutes, faculty and staff, as well as all those who care about the development of ShanghaiTech.

Vice President and Provost Yin Jie, Founding Dean of School of Physical Science and Technology Yang Peidong, Founding Dean of School of Life Science and Technology Lin Haifan and Founding Dean of School of Information Science and Technology Cher Wang respectively announced the names of the master's degree graduates and bachelor's degree candidates from each school. As each bachelor's degree student walked on the stage to accept their diploma, their photos from 2014 and 2018 were juxtaposed on a large screen behind them. President Jiang Mianheng, directors of CAS institutes and the school deans shook hands with each of them and awarded them their degree certificates. University Council Chairman Zhu Zhiyuan announced the names of the graduates who were awarded the 2018 President's Award and ShanghaiTech Outstanding Graduates. ShanghaiTech Governing Board Director Xu Kuangdi and members Zhou Xiaochuan, Ding Zhongli, Weng Tiehui and Fu Chengyu awarded the certificates.

"That was the most memorable moment, watching each of us walking the stage," said Zheng Weitong, a graduate of the School of Life Science and Technology. "The photos showed so many dramatic changes we've gone through in the past four years." Her parents, who traveled from Taizhou, Zhejiang Province to support her, said they were very proud. "It was a memorable graduation. This is one of the best schools in China and this is their first undergraduate graduation. What an honor," said her mother, Wang Lingfen.

Undergraduate Class of 2018 student representative Qian Lechen shared with her classmates her college experiences and encouraged her classmates to choose the road less traveled and get ready for the challenges ahead. "Each of us is living in layers of eggshell. Breaking the shell from the outside is to be hunted by others, but breaking it from the inside means we're growing up," she said.

PhD student Jia Qibo from School of Information Science and Technology also spoke, and called on students to follow the example of pioneers in their respective fields and explore all the possibilities in the world around them.

School of Physical Science and Technology Assistant Professor Lin Bolin spoke on behalf of the faculty and called on students to contribute to society and consider the earth's well-being.

Invited speaker Zhao Zhongxian, CAS Academician, Third World Academy of Sciences Academician and China's 2016 Top Science and Technology Awardee congratulated ShanghaiTech on its progress and shared with the audience his study and research experiences. He addressed the graduates, saying he expected them to carry forward the tradition and virtues of past generations of Chinese scientists and become ethical and responsible researchers.

In a history-making moment, President Jiang then instructed all the graduates to move the tassels on their mortarboard caps from the left to the right to signify the completion of their graduation.

Then University Council Chairman Zhu Zhiyuan announced the founding of ShanghaiTech's Alumni Association and the graduating class of 2018 became its first members. The crowd was abuzz with activity as all the graduates pulled out their phones to scan the QR code on screen and join the alumni association's brand-new WeChat account.

The undergraduate Class of 2018 bestowed a gift designed by themselves to their new alma mater, a plaque featuring the university tower as a major element and a tree pattern composed of signatures from all 199 undergraduates in the graduating Class of 2018, symbolizing that the students have been nourished by ShanghaiTech and the university has also been enriched by students. President Jiang accepted this valuable gift and the sincere blessings behind it.

The ceremony complete, the graduates and their families streamed out into the sunshine and gathered in groups to take photos in their commencement gowns. Later in the afternoon, official photos of the graduating

class were taken on the green, but throughout the day students posed for selfies and fun shots throughout campus and in front of metal sculptures reading "I Heart ShanghaiTech."

"It was a real honor to walk the stage, a real memorable and important moment in my life so far," said Huang Jiacheng, a new graduate of the School of Information Science and Technology who was taking photos with his family. His mother agreed. "It was a great ceremony. My child has finally grown up."

Ding Peng, a graduate of the School of Information Science and Technology posed for photos with his classmates. "Today has been quite exhausting," he said in the evening, "but indeed a very happy and meaningful day in my life."

ShanghaiTech's first commencement ceremony marks a new beginning for each graduate and also is a major milestone of ShanghaiTech's development as it continues to pursue its vision and work towards its mission of meaningfully impacting Shanghai and China's development.





Shanghai Municipal Committee Party Secretary Surveys ShanghaiTech

On June 5th, CPC Central Committee Political Bureau Member and Shanghai Municipal Committee Party Secretary Li Qiang visited ShanghaiTech University and East China Normal University to stress the essential role of universities in Shanghai's transformation into a world-class center of science and technological innovation. During his visit, he stated that institutions of higher education should build top-notch faculty teams committed to nurturing innovative talents with moral integrity to contribute to local and national development.

Jointly established by Shanghai Municipal

Government and Chinese Academy of Sciences, ShanghaiTech is devoted to fostering the next generation of leading scientists, inventors and entrepreneurs and exploring cutting-edge research areas critical to national, economic and social development. During his visit, Li Qiang was given an introduction of ShanghaiTech and affirmed the progress achieved by the University so far. He said Shanghai Municipal Government will continue to support ShanghaiTech in educational reform and innovation.

Delegates from Shanghai Municipal

Government toured the campus after the meeting. In the School of Information Science and Technology, delegates interacted with faculty and technicians and learned about the latest developments of fog computing, block chain and light fields. In the School of Physical Science and Technology, Li Qiang inquired about the construction of the Hard X-ray Free Electronic Laser Facility and visited the Topological Quantum Physics Lab and the newly established Electron Microscopy Center. The delegation visited the School of Life Science and Technology, Shanghai Institute for Advanced Immunochemical Studies (SIAIS) and iHuman Institute.

Li Qiang stated his belief that significant scientific discoveries and findings are made where top scientists are and said he hoped ShanghaiTech would deepen its talent recruitment and international cooperation.

Li Qiang communicated with faculty and student representatives, urging students to appreciate their college life and make full use of the resources and facilities available to study and research. He encouraged students to be passionate and innovative, stay curious and live ethically, in order to make their own contributions to social development.





Nobel Prize Winner Steven Chu Gives ShanghaiTech Lecture

Steven Chu, the 1997 Nobel Prize winner in Physics and former US Secretary of Energy, visited ShanghaiTech on January 12th to deliver the ShanghaiTech Lecture on the role of nanoscience and electrochemistry in sustainability and biology. Faculty and students filled the auditorium, as well as nearly one hundred high school students from eight middle schools in Shanghai who were specially invited to the talk.

Through vivid examples and humor, Professor Chu discussed the current global energy shortage and the challenges of developing clean energy. He pointed out the enormous potential of biochemistry to solve the above-mentioned problems. He introduced the research progress of nano and electrochemical technology in the field of biomedicine and its applications. After his speech, President Jiang Mianheng, sincerely thanked Professor Steven Chu on behalf of ShanghaiTech University, and gave him a token of appreciation.

Professor Steven Chu also visited the School of Physics Science and Technology and the School of Life Science and Technology, and chatted with teachers and students participating in the cross-disciplinary discussion.

Professor Steven Chu was born in 1948 in St. Louis, Missouri, USA. He is now a professor of physics and a professor of molecular cellular physiology at Stanford University, a member of the US National Academy of Sciences, a member of the American Academy of Philosophy, a member of the American Academy of Arts and Sciences, a member of the Royal Society of England, and a foreign member of Chinese Academy of Sciences. Professor Chu received the 1997 Nobel Prize in Physics for inventing a method of laser cooling and capture of atoms. He served as the director of Quantum



Electronics Research Department of Bell Labs, the director of the United States Lawrence Berkeley National Laboratory, and a professor of physics in University of California, Berkeley. From January 2009 to April 2013, he acted as the 12th US Secretary of Energy. As the first cabinet member in the history of the United States who is a scientist, he initiated a series of initiatives to promote the development of clean energy.

The ShanghaiTech Lecture, as the highest lecture series of the university, aims to provide a platform for the world's top experts and scholars to promote science, and to sow seeds of hope among young students.



During his visit, Professor Kotlikoff was welcomed and met by Jiang Mianheng, President of ShanghaiTech. Accompanied by Vice Provost Jiang Ge, he toured the ShanghaiTech campus and held a discussion session with SEM faculty members to share his experience in academic research and career development.

Laurence J. Kotlikoff is the William Fairfield Warren Professor of Economics at Boston University, a Fellow of the American Academy of Arts and Sciences, a Fellow of the Econometric Society,

a Research Associate of the National Bureau of Economic Research, Head of International Department for Fiscal Sustainability Studies, the Gaidar Institute, President of Economic Security Planning, Inc., and the Director of the Fiscal Analysis Center. He has served as a consultant to the International Monetary Fund, the World Bank, the Harvard Institute for International Development, the Organization for Economic Cooperation and Development, and a number of governments and central banks.

World-Renowned Economist Introduces Global Economic Future and its Solutions

World-renowned economist Laurence J. Kotlikoff visited ShanghaiTech and delivered a lecture to faculty and students at the School of Entrepreneurship and Management on April 12th. Professor Kotlikoff began his speech “Our Global Economic Future and How to Fix It” with his characteristic wry humor. “Economists are called dismal scientists. I won’t disappoint,” he

joked. He then presented the seven immense challenges the world is facing, namely nuclear proliferation, population explosion, climate change, financial instability, fiscal insolvency, growing inequality and automation. He discussed the severity of these challenges one by one and proposed solutions based on reasons of economics.





Google Greater China Vice President Discusses AI and Creativity

What are the innovations of AlphaGo? What are Google's latest research applications in the field of artificial intelligence (AI)? How does AI collaborate with fine art? Google Greater China President Scott Beaumont visited ShanghaiTech University's "School of Creative Arts Presents" to give a lecture on the broad applications of AI, titled, "Artificial Intelligence for Everyone."

Alpha Go as a Start

Among strategy board games, chess has always been considered as the most challenging one for artificial intelligence, not only because chess has plenty of room for it to compute, but also due to the extreme difficulty of evaluating the best gaming position. In order to compete, AlphaGo uses a new machine learning technique that combines both supervised learning and reinforcement learning, forming a policy network through training by using states on the go chess board as input, and producing a probability distribution among all possible stone position, it trains a value network

to predict self-taught games. This value network uses rewards from -1 (Player's absolute victory) to 1 (AlphaGo's absolute victory) as the standard to determine the next position that AlphaGo regards as best. AlphaGo integrates these two kinds of networks based on Monte Carlo tree search to realize its real advantage.

Beaumont also introduced how AlphaGo decides where to move the stone. "After gaining information from the game, AlphaGo uses policy network to search for the placement with high potential value in order to decide where to move next. In the limited search time, the most frequently-examined position during the simulated process will be AlphaGo's final choice. During the preliminary observation and attempts during the game, AlphaGo's search algorithm is able to add human-like intuition above its programmed algorithm," explained Beaumont.

AI in Everyday Life

In the recent years, Google has been actively developing artificial intelligence in many fields, yielding creative results, said Beaumont. In his lecture, he gave many examples to illustrate how AI gradually influences our everyday life. "If 6 represents a perfect translation, Google's Neural Machine Translation System has reach 5 already, with its Angle-French translation almost as accurate as a human's work." Two years ago, Google researchers proposed an algorithm based on deep learning, which helps doctors to provide a more accurate diagnosis with diabetic retinopathy during fundus fluorescein angiography.

Artificial intelligence sounds complicated, but it can also help people with everyday life. Inspired by AlphaGo, a Japanese automotive engineer uses deep learning to develop a system that can pick cucumbers for his farmer parents, incorporating image recognition and a hardware controller. Moreover, Google Art & Culture's lab has developed a facial recognition feature to allow visitors identify their ancestries in the museum art exhibits.

"AI is changing many fields including translation, health, and data collection," said Beaumont. "We need to prepare ourselves with computer knowledge, quick data access and model building ability, as well as a passion to experiment." He added, "AI might lead to another industrial revolution, but it will neither cause threat to traditional technology nor replace human. I believe the human race and artificial intelligence can coexist."

Founded in November 2017, ShanghaiTech University's School of Creative Arts (SCA) aims to provide platforms for young scholars to research, experiment, exchange ideas, progress and challenge themselves through a series of lectures and seminars related to fine art and technology. "School of Creative Arts Presents" is a SCA-initiated series in which artists and interdisciplinary creative talents are invited to share their works, experiences and insights.



ShanghaiTech Welcomes MIT Associate Provost

ShanghaiTech hosted Massachusetts Institute of Technology's Associate Provost Richard Lester and Bruce Tidor, Professor of Biological Science and Computer Science, who met with President Jiang Mianheng on the morning of March 28th.

ShanghaiTech Provost and Vice President Yin Jie introduced ShanghaiTech, followed by presentations on the School of Physical Science and Technology (SPST) by Professor Chia-kuang Tsung and the School of Life Science and Technology (SLST) by Vice Dean Liu Jilong.

Since ShanghaiTech initiated its 3+1 study abroad program in 2015, six ShanghaiTech undergraduate students have been accepted as visiting students at MIT for semester or year-

long exchanges. President Jiang and Professor Lester agreed that the program has been a successful win-win cooperation, as the highly selective program has sent ShanghaiTech's top students to MIT for study. Both President Jiang and Lester agreed that they would like to continue the student program and explore cooperation in faculty development and curriculum design.

After the meeting, Lester and Tidor visited EM in SPST, the Mass Spectrum, NMR in iHuman Institute and the Molecular Imaging facility of SLST. iHuman Institute Distinguished Adjunct Professor Kurt Wüthrich (2002 Nobel Prize Laureate and recent recipient of the Shanghai International S&T Award), discussed NMR with the visitors.



Temasek Holdings CEO Visits ShanghaiTech

A delegation led by Temasek Holdings Executive Director and CEO Ms. Ho Ching visited ShanghaiTech and met with President Jiang Mianheng on April 10th. President Jiang extended a warm welcome to Ms. Ho and the Temasek delegates. Provost and Vice President Yin Jie introduced ShanghaiTech's development and Wu Yibing, Joint Head (China) of Temasek International, introduced the company.

Ms. Ho discussed ShanghaiTech's research directions, faculty team and funding mechanisms with President Jiang. She said she was very much impressed by what ShanghaiTech has achieved in the past five years and would be happy to see future

cooperation with ShanghaiTech in areas such as tech-transfer.

Together with President Jiang, Ms. Ho toured the campus and visited schools and research institutes, including the School of Information Science and Technology's VR Lab, Electron Microscope in the School of Physical Science and Technology and MS facilities in iHuman Institute.

Ms. Ho obtained her Master of Science degree in Electrical Engineering from Stanford University and has been listed several times by prestigious business magazines as one of the most influential women in the world.



Professor Eike Martin from DKFZ Tours ShanghaiTech

On May 24, 2018, Professor Eike Martin, Director of the International Affairs of German Cancer Research Center (DKFZ), visited ShanghaiTech. A ShanghaiTech delegation, headed by President Jiang Mianheng, visited Europe last time in November 2017 and Professor Martin's visit was to continue the discussion of a possible collaboration.

Vice President Hua Renchang gave Professor Eike Martin a warm welcome, introduced ShanghaiTech's recent developments and

expressed his hope for substantial cooperation between ShanghaiTech and German Cancer Research Center in the coming future. Professor Martin said he was very impressed by ShanghaiTech's rapid progress and he was very willing to actively promote cooperation between two sides in scientific research, student exchange, and technology transfer.

Professor Martin also gave a talk in the Ren Building Auditorium, introducing the German Cancer Research Center to teachers and students from School of Life Science

and Technology, iHuman Institute, SIAIS Institute, and School of Information Science and Technology. After the talk, teachers and students discussed many broad topics with Professor Martin, including how to cooperate with German Cancer Research Center. Professor Martin was also invited to visit School of Life Science and Technology, iHuman Institute, and SIAIS Institute. He gave a high evaluation of ShanghaiTech's research achievements in tumor immunity, cell biology, tumor biology, and biological imaging. He said he believes there's good potential for future cooperation.

The German Cancer Research Center (DKFZ) in Heidelberg was founded in 1964 and has nearly 3,000 employees. It is Germany's largest medical and life science research institution. The center has more than 90 departments and

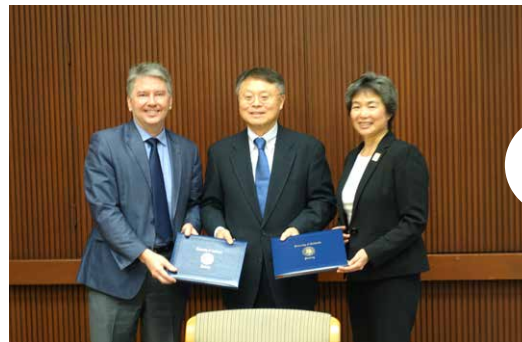
research groups, and more than 1200 scientists who are committed to researching cancer generation, development, risk factors for cancer, and seeking new strategies to prevent cancer. The center's research has greatly improved the screening, diagnosis, and treatment of cancer, enabling thousands of people to prevent cancer or find and treat faster in the presence of cancer. Since its establishment, the Cancer Research Center has made several breakthrough achievements in the field of cancer research. Professor Harald zur Hausen received the 2008 Nobel Prize in Physiology and Medicine for finding that cervical cancer was induced by human papilloma virus (HPV) infection and in 2014, Professor Stefan W. Hell won the Nobel Prize in Chemistry for his pioneering work on ultra-high resolution fluorescence microscopy.



ShanghaiTech Delegation Visits American Universities

In May, a ShanghaiTech delegation headed by President Jiang Mianheng toured a group of American institutions of higher education. President Jiang met with presidents from Yale University, MIT and Drexel University and exchanged ideas with leadership members from University of Pennsylvania and University of California-Berkeley. He met and talked with renowned scholars and professors from University of California-Los Angeles, California Institute of Technology, Stanford University and Harvard University.

On behalf of ShanghaiTech, President Jiang held in-depth discussions and signed a number of agreements with US universities. This trip helped to consolidate collaboration between ShanghaiTech and US universities in student exchange, joint research and faculty development.



President Jiang with UC Berkeley
Vice Provost Tsu-Jae King Liu and
UCB College of Chemistry Dean
Douglas Clark

ShanghaiTech delegates with
UPenn Provost Wendell Pritchett



Discussing faculty development
agreement with UPenn Engineering
Department

President Jiang with Drexel
University President John Fry



President Jiang in discussion with Yale
University President Peter Salovey



ShanghaiTech delegates with Dean
and Ensign Professor of Medicine
at Yale School of Medicine Robert
J. Alpern



President Jiang with MIT President
L. Rafael Reif





President Jiang Attends 4th International Universia Presidents Meeting

In May, President Jiang attended the 4th International Universia Presidents Meeting at the University of Salamanca, Spain and visited the headquarters of Santander Bank. He met with Executive Chairman of Santander Bank Ana Botín, CEO of Santander Group Jose Antonio Alvarez and Senior Executive VP Victor Matarranz and discussed with them about further cooperation with Santander Bank on the basis of existing programs.

ShanghaiTech and Santander Bank signed a memorandum of understanding in April, 2014 and the two sides reached a funding agreement in November, 2015 to subsidize ShanghaiTech students and faculty members to attend international conferences, visiting programs and Spanish-language courses. The ShanghaiTech delegation visit to Santander Bank will strengthen bilateral ties and further the ShanghaiTech-Santander collaboration.

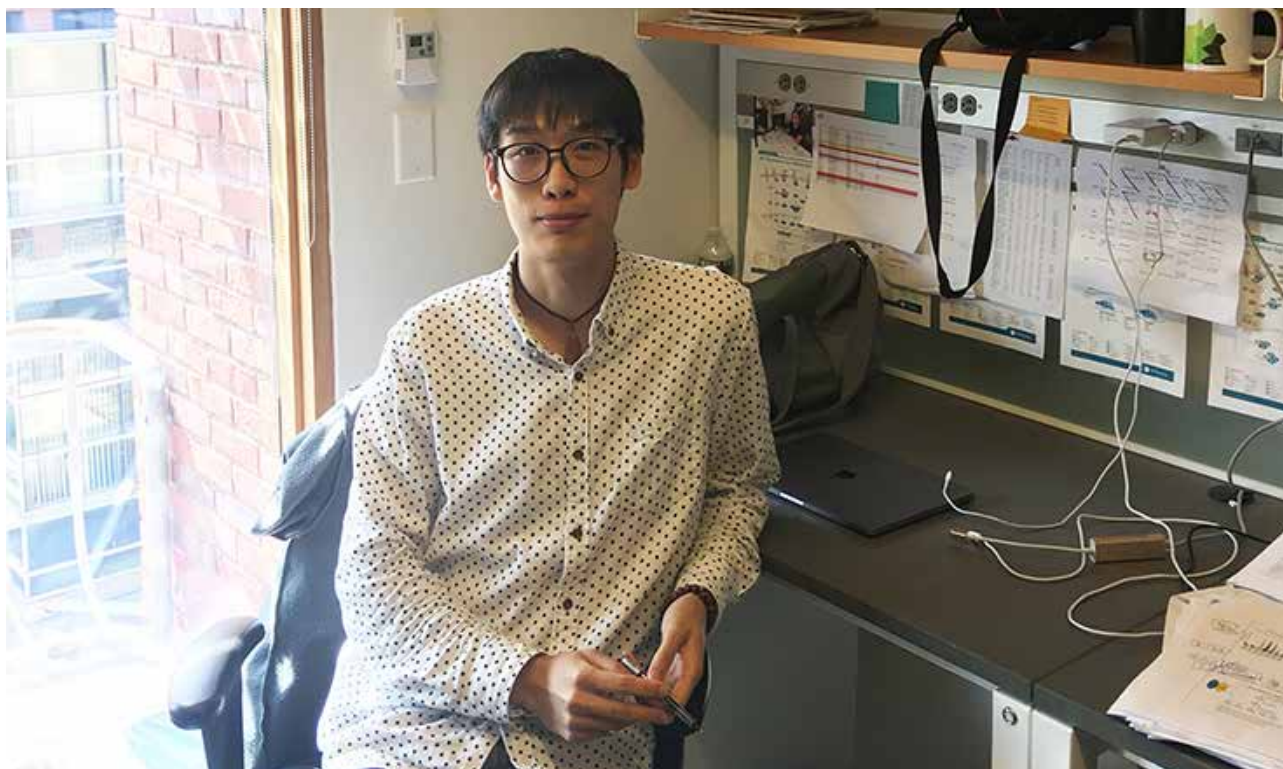
Organized by Universia and Santander Bank, the two-day meeting brought together 600 university presidents from 26 countries representing 10 million university students around the world, in a discussion with the theme of “University, Society and Future” on the challenges facing universities today. The meeting’s conclusions were summarized in the ‘Salamanca Charter,’ a document reiterating the universities’ commitment to continue to lead by reinventing and transforming themselves.

Founded in 1857, Santander Bank is the largest bank in Spain and has established branches in more than 40 nations. It is the largest financial group in Spain and Latin America, with prominent positions in the UK, Brazil, Portugal, Germany, Poland and the northeastern United States. The Santander Group has made a long-term commitment to the higher education sector. Since 1996, Santander Universities has been collaborating with colleges, universities, and research centers, distinguishing it from other national and international banks and financial institutions.



ShanghaiTech's First Senior Class Looks Back

Back when ShanghaiTech's first class of undergraduates visited for Campus Assessment Day in 2014, there was not much of a campus to visit and ShanghaiTech was still more of an idea than reality. Now, four years later but in what seems just a blink of an eye, ShanghaiTech's senior class has made it from impressionable young freshmen to accomplished and promising graduates. They prepare to bid farewell to their college days and move on in their academic and professional careers, these seniors will always remain a special part of ShanghaiTech as they are the very first class to graduate from this young university.



SLST undergraduate student Zhu Haolong got PhD scholarships from 7 top universities and colleges including The John Hopkins University and Cornell University

Zhu Haolong, a Life Science major in the School of Life Science and Technology, who participated in a 3+1 study program and was a visiting student at Harvard and will continue his studies in a PhD program at Johns Hopkins University, was attracted to come to ShanghaiTech to be part of a brand-new university. “It was very good opportunity for me to be one of the very first class of the undergrads to experience and also to see a new campus being developed in this century in Shanghai.” Zhu said that the newness of the university, which might be seen as a risk for incoming students, actually was an attraction for him. “I’m the kind of person that wants a type of freedom. Those old universities, those traditional schools, they are all top schools and they offer very good curriculum. They have a long history. It’s a good thing. But, on the other hand, it’s somehow limiting the opportunities

they offer to the students. For ShanghaiTech I feel we have those resources from those traditional universities, which is good, and also we have the freedom to be really creative and to do something that we truly want to try,” he said.

The amount of freedom and opportunities offered to students has been a major benefit for many students of ShanghaiTech’s first graduating class. They took a risk on attending a brand-new school, but also took advantage of being one of only 200 undergraduate students in their year. “I was very impressed how the school could be so supportive of the students,” said Zhu. “As long as the leadership sees there’s a potential, there’s opportunity, and those students have the passion to do that, they will support us.”



SPST Assistant Professor Lin Bolin (left) and undergraduate student Chen Anqi (right) published research on carbon mitigation in Joule

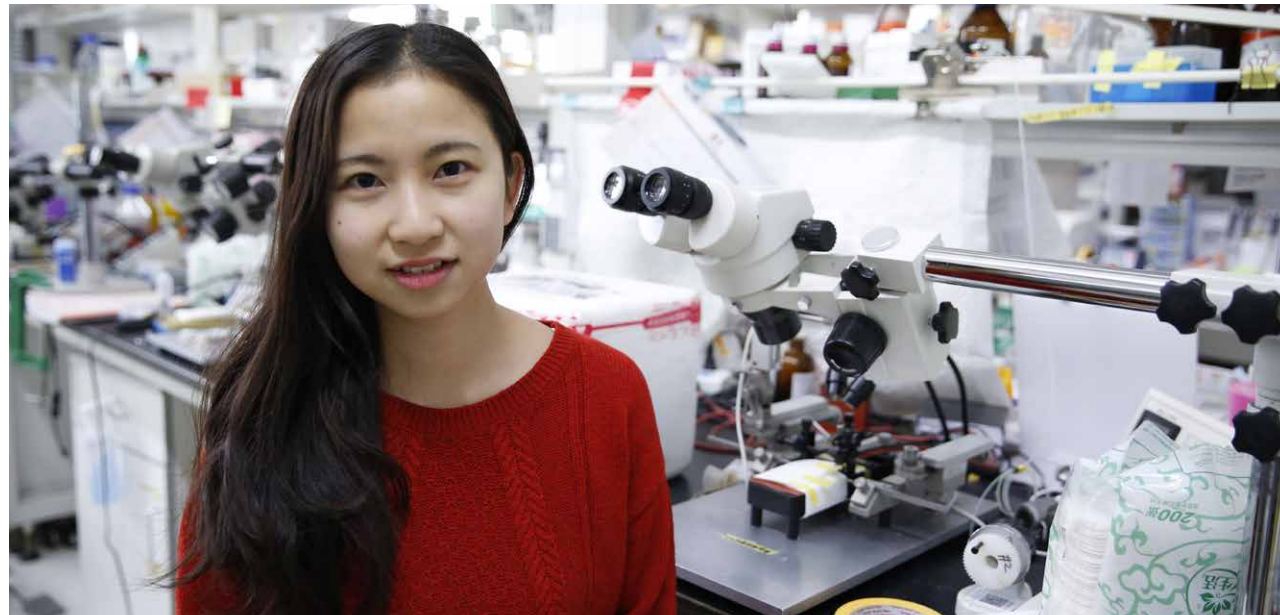
For seniors Chen Anqi and Qian LeChen, that opportunity came in the way of getting into labs earlier than their classmates at other universities. Chen, who majored in Materials in the School of Physical Science and Technology, says her dearest memories of ShanghaiTech will always be the effort she put into her research. “I entered the lab in the second year here, so I have more chances to evolve in my research.” Chen’s research in materials led her to become involved in a research project on carbon mitigation. “We all know the greenhouse effect, and carbon dioxide contributes the most to greenhouse effect. It’s a problem we humans must face in the near future. The technique we use, electrocatalysis, can make carbon dioxide become useful chemicals. The chemicals can be used as building blocks for the chemical industry, and some of them can be used as fuels for vehicles.”

The opportunity to get into a lab in her sophomore year led to her research project supervised by Assistant Professor Lin Bolin. “I think the paper I published may be the most wonderful memory for me. My supervisor and I spent almost one and a half year to finish this work,” she said. The work was finally published in Joule in February of this year just when Chen went to visit her family for Spring Festival. “When I told my parents about my research being published, I think they felt such a relief because they know I have worked on this for a long time.”

Chen says she’s motivated to continue her research as a PhD at ShanghaiTech. “I think it’s useful. It’s tied close with true problems in our society.” For Chen, ShanghaiTech is synonymous with opportunity. “Our school really provides us a lot of chances to make us experience more. I think in the university,

to experience more and know what you truly want, is the most important thing.” While she is sad to say goodbye to her friends, Chen is looking forward to staying on at ShanghaiTech. “There’s a lot of scientific sources here. Just

like why I come here for undergraduate study, there will be a lot of source I can get access to. It will be helpful to my study.”



SLST undergraduate Qian Lechen received offers from Harvard University, Cornell University and University of California, San Diego and would pursue PhD at Harvard

Qian LeChen is another senior student who relished the opportunity to get into the lab early. “I think students here get a lot of chance to get into labs. My experience at Harvard (as a visiting scholar) is that professors told me that the students are competing with each other for the chance to get into labs. But here at ShanghaiTech the professors really welcome students to join the labs and do lab work. And also the leadership at our university thinks highly of the research training experience. So I think it’s really the advantage to join ShanghaiTech and get such experiences.

Her experience starting the first iGEM team in her sophomore year was a formative one. “We recruited 31 students at that year. There were

students from Computer Science, Physics, also Material Science and we worked together to exchange our ideas. We worked on a super cool project, basically it is a platform to convert sunlight into hydrogen production and we worked on it for one year and then we won the gold medal at Boston,” she said. “That was a pretty cool and memorable experience for me.”

The first graduating class has had a unique role in building ShanghaiTech and creating the university’s atmosphere. That international feel is meant to prepare students for their experiences abroad and their future professional life.



Putting STEM Skills into Practice

A student leans over a worktable, sawing back and forth with a handsaw. Over the loud din, another student is building a stool. Sawdust flies as beautiful, yet functional, wood pieces come together through the students’ patient and determined handiwork.

The woodworking class is one of ShanghaiTech’s new offerings, a hands-on class to supplement the students’ current lab-heavy workload. Along with a 3D Printing class, it is part of an effort to provide more diverse options for students to put their STEM skills to practice.

At the beginning of each session, instructor Miao Xiao Dong explains the project the students will be taking on. For each of the course’s eight classes, the students will create a useful wooden creation, from stools to phone stands. Then the student put on their protective masks and get to work, using tools and machines to file, saw and drill their pieces into finished works.

“This is really sharp,” Miao tells a student he’s helping file a piece of wood. “You can make it nice and neat here.” He moves to another table where a student is preparing to saw her piece

of wood. “Saw here, and you can make it into a double-sided phone stand. That way you and your friend can watch your phones together.”

Miao says he’s impressed with the students’ drive. “Time is limited and they must finish one piece each class, so they don’t even have time to take a break. They’re very focused,” he says.

The students throw themselves into the class. There is even talk among some of the students of creating a woodworking club after the course finishes. One student explains, “You can’t just study theory. You also have to learn craft.”

ShanghaiTech focuses on the integration of general education and professional skills. *Modern Woodworking Design and Practice* and *Fabo Academy X* are the first two courses introduced by General Education Center to help students bring innovative ideas to life. The courses adopt a fast-paced learning and practicing model which requires students to design and fabricate projects in a short time, utilizing woodworking tools, 3D printers and CNC machinery.



Craftech Wins 1st Prize in Maker Contest for College Students

From December 30th 2017 to January 1st 2018, a three-person team from ShanghaiTech competed in a three-day Maker Contest, finishing first. Maker Contest is a competition based on the idea “Create almost everything,” originated from the Fablab O (fabrication laboratory). This competition intended to promote creativity among Shanghai undergraduates and encourage collaboration between students from different majors so that more inspiring innovation could be seen during the contest.

ShanghaiTech’s team was made up of members of Craftech, a new student club which only has four members, Zhou Shimin and Chen Xinyan from SPST, Chen Yiwen and Zhang Jiale from SIST. Craftech aims to gather ShanghaiTech’s makers and try to use all machines in Student Creation Center correctly so that every member can realize their own ideas.

Inspired by the competition’s theme “New future, new life,” The team began the competition with an innovative machine to retrieve the large number of discarded shared bikes from city streets. But midway through the competition, the team decided to start from

scratch, and developed an application that could recognize facial expressions, determine the emotion and then play music to match the emotion. The core tech of the team’s design was facial recognition, based on deep learning including opencv, CNN, and SVM.

The team worked hard, dividing up the work between them, staying up late to assemble the hardware and parts. “That must be the most unique New Year’s Eve I’ve ever spent. We didn’t even sleep because the contest was so exciting, and we found pleasure creating into the new year,” said Zhang Jiale.

On the final day, the team showed off their projects, alongside the innovative projects created by the other teams. In the end, Craftech took first place. “I think we deserved the first place,” said Zhang, “because when the other teams went back to their hotel, we stayed up late working on making our product better.” He added, “I love to realize ideas which could make people’s lives more convenient and happy, and involve hardware and software interaction. Working with a team was a unique experience and we are already planning to compete in next Maker competition.”



GeekPie Enters ASC World Supercomputer Contest Finals

The 2018 ASC World Supercomputer Contest (ASC18) ended on May 9th at Nanchang University with Tsinghua University successfully defending their championship. ShanghaiTech University, a first-time finalist, won Silver Medal and the e Prize award. National Tsing Hua University won the award for Highest Computing Performance. Russian St. Petersburg National University, Shanghai Jiao Tong University, and National University of Defense Technology all won awards for Application Innovation.

As one of the world’s top three supercomputing competitions (alongside SC and ISC), the ASC World Supercomputer Contest was founded

by the Asian Supercomputing Association and has been held for seven years. The participating teams are required to optimize the performance of the designated applications on their own supercomputing clusters under power constraints. The contest is committed to inspiring the next generation of HPC scientists and engineers to create innovative solutions. It also pays close attention to cutting-edge technology and facilitates communication among HPC communities worldwide. The contest gives awards for e Prize, Highest Computing Performance, and Application Innovation awards in addition to awards for champion and silver medalist.

This year there were more than 300 college students from 165 universities on six continents participating in the competition. After an intense two-month competition, 20 teams moved on to the finals, including ShanghaiTech University, Tsinghua University, Shanghai Jiao Tong University, Zhejiang University, Texas A&M University, and Hong Kong Baptist University. The ShanghaiTech University team (GeekPie_HPC) took first place in the preliminary round and is entering the finals for the first time.

ShanghaiTech's GeekPie_HPC Team members come from the GeekPie student community under the guidance of assistant professor Shu Yin (SIST) and the engineers Wang Jinlei (SIST) and Zhang Yingdong (Library and Information Technology Center). The team consists of five undergraduates from the SIST. They are Xie Zhiqiang (Class of 2019), Luo Haocong (Class of 2019), Shen Zheqi (Class of 2020), Liu Jianzhong (Class of 2020) and Chen Chen (Class of 2020).

During the finals, the GeekPie_HPC Team designed their own high-performance supercomputer system under the precondition of 3000 watt power limit and completed five challenges, which were: (1) HPL, HPCG supercomputing benchmark testing and optimization, (2) Answer Predication for Search Query (APSQ) based on CNTK deep learning framework from Microsoft, (3) the redesign and optimization of RELION, the core application of the cryogenic microscopy technology, Nobel Prize 2017, (4) the optimization of CFL3D, a well-known NASA computational software for fluid mechanics, (5) the running, analysis and optimization of the mystery application, Siesta. These topics highly challenged the students' breadth of perspectives on scientific issues, their depth of

thought about designing supercomputer system and their ability to analysis and optimize applications. In the AI reading understanding section, APSQ, one team member proposed his unique innovations and improvements for the model algorithm and training performance. The team completed the parallel model training of the large-scale data sets within eight hours and achieved 46.46 high prediction accuracy, almost the most advanced level in the world, earning them the e Prize award, which is given to teams displaying an excellent understanding of supercomputer systems and applications as well as the great ability of optimization.

The ShanghaiTech team surprised everyone with their performance in this competition and improved the university's standing in the international field of high-performance computers. The students were encouraged to implement technologies and to share innovative thoughts with students and experts from around the world in the high-performance computing area, which allowed them to demonstrate their openness and self-confidence.

The team's participation received great support from the Library and Information Technology Center's computing centers and other testing resources, as well as experience-sharing from the architecture design and maintenance of school-level high-performance public service platform, which was helpful in building the testing environment in a short time. They also received technical guidance and hardware and software support from iHuman Institute and the Residential College, fully embodying ShanghaiTech's philosophy of science and education integration.

GeekPie is a student association of computer science enthusiasts at ShanghaiTech. It is

comprised of the GeekPie_Robotics Team, the GeekPie_FPGA Team, the GeekPie_Information Security Team, and the GeekPie_Cloud Storage in addition to the GeekPie_Operation Teams and the GeekPie_PR Team. The GeekPie_HPC Team is a newly established team of the GeekPie Family. GeekPie has won more than 30 awards including ADI UDC

Bronze Prize and KNOE Hackathon Gold Prize and has established close collaborations with industries such as Quadcomm, Microsoft, DaoCloud, ADI, Intel, and GE.



From left to right: SIST Assistant Professor Yin Shu, Undergraduate students Shen Zheqi, Xie Zhiqiang, ASC Advisory Committee Chair & University of Tennessee Professor Jack Dongarra, SLST students Chen Chen, Liu Jianzhong and Luo Haocong



Professor Kurt Wüthrich Honored by Shanghai Government

At the Shanghai Science and Technology Award Conference held on March 23, 2018, ShanghaiTech Professor Kurt Hermann Wüthrich was presented the 2017 Shanghai International Science and Technology Cooperation Award.

Professor Wüthrich was appointed as Distinguished Professor of the iHuman Institute of ShanghaiTech University in 2013 and has installed the first Nuclear Magnetic Resonance (NMR) laboratory at the University. Professor Wüthrich has made outstanding achievements in the research of biological macromolecules (proteins and nucleic acids) using high-resolution NMR technology. He was the recipient of the 2002 Nobel Prize in Chemistry for his development of nuclear magnetic resonance spectroscopy for determining the three-dimensional structure of biological macromolecules in solution. In 2015, he was selected for “The 1000 Plan for Foreign Experts in Shanghai.” He is a Foreign Associate, US National Academy of Sciences (1992), Associé étranger, Académie des Sciences, Institut de France (2000), Foreign Member of the Latvian Academy of Sciences (2004), and a Foreign Member of the Royal Society, UK (2010).

Professor Wüthrich has made significant contributions to the development of the Chinese scientific research community. From 1978-1984, he served as Secretary General of the International Union of Pure and Applied Biophysics (IUPAB). From 1983 onward, he visited China, had in-depth exchanges with universities and scientific research institutes, and contributed to the foundation for China’s successful participation in IUPAB and other international organizations. In 1986, Professor Wüthrich organized the first school of biophysics in Beijing under the auspices of UNESCO and the International Federation of Pure and Applied Biophysics. Professor Wüthrich and his wife have visited China many times and have made great contributions to the promotion of scientific and technological exchange and cooperation both at home and abroad.

Professor Wüthrich’s NMR research group at ShanghaiTech currently has 10 people, and is equipped with world-class 600 and 800 MHz NMR spectrometers. He introduced fluorine NMR to conduct research on the dynamic characteristics of the challenging G protein-coupled receptors (GPCRs). He actively promotes collaborations between ShanghaiTech University and the Scripps Research Institute and Harvard University of the United States, the Swiss Federal Institute of Technology, the Institute of Biophysics of CAS in Beijing, the University of Science and Technology of China, Tsinghua University and the Shanghai Institute of Materia Medica. Cooperation between these universities and research institutes has actively promoted the application of solution NMR technology in China.

Professor Wüthrich is currently one of the leading lecturers in the structural biology

course at ShanghaiTech University. He teaches graduate students NMR for the determination of three-dimensional structures of biological macromolecules. In addition, Professor Wüthrich has also given many general lectures for ShanghaiTech students on his life experiences. He believes that curiosity plays a very important role in promoting scientific research and he advocates balancing research and life.

Professor Wüthrich is not the first ShanghaiTech recipient of the Shanghai International Science and Technology Cooperation Award. In 2015, Professor Raymond Stevens, Founding Director of iHuman Institute, was also a recipient. This highlighted the potential of iHuman Institute in connecting international high-end scientific research resources and strengthening international cooperation. As an internationally advanced research institute, iHuman Institute has gathered a group of well-known domestic and foreign scholars who are engaged in an ambitious “imaging across scales” project. Breakthroughs in the field have been published in top journals, including Cell and Nature. Scientific talent combined with a high-level scientific research platform, a rigorous and pragmatic research strategy, and an open and active atmosphere of academic exchange have enabled iHuman Research Institute to evolve into a world-class research institution.





SLST Founding Dean Lin Haifan Elected Member of American Academy and NAS

Lin Haifan, Founding Dean of the School of Life Science and Technology (SLST), Yale University Professor of Cell Biology and Reproductive Sciences and Director of the Yale Stem Cell Center, was among 213 academics newly elected as members of the American Academy of Arts and Sciences (AAAS), which celebrates excellence in a wide range of disciplines.

Professor Lin's work focuses on the self-renewing mechanism of stem cells. He has been using *Drosophila* germline stem cells to explore how adult stem cells are regulated in the reproductive system. He uses mouse germline and embryonic stem cells, human embryonic stem cells, and Hydra stem cells as models to explore germline development and cancers related to the malignant proliferation of stem cells.

Lin was also elected to the United States National Academy of Sciences (NAS) in recognition of his contribution to the mechanisms underlying the self-renewing division of stem cells.

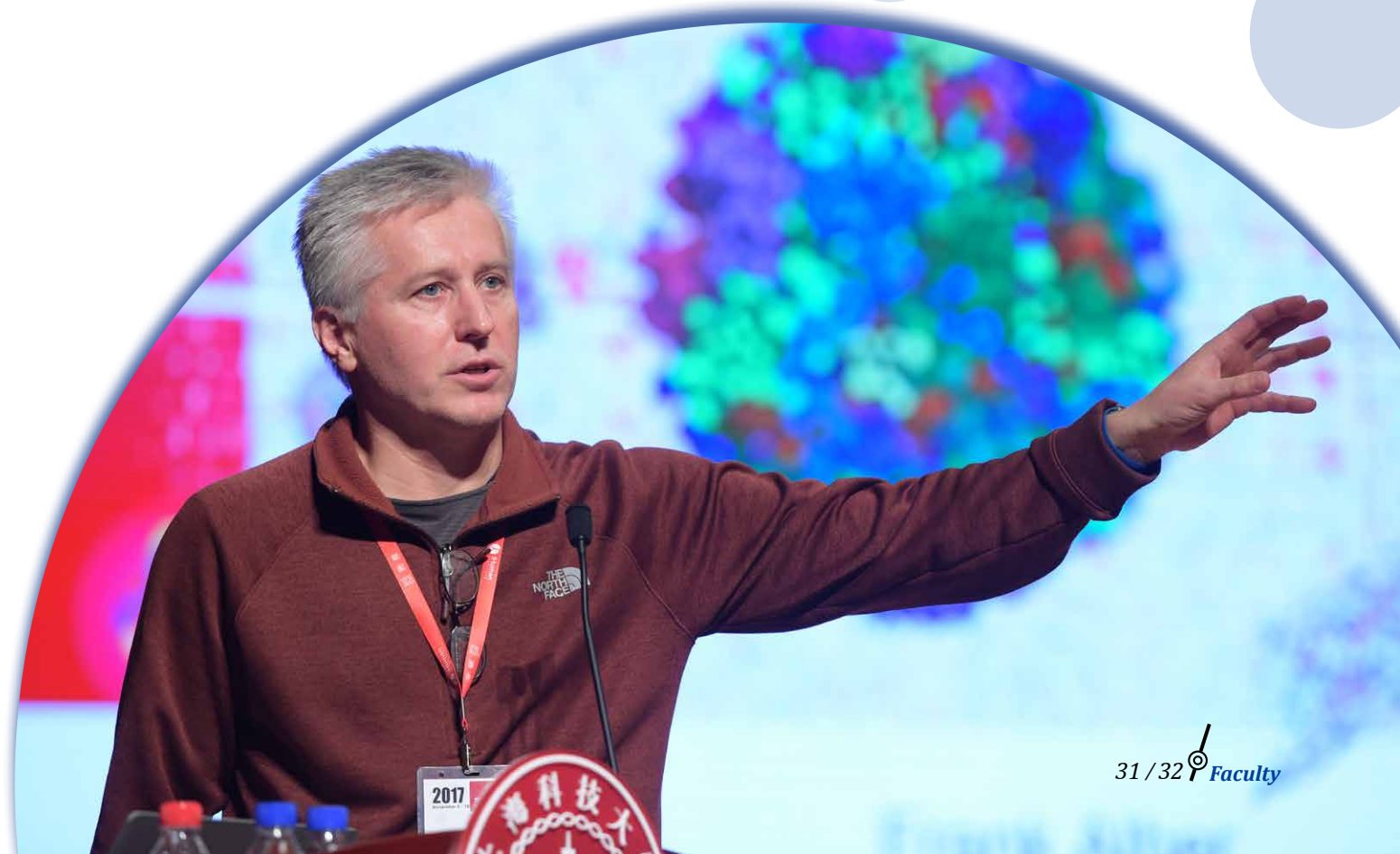
Professor Lin was appointed as Adjunct Professor in Shanghai Institute for Advanced Immunochemical Studies (SIAIS) in June of 2013. A year later he was appointed as the Founding Dean of SLST. In the past years, Professor Lin had made great progress in research and leadership at ShanghaiTech.

Professor Andrej Sali Elected to United States National Academy of Sciences

Andrej Sali, adjunct professor at iHuman Institute and University of California-San Francisco professor, was elected as a member of National Academy of Sciences on May 1st.

Professor Sali is one of the leading experts in integrative structural biology. He has been collaborating with iHuman Institute and last year was appointed as an adjunct professor at ShanghaiTech. His research focuses on the discovery of general structural principles underlying cellular processes,

through maximizing the accuracy, precision, completeness, and efficiency of the structural coverage of proteins and their assemblies. This goal is achieved by the integration of different types of experimental data, physical theories, and statistical inference, spanning all relevant size and time scales. The Sali group has made important discoveries regarding the Nuclear Pore Complex and published high-level articles on journals including Nature.

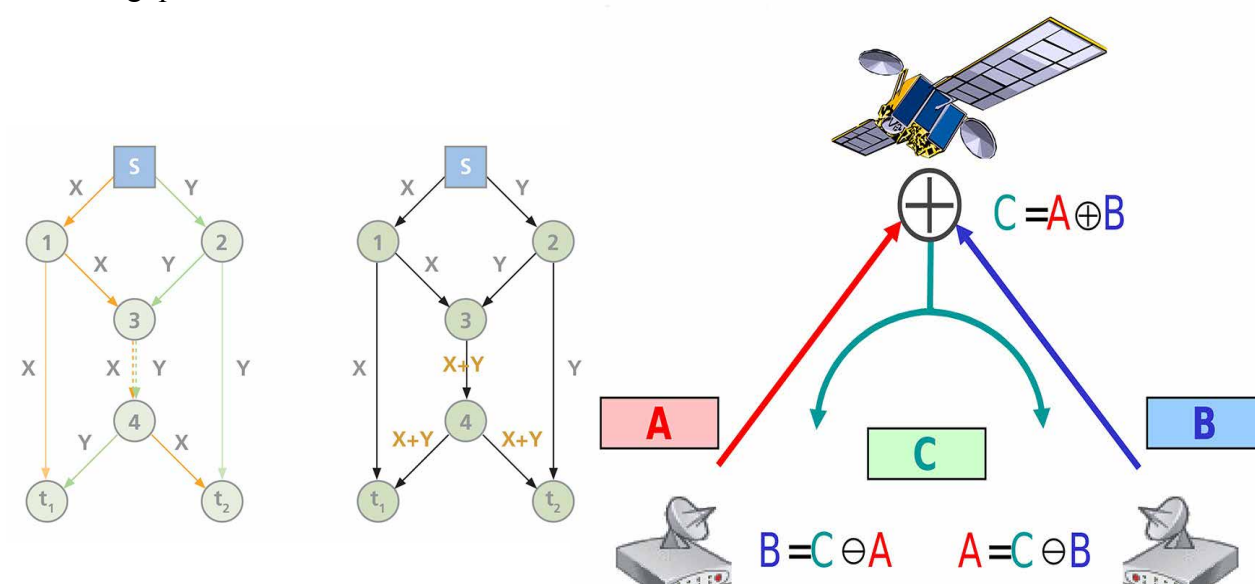




SIST Professor Honored with 2018 ACM Sigmobility Test-of-Time Paper Award

Professor Cai Ning's paper "Network Information Flow," which he published with co-authors, was honored with the 2018 ACM SIGMOBILE Test-of-Time Paper Award. The paper, first published in Volume 46, Issue 4 of IEEE Transactions on Information Theory in July of 2000, is universally recognized as a landmark paper in the field of network coding. This seminal work on network coding has had a profound impact on the networking, information theory, and mobile systems communities. The information theoretic analysis led to significant academic work for more than a decade in the networking community on leveraging network coding to build systems that achieve higher reliability and throughput.

The Network Science Research Center in ShanghaiTech's School of Information Science and Technology focuses on the convergence of Communication, Computing and Control. Professors and students at the center have received numerous international academic awards over the past three years, including the 2018 ACM Sigmobility Test-of-Time Paper Award, the 2016 IEEE Signal Processing Society Young Author Best Paper Award, the 2016 IEEE Information Theory Society Best Paper Award, the 2016 IEEE Guglielmo Marconi Best Paper Award, the 2016 IEEE Globecom Best Paper Award, and the 2016 IEEE Eric Sumner Award.



Nanofibrils in Nature and Materials Engineering

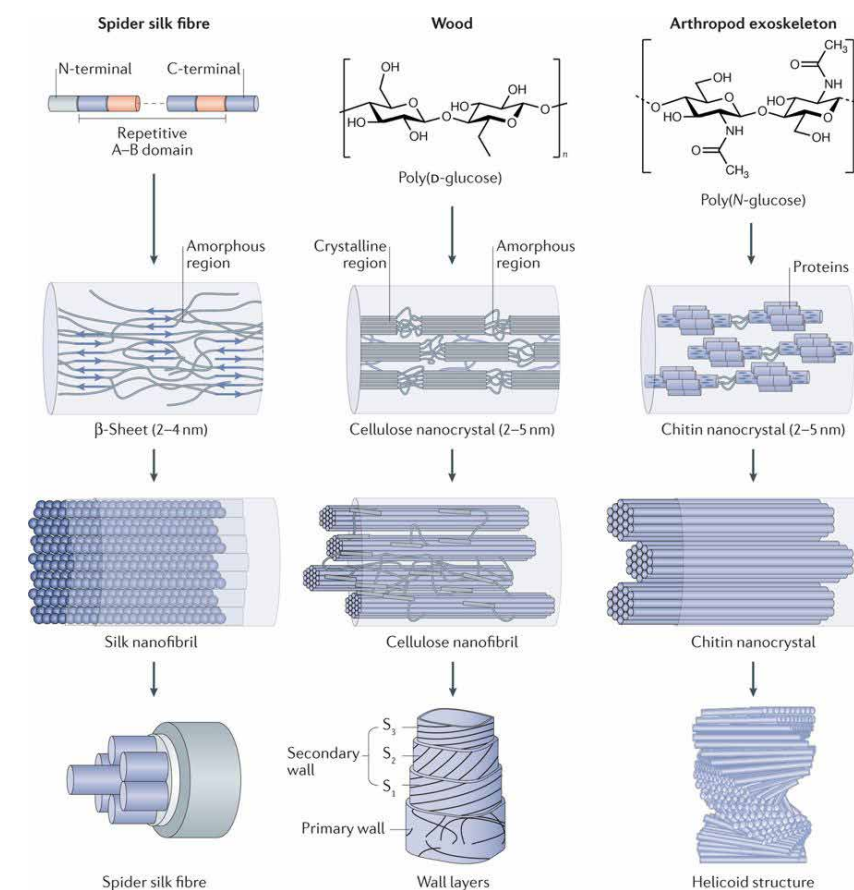


Figure 1. Hierarchical structure of silk, cellulose and chitin

Assistant Professor Ling Shengjie of School of Physical Science and Technology at ShanghaiTech University, in collaboration with Professor David L. Kaplan of Tufts University and Markus J. Buehler of Massachusetts Institute of Technology published a review article of "Nanofibrils in nature and materials engineering" in *Nature Reviews Materials* on April 5th.

Biopolymer nanofibrils, such as cellulose, chitin, and silk nanofibrils, constitute the basic architectural element of many biological materials that fulfil structural functions. These nanofibrils are composed of different biopolymer molecules, i.e. cellulose, chitin and silk fibroin. However, they usually share common structural characteristics at higher structural levels. For example, they are highly

oriented semi-crystalline structures with alternately amorphous and nanocrystalline regions stabilised by hydrogen bonds and van der Waals forces. Their crystal sizes are typically confined to several nanometres. In addition, these biopolymer nanofibrils usually bundle into microfibrils and further organize into fibres and/or higher well-organised 2D- (laminar) and 3D- (helicoidal) structures.

These unique nanofibril structures not only endow the exceptional mechanical properties of biological structural materials but also support physiological functions, such as structural support, defence and prey capture. For example, nanoconfinement and nanofibril orientation of spider dragline silk fibre contributes unparalleled mechanical properties, which exhibit a unique combination of high tensile strength (a tensile strength of 1-2 GPa) and extensibility (50-60% strain at failure). These mechanical features enable the silk fibre to absorb a large amount of energy before

breaking, resulting in toughness values that are several times that of steel and Kevlar fibres. To adapt against the wind and regulate tree growth, the orientation of laminar cellulose nanofibrils in cell walls makes trees capable of adjusting mechanical properties of the wood according to the functions of different wood tissue types. The 3D helicoidally stacking of chitin nanofibril layers in exoskeletons are able to resist fracture efficiently through energy dissipation and prohibit crack propagation.

Accordingly, insight into these material strategies in nature offers an opportunity to disclose structure-property-function relationships of natural materials, and to inspire new routes to use these biopolymer nanofibrils. Cellulose, chitin and silk nanofibril, as three of earth's most abundant biopolymer nanofibrils, have great potential for large-scale applications. In recent years, the applications for these materials have also been widely explored due to their high mechanical

performance, sustainability, wide availability, low cost, low weight, and biocompatibility. However, the structures and/or physical properties of the most artificial biopolymer nanofibril-based materials remain inferior to analogues found in nature. Therefore, determining how to efficiently design and use these biopolymer nanofibril-based materials has become an important subject. With the aim of optimizing the structural-property-function relationships of biopolymer nanofibril-based materials, a series of studies has recently transferred natural material strategies into artificial biopolymer nanofibril-based material design and process. These studies not only demonstrate the potential success of this approach but also lay out a blueprint for how to design de novo, new features and functions, by building on this approach.

In their review, the authors first introduced

several important “universal multiscale construction strategies of nanofibrils” in nature, focusing on strategies utilising biopolymer nanofibrils, including nanoconfinement, nanofibril 2D orientation, and 3D helicoidal stacking. They summarised artificial material design routes for developing biopolymer nanofibril-based materials, focusing on recent work that attempts to mimic the natural structures and then discussed the broader challenges and directions for future developments of these biopolymer nanofibril materials.

This study was supported by a startup grant given by ShanghaiTech University.

Read more at: <https://www.nature.com/articles/natrevmats201816>

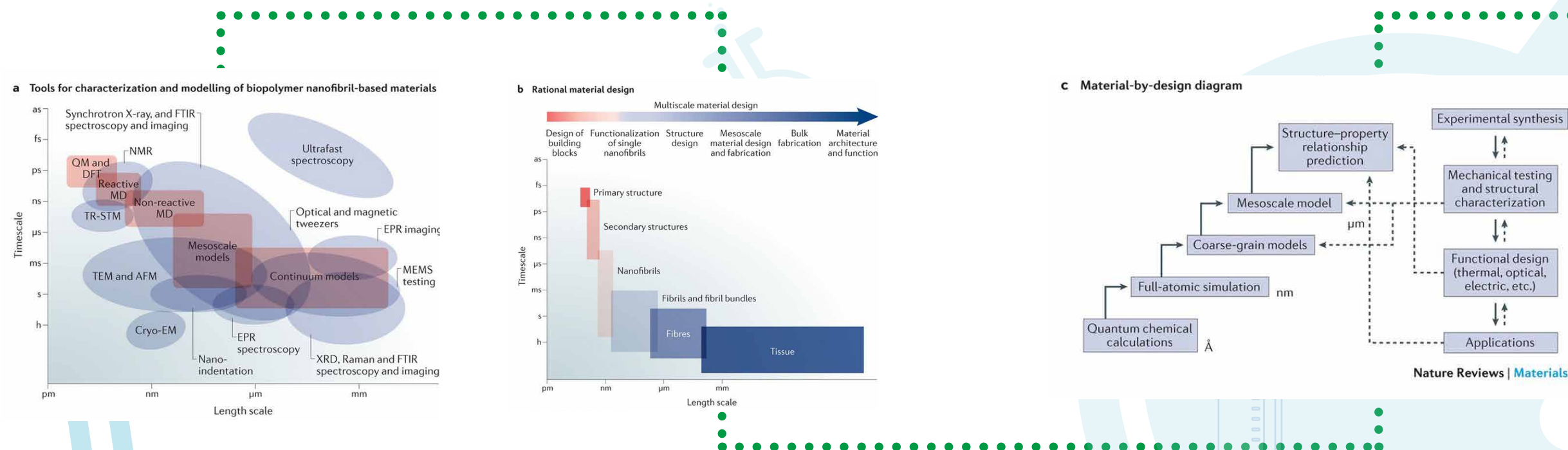


Figure 2. Rational design of nanofibrillar materials

Mechanistic Insights into How Staphylococcus Aureus Utilizes StP

Recently, Dr. Ji Quangjiang's group in the School of Physical Science and Technology deciphered the molecular mechanism of how the pathogen *Staphylococcus aureus* utilizes staphylopin (StP) to recognize and capture metal ions from its surroundings.

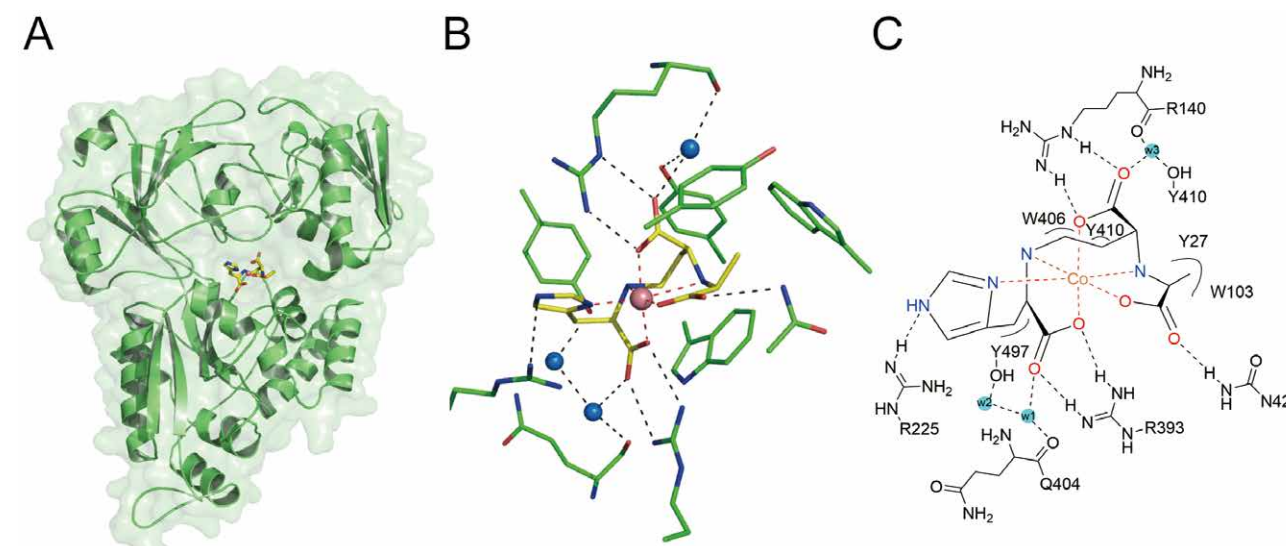
Their research was published in an article in *Proceedings of the National Academy of Sciences* titled "Mechanistic insights into staphylopin-mediated metal acquisition." Transition metals are required trace elements for all forms of life. More than 30% of all proteins contain a transition metal cofactor. Metals serve as catalytic centers for enzymatic reactions, contribute to overall protein stability, or act as signaling agents. Transition metals are essential for microbial survival and pathogenesis, while pathogens must obtain nutrient metals from the host to colonize and cause disease. *S. aureus* is a Gram-positive bacterium that is the leading cause of hospital- and community-acquired infections. This pathogen causes a wide variety of infections, ranging from minor skin infections to life-threatening diseases, such as septicemia, necrotizing pneumonia and toxic shock syndrome. Research on how *S. aureus* acquires metal ions from the human host and causes disease is crucial for the development of strategies to prevent and treat *S. aureus* infections. *S. aureus* biosynthesizes StP, a broad-spectrum metallophore that binds, mediates the transport of transition metals such as Ni^{2+} , Zn^{2+} , Co^{2+} and contributes to staphylococcal virulence. (*Science*, 2016, 352, 1105). However, the molecular mechanism of how StP/metal complexes are recognized and transported remained unclear.

Researchers in the Ji Lab employed isothermal titration calorimetry (ITC) to examine the interactions between StP/metal and the Cnt solute-binding protein (CntA) and discovered that StP/metal recognition by CntA is selective and specific while both the metallophore StP and metals are indispensable for CntA recognition. Then they obtained multiple structures of CntA in apo form and in complex with StP and three different metals (Ni^{2+} , Zn^{2+} , Co^{2+}) (Fig. A) and determined that StP/metal binding triggers a notable interdomain conformational change in CntA. They also found the ten key residues (Y27, W103, R140, R225, R393, Q404, W406, Y410, N423, and Y497) in the ligand-binding pocket, deciphering the detailed interactions between CntA and StP/metal (Fig. B/C). Furthermore, Ji group used the recently developed CRISPR/Cas9-based genome editing tool pCasSA and quickly created five independent single amino-acid mutations in the *S. aureus* genome, allowing systematic investigations of the role of

StP/metal recognition *in vivo*. Taken together, their work unveils the detailed StP-recognition mechanisms by structural characterizations of the CntA/StP/metal complexes as well as the ligand-free CntA. These discoveries shed light into the explorations of novel metal-acquisition mechanisms in other microbes and suggest that targeting StP/metal recognition could be a feasible strategy to counter bacterial infections.

The paper's first author is Song Liqiang, postdoctoral research assistant from the School of Physical Science and Technology, the second author is graduate student Zhang Yifei, and Ji Quanjiang is the corresponding author. Their research was supported by the National Key R&D Program of China, the National Natural Science Foundation of China and the "Young 1000 Talents" Program.

Read more at: <http://www.pnas.org/content/early/2018/03/21/1718382115>



(A) The surface structure of the CntA/StP/Co²⁺ complex
(B/C) Detailed interactions between CntA and StP/Co²⁺



A Long-standing Scientific Mystery Resolved

A research team led by Assistant Professor AChen Gang of the School of Physical Science and Technology at ShanghaiTech University has solved the long-standing mystery of the origin of the attractive forces between like-charged colloidal particles. Their work was recently published in the prestigious journal *Nature Communications*.

Colloids adsorbed at a fluid interface are ubiquitous in nature and central to a promising route to materials synthesis that combines considerable freedom of material choices with the opportunity to create highly ordered structures on the length scale from nano- to micrometers. If the interface area is

confined, the repulsive Coulomb interactions between colloids can induce ordering and even crystallization. However, metastable crystallites and voids have also been observed without area confinement. Neither should be possible in a system with purely repulsive interactions, suggesting that like-charged particles at interfaces can also experience attractive interactions. Since the first direct microscopic observation of 2D colloidal crystals trapped at the air/water interface by Pieranski, considerable experimental and theoretical efforts have been devoted to the study of colloidal particle interaction, dynamics and assembly at liquid interfaces. Despite some new developments in experiments and

the emergence of several theories in recent decades, much confusion still surrounds the interfacial crystallization process and the origin of the attractive forces between like-charged colloidal particles.

In their paper, Assistant Professor Chen and his team reported the in situ grazing-incidence small-angle X-ray scattering (GISAXS) study of the real-time self-assembly process of polystyrene nanospheres on the air/water interface of a Langmuir-Blodgett (LB) trough. This approach allows for simultaneous monitoring of the in-plane ordering and crystallization and the out-of-plane immersion depth (or contact angle) variation, providing a complete picture of the interfacial colloidal self-assembly process. Upon compression, multiple metastable intermediate states are

observed before the stable 2D hexagonal close-packed superlattice monolayer forms under van der Waals attraction. Surprisingly, the immersion depth of the colloidal particles is found to vary with the interparticle distance. Numerical simulations demonstrate that the out-of-plane component of the electrostatic force from neighboring particles increases as the interparticle distance decreases. Such a force presses the particle into water, which deforms the interface and induces the long-ranged capillary attraction. This new finding provides an important clue to the long-standing mystery of the attractive interaction between like-charged particles.

Read more at: <https://www.nature.com/articles/s41467-018-03767-y>

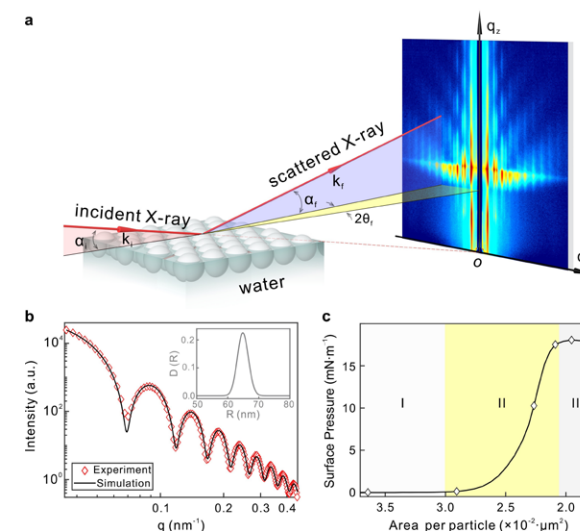


Figure 1: GISAXS experimental setup, SAXS data and surface pressure isotherm

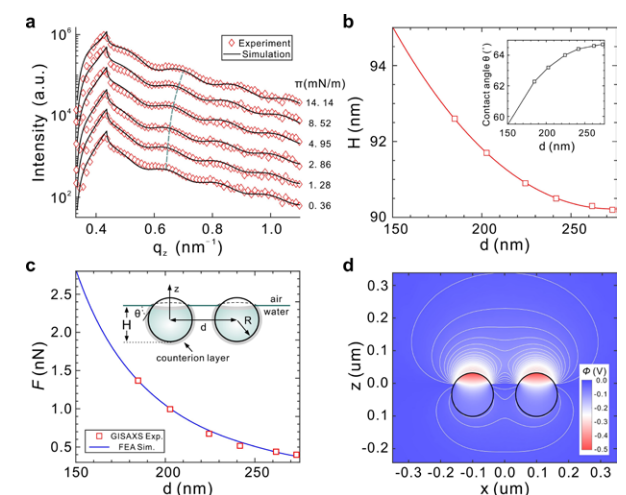


Figure 2: X-ray scattering profiles, particle positions and electrostatic interactions

Quantitative 3D Observation of Potential Nanomedicine in Mammalian Cells

A team of scientists led by Professor Jiang Huaidong and Professor Liu Zhi of the School of Physical Science and Technology at ShanghaiTech University, along with Professor Chen Chunying at the National Center for Nanoscience and Technology of China, and Professor Tai Renzhong at the Shanghai Institute of Applied Physics have made important progress in the field of bio-imaging based on synchrotron radiation facility. The researchers performed multi-model imaging techniques such as scanning transmission X-ray microscopy, X-ray fluorescence microscopy, and combined with new nano-CT algorithms to achieve high-resolution imaging of mammalian macrophages, and quantitatively observed three-dimensional distribution of potential nanomedicine $[\text{Gd}@\text{C}_{82}(\text{OH})_{22}]_n$ within the cells. Their work provides important information for understanding the high-efficiency and low-toxicity anti-tumor effect of nanomedicine. The paper was published in *IUCrJ* as a cover article entitled “Three-

dimensional ultrastructural imaging reveals the nanoscale architecture of mammalian cells.” A scientific commentary article entitled “Multi-model imaging of the interaction of nanomaterials with cells” was published in the same issue of *IUCrJ*.

Understanding interactions between functional nanomaterials and intracellular biological structures at the cellular level is crucial for studying biological effects in nanomedicine and nanotoxicology. So far, optical microscopy and electron microscopy are the most commonly used techniques for cellular studies. However, optical microscopy is limited by factors such as resolution and fluorescent labeling, and it is impossible to perform 3D imaging of intracellular non-fluorescent structures at nanometer resolution. For electron microscopy, sample preparation techniques still suffer from tedious steps and only cell slices can be observed due to the poor penetration depths of electrons. Synchrotron-based X-ray

microscopy can fill the gap for structural investigation of whole cells at nanoscale by taking advantage of strong penetrability and short wavelength of X-rays.

This work was mainly carried out on the beamline BL08U1A at Shanghai Synchrotron Radiation Facility (SSRF). In this study, X-ray spectroscopy, scanning transmission X-ray microscopy and an iterative tomographic algorithm called equally sloped tomography were combined to investigate individual macrophages exposed to the potential antitumor agent $[\text{Gd}@\text{C}_{82}(\text{OH})_{22}]_n$. The macrophages grown on the carbon membrane were scanned through the focal plane of X-ray beam perpendicularly. In order to achieve 3D cell structure, 46 projections were measured at equally sloped angles within a range of $\pm 79.4^\circ$ for each data set. At the same time, according to the abrupt change in the X-ray absorption edge of a specific element (Gd) and the energy-adjustable characteristics of the synchrotron radiation source, researchers realized chemically resolved imaging of biological cells. The nanomaterials containing Gd in cells can be directly observed and

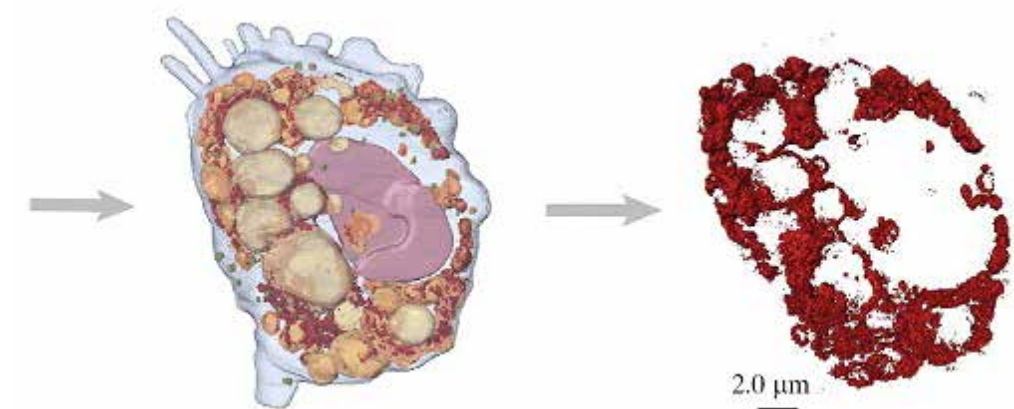
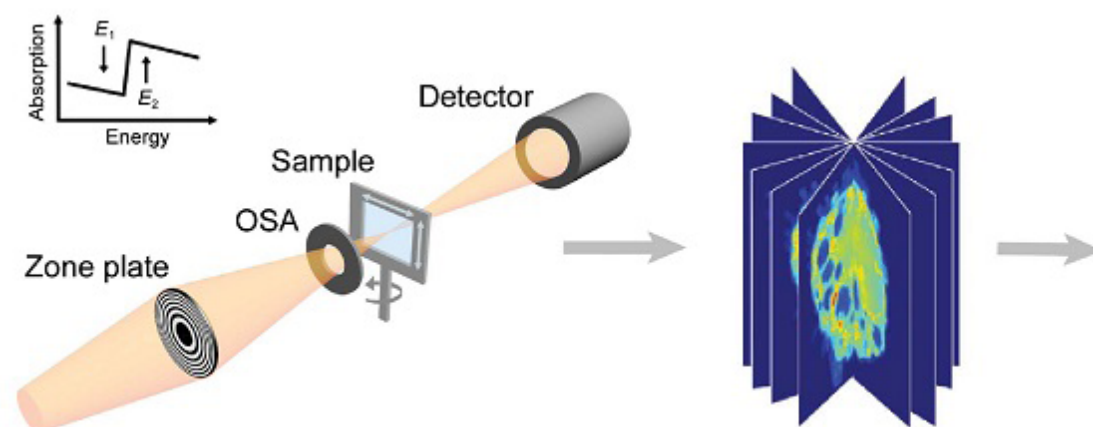
accurately localized. Thus, 3D distribution of the nanomaterials can be performed and quantitatively analyzed with a resolution of 75 nm (Figure 1). This imaging technique provides an intuitive and reliable quantitative approach to the study of nanomaterials within intact large-size cells at the nanometer scale and will greatly benefit the fields of nanomedicine and nanotoxicology.

Dr. Yao Shengkun from the School of Physical Science and Technology is the first author of the paper and Professor Jiang Huaidong is the corresponding author. This study was supported by the National Natural Science Foundation of China, the Major State Basic Research Development Program of China, ShanghaiTech University and Shanghai Synchrotron Radiation Facility.

Read more at: <https://journals.iucr.org/m/issues/2018/02/00/mf5022/index.html>

<https://journals.iucr.org/m/issues/2018/02/00/hi5652/index.html>

3D imaging of single cell and the distribution of intracellular nanomaterials



Researchers Develop Efficient CO₂ Mitigation Principle

A team of researchers led by SPST Assistant Professor Lin Bolin have discovered a new principle for efficient CO₂ mitigation, and, for the first time explicitly overturned the dominant paradigm that the use of fossil fuel power to drive CO₂ chemical reductions would create more CO₂ emissions than it would reduce. The researchers propose a progressive strategy for global CO₂ mitigation.

Their study, titled “A Simple Framework for Quantifying Electrochemical CO₂ Fixation,” was published online with open access on *Joule* on February 26, 2018. Undergraduate student Chen Anqi is the first author and Dr. Lin Bolin is the corresponding author.

Limiting average global temperature rise well below 2°C relative to pre-industrial levels by 2100 via substantial emission abatements of greenhouse gases, especially CO₂, is one of the greatest global challenges in this

century. Failure to meet the target set in the Paris Agreement on Climate Change has been widely projected to cause severe socioeconomic damage due to adverse climate changes from rapid global warming. Despite growing global awareness of the seriousness of global warming, there is insufficient attention being paid to the urgency of the situation. The authors estimate that without immediate worldwide action, the remaining carbon budget will very likely run out in about two decades, based on synthetic analysis of available data, particularly current global CO₂ emissions approximately 41 gigatonnes annually with growing trend and the remaining carbon budget only about 800 gigatonnes to meet the temperature-control target in 2116 according to Intergovernmental Panel on Climate Change (IPCC), Energy Information Administration (EIA) of USA and The Global Carbon Project. A “golden triangle” with three key vertexes—“mitigation efficiency,”

“storage stability,” and “economic cost”—is conceptualized for the first time as a qualitative principle to gauge the feasibility of various CO₂ mitigation strategies. Extensive examination of available data, especially from the reports by International Energy Agency (IEA), suggests that aside from carbon capture and storage (CCS), chemical fixations of CO₂ (CFC) with high “storage stability” can substantially abate CO₂ emissions.

Inspired by Einstein's philosophy of simplicity, Chen and Lin creatively formulated intricate and wide-ranging CO₂ mitigation processes with two very simple equations, introducing a mass-per-unit-energy concept for both CO₂ emission and fixation. Straightforward calculations based on the mass-per-unit-energy equations directly provide the first-ever set of figures of merit quantifying intrinsic abatement capacities of diverse electrochemical CO₂ fixations and thus reveal that electrochemical reductions of CO₂ to nongaseous chemicals with high oxidation states (i.e. fewer electrons transfer) is the key principle for high "mitigation efficiency." In particular, the widely overlooked oxalic acid has high "mitigation efficiency" and much higher "storage stability" than CO₂ and is a nontoxic industrial raw material with

economic benefit. The fixation to oxalic acid can serve as a progressive strategy for global CO₂ mitigation.

In spite of their rapid adaptation, low-carbon electric energies like wind or solar generated energy are still too small in scale to drive substantial CO₂ reduction toward the temperature-control target in the next two decades before exhausting the remaining carbon budget. Therefore, the authors propose that chemical reduction routes need alternative energy supply already or soon to become available in large scale in order to allow time for the gradual growth and deployment of decarbonized energies to eventually achieve the temperature-control target.

Joule is published monthly by Cell Press, and is a new home for outstanding and insightful research, analysis, and ideas addressing the need for sustainable energy. A sister journal to Cell, Joule spans all scales of energy research, from fundamental laboratory research into energy conversion and storage up to impactful analysis at the global level.

Read more at: [http://www.cell.com/joule/fulltext/S2542-4351\(18\)30049-7](http://www.cell.com/joule/fulltext/S2542-4351(18)30049-7)

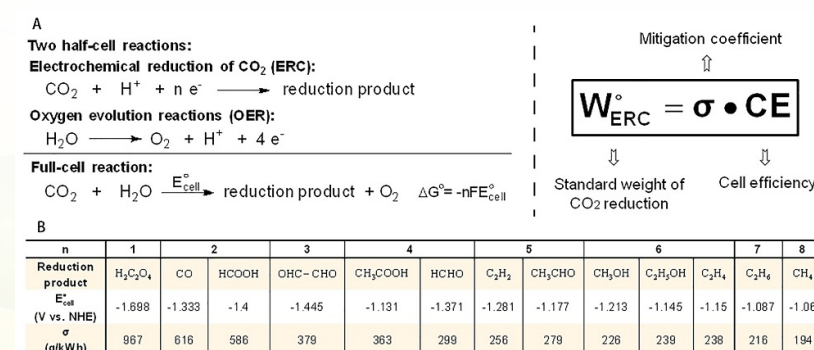
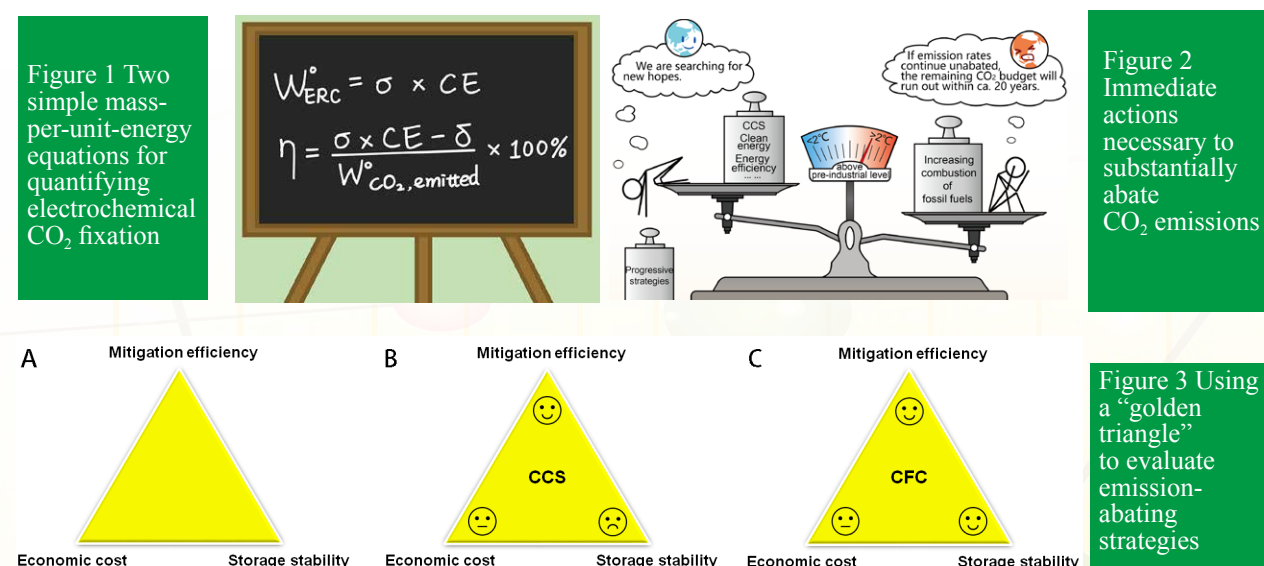


Figure 4 Quantifying the abatement capability of electrochemical reductions of CO₂

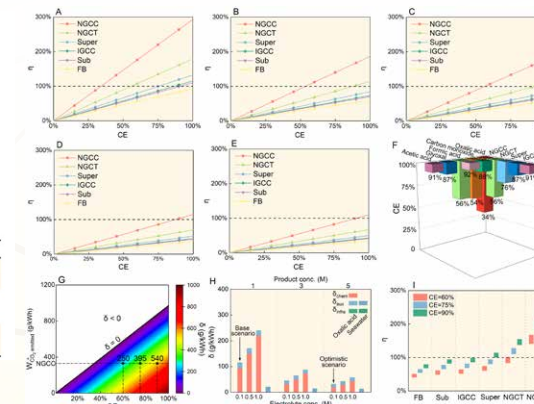
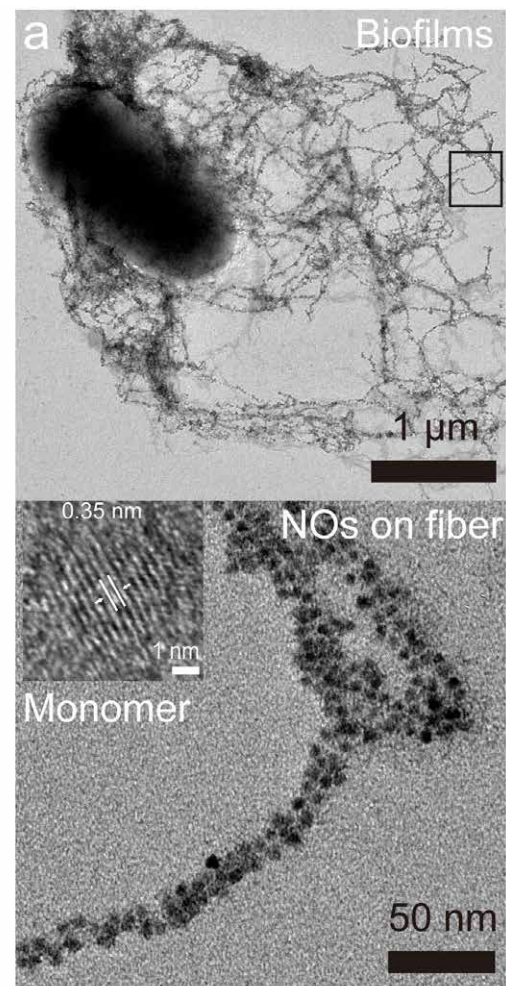
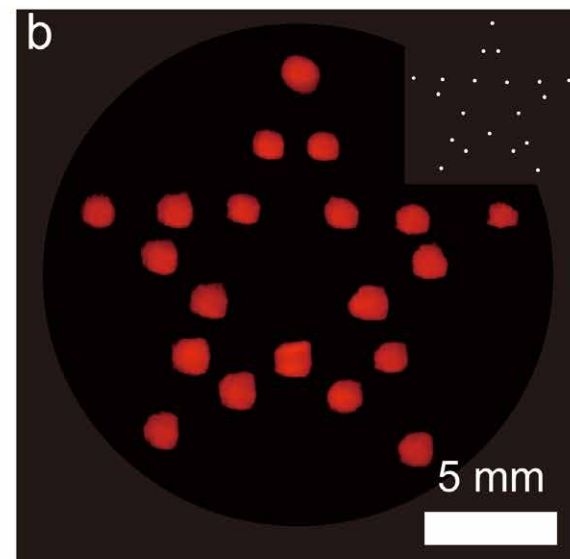


Figure 5 Electrochemical Reduction of CO₂ Driven by Fossil Fuel Power

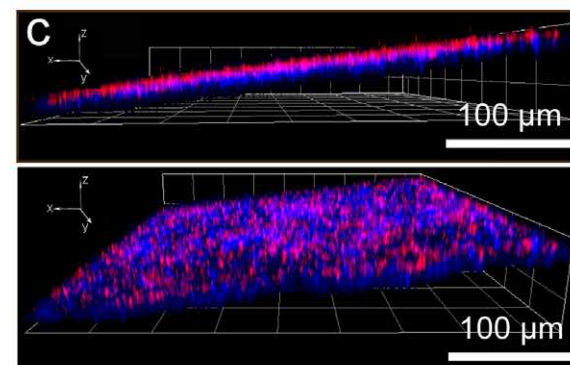
Engineered Bacteria Direct Dynamic Assembly of Inorganic Nano-objects with Spatiotemporal Control



Dynamic assembly of red QDs



Patterned assembly



Layer-by-layer assembly

Zhong Chao's Group in the Division of Materials and Physical Biology at ShanghaiTech's School of Physical Science and Technology (SPST) has recently reported an engineered bacterium, which can sense environmental signals (for example, light or small molecules) to produce biofilms and, and simultaneously direct the assembly of inorganic

nano-objects with spatiotemporal control in a dynamic, reconfigurable and scalable fashion. Their exciting results have been published in *Advanced Materials*, a prestigious international journal in the field of materials science. Owing to its broad interest, their communication paper was highlighted as an inside back cover in issue 16 and has also been recommended by

the editors as a highlighted "Video Abstract" on the official website.

Biological self-assemblies are ubiquitous in nature, occurring on scales from the molecular to the organismal. They constitute the basis for structural construction and functional operations of biological nanomachines, materials, and systems. For example, the dynamic assembly of organic and inorganic components, governed spatiotemporally by cells, endows biologically assembled materials such as bones and shells with a structural hierarchy and with functional properties superior to those of their synthetic counterparts. A hallmark of such biological self-assembly system is its dynamic, adaptive, environmentally responsive, and self-replicating nature. These desirable attributes are unattainable with current artificial self-assembly systems. Integrating and harnessing biologically dynamic self-assembly into synthetic self-assembly systems would provide exciting opportunities for producing conceptually new types of materials and nanotechnologies that can be reconfigured on demand, but the pathways to achieve this goal are still undetermined.

By using synthetic gene circuits, the researchers could manipulate cells to link nanoscale objects and curli fibers via metal coordination chemistry and to indirectly guide the assembly of inorganic nano-objects (NOs) onto curli fibers with precise spatiotemporal control. Living biofilms adapt to environmental stimuli (for example, light) and make correlated modifications in their assembled structural states. Their strategy is therefore suitable for creating ordered ensembles of NOs that are reconfigurable on demand. For example, by combining dynamic self-assembly with the intrinsic adherence

of biofilms, they accomplished large-scale and hierarchical assembly of discrete NOs or complex heterogeneous structures on substrates of distinct surface functionalities or three-dimensional (3D) materials of complex shapes. Furthermore, by integrating programmed light regulation with a light-sensing strain, they could spatially control cells to assemble curli fibers on desired areas of the substrates in the presence of patterned masks and thereby achieve patterned assembly of quantum dots with a minimum patterning resolution of 100 microns. In addition, by temporally controlling the sequential addition of NOs into the culture, they demonstrated multilayered heterogeneous NO assembly through autonomous layer-by-layer assembly. The complex nanostructures created by their strategy may lead to potential applications in bioelectronics, optoelectronic devices, biocatalysis, wearable and portable devices, smart textiles and energy-relevant. As a proof-of-concept, they demonstrated a touch switch device based on a capacitor constructed from conductive biofilms. In the future, this strategy would be useful to create living functional materials that fruitfully combine the strengths of living systems (e.g., self-repair, ability to sense and respond to complex environments) with those of inorganic systems.

The work demonstrates the application of synthetic biology tools for manipulating and harnessing biological self-assembly systems to advance a new repertoire of nanotechnologies and materials with increasing complexity that would be otherwise challenging to produce.

Read more at: <https://onlinelibrary.wiley.com/doi/epdf/10.1002/adma.201705968>

<https://onlinelibrary.wiley.com/doi/epdf/10.1002/adma.201870115>

SLST Team Finds Immunotherapy Response Predictive Biomarkers

The prognosis of late stage cancer patients after traditional cancer treatments such as radiation, surgery and chemotherapy is always poor. Immunotherapy with antibodies targeting immune checkpoints represents a major breakthrough in cancer treatment. Some cases of patients previously considered incurable are now able to be cured through immunotherapy. However, only a fraction of patients show durable response to immunotherapy, and the need for the discovery of biomarkers predicting the response to immunotherapy is urgent. The approval of mismatch repair deficiency as a tissue-agnostic immunotherapy biomarker by FDA has been selected as one of the ten scientific breakthroughs in 2017.

Cytidine deaminase APOBEC3B plays a key

role in the mutation process of non-small cell lung cancer (NSCLC). APOBEC3B is also reported to be up-regulated and predicts bad prognosis in NSCLC. However, targeting APOBEC3B high NSCLC is still a big challenge. Recently a research team led by Assistant Professor Liu Xuesong has identified APOBEC3B expression and APOBEC mutation signature as immunotherapy response predictive biomarkers. Dr. Liu's team found that APOBEC3B up-regulation is significantly associated with immune gene expression, and that APOBEC3B expression positively correlates with known immunotherapy response biomarkers, including PD-L1 expression and T cell infiltration in NSCLC. Importantly, APOBEC mutational signature is specifically enriched in NSCLC patients having

a durable clinical benefit after immunotherapy. Furthermore, APOBEC mutation count could be more accurate in predicting the response to immunotherapy than the total mutation count. Since APOBEC mutation signature is prevalent in several types of cancers including bladder, cervical, breast, head and neck, and lung cancer, it will be interesting to further investigate whether APOBEC mutation signature is another type of tissue-agnostic immunotherapy biomarker similar to the mismatch repair deficiency.

students Wang Shixiang and Jia Mingming are joint first authors and Dr. Liu Xuesong is the corresponding author. This work was supported by grants from the National Natural Science Foundation of China, Shanghai Municipal Science and Technology Commission and ShanghaiTech University.

Read more at: <https://www.nature.com/articles/s41388-018-0245-9>

Liu Xuesong's Lab homepage: <https://liuxslab.netlify.com>

This work was published online in *Oncogene* on April 26, 2018. Graduate

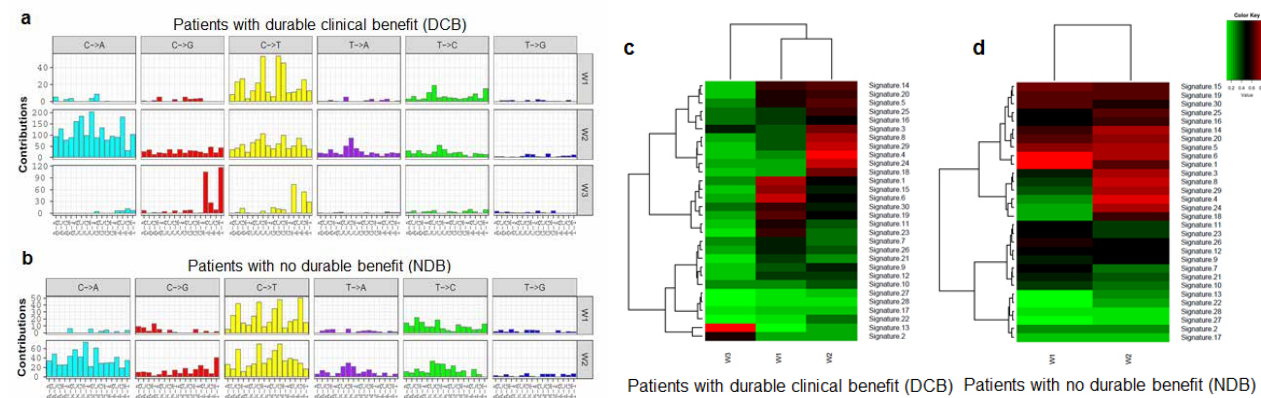


Figure 1: APOBEC mutational signature is specifically enriched in patients with durable clinical benefit but not in patients with no durable benefit

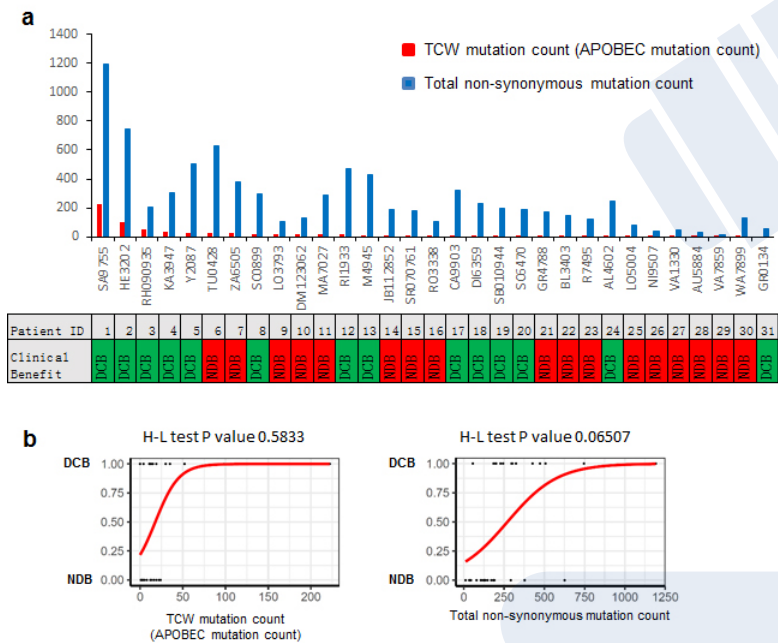


Figure 2: TCW mutation count (APOBEC mutation count) could be more accurate than the total non-synonymous mutation count, in terms of predicting PD-1 blockade immunotherapy clinical response

Genome-Wide CRISPR Screen Focused on Regulation of T Cell Function

An international effort within the immunology research community resulted in the first genome-wide CRISPR screen focused on the molecular mechanism of T cell function regulation. A group of scientists led by Dr. Wang Haopeng of the School of Life Science and Technology, along with Dr. Arthur Weiss at UCSF and Dr. Wei Lai of the Zhongshan Ophthalmic Center at Sun Yat-sen University, have systematically investigated the T cell signal transduction network, using an unbiased screen approach. Their paper, “A genome-wide CRISPR screen identifies FAM49B as a key regulator of actin dynamics and T cell activation,” was published online in *PNAS* on April 9, 2018.

The recent success of T cell-based cancer immunotherapies highlights the importance of further understanding the molecular mechanisms underlying the regulation of T cell

responsiveness. Dr. Wang’s team performed a genome-wide CRISPR screen to identify genes that regulate T cell activation upon anti-T cell receptor (TCR) stimulation. This screen not only confirmed many of the known regulators in proximal T cell signaling, but also identified a previously uncharacterized gene named FAM49B, which acts as a negative regulator in T cell activation. This study suggests that genome-wide CRISPR screening is a powerful means to identify key regulators of TCR signaling. The same strategy could be applied to CD28-mediated co-stimulatory signaling or PD-1-mediated co-inhibitory signaling. The unbiased approach presented in the paper may allow scientists to identify new therapeutic targets for cancer immunotherapy.

Read more at: <http://www.pnas.org/content/early/2018/04/03/1801340115>

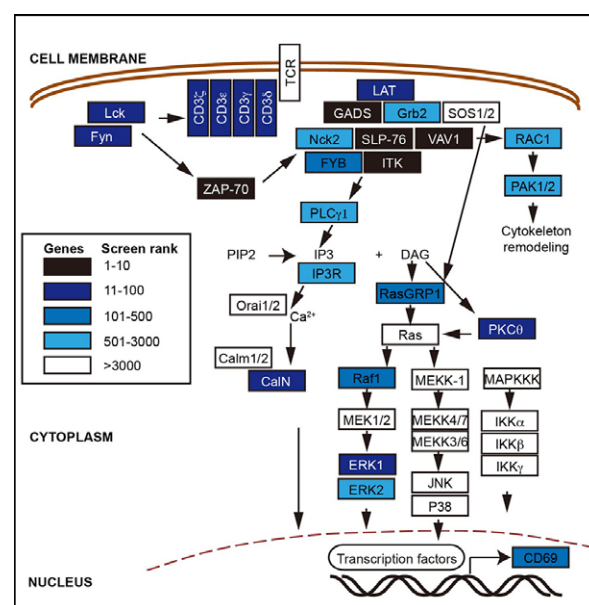


Figure 1: CRISPR screen reveals TCR signaling network of T cell activation

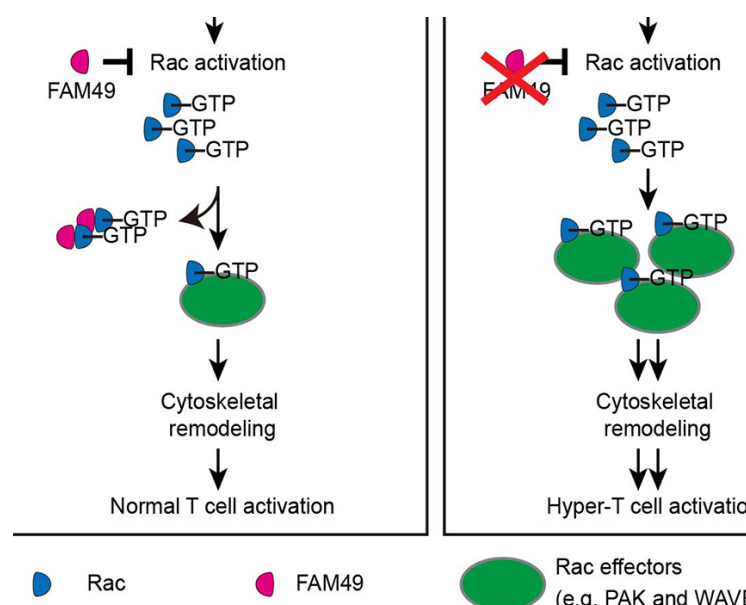


Figure 2: Proposed model for FAM49B mediated regulation

SIAIS Researchers Report New Progress on Zika Virus

Nature Microbiology recently made available as an Advance Online Publication the research findings of a collaboration between SIAIS Research Associate Professor Liu Jia from the Laboratory of ADC Chemistry and Professor Xu Jianqin from Shanghai Public Health Clinical Center, Fudan University on Zika virus (ZIKV) infection.

ZIKV belongs to the flavivirus virus family and was discovered in the Zika forest in Uganda, Africa in 1947. There were very few early cases of ZIKV infection reporting infection-related human diseases, however, the ZIKV outbreak in South America has been shown to be associated with microcephaly

in newborns and Guillain-Barré syndrome in adults. Despite studies showing the causal link between ZIKV infection and fetal birth defects, the mechanisms underlying ZIKV infection, especially its entry pathway, remain largely unknown. Among the others, the role of AXL during ZIKV infection has been controversial thus far. AXL belongs to TAM (Tyro3, AXL and Mertk) receptor tyrosine kinase. Several studies have suggested AXL as the entry receptor for Zika virus, and have shown that blocking AXL using antibodies, siRNA or genetic ablation can protect cells from ZIKV infection. However, conflicting studies suggest against the role of AXL as ZIKV entry receptor and have demonstrated in vitro and in vivo studies that ZIKV infection can be AXL-independent.

In their study, Dr. Liu Jia and collaborators studied ZIKV infection in human astrocytes. They found that although targeted gene disruption of AXL could prevent ZIKV infection in human astrocytes, it did not block virus entry. This indicated that AXL did not function as the entry receptor of ZIKV but might instead promote ZIKV infection via alternative mechanisms. Further experiments elucidated that AXL promoted ZIKV infection by antagonizing type I interferon (IFN) signaling. Additionally, this study has illustrated the important role of SOCS1 in regulating type I IFN.

Research Assistant Professor Yang Yifeng

from ShanghaiTech University and Graduate student Chen Jian from Fudan University are co-first authors of this study. Research Associate Professor Liu Jia from ShanghaiTech University and Professors Xu Jianqing and Zhang Xiaoyan from Fudan University are co-corresponding authors. The National Natural Science Foundation of China and ShanghaiTech University provided financial support to the study.

Read more at: <https://www.nature.com/articles/s41564-017-0092-4>

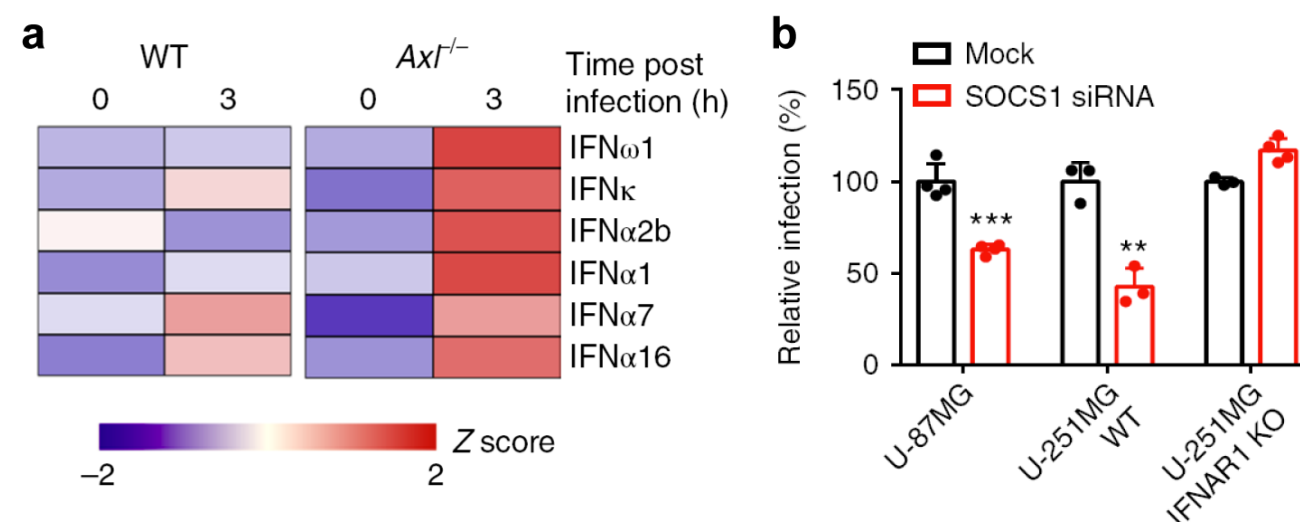
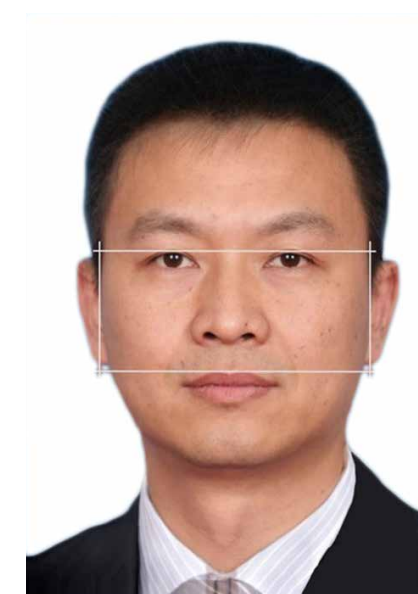


Figure: a. AXL antagonizes type I IFN signaling during ZIKV infection. b. SOCS1 played a critical role in AXL-mediated regulation of type I IFN signaling



Group Facial Width-to-Height Ratio Predicts Intergroup Negotiation Outcomes

Figure: Example of measuring FWHR (To protect the identity of participants, researchers produced the present photo by merging three photos using Psychomorph.)

In our daily lives, we often have to make quick judgments about strangers based on very little information. The face, as a distinct cue for social communication, is particularly useful for inferring individual characteristics in interpersonal judgment and decision making. The facial width-to-height ratio (FWHR) is one cue that people implicitly use to determine the extent to which men might be trustworthy, dominant, or aggressive.

To identify the potential impact of FWHR on intergroup negotiations, researchers randomly assigned 1,337 Chinese business executives from Shanghai, Beijing, and Shenzhen to 288 groups and they completed a multi-issue negotiation exercise against each other. Results showed that both groups with larger than average FWHRs and those with larger maximum individual FWHRs achieved objectively better negotiation outcomes. These findings suggest new strategies for negotiators to enhance their negotiation performance. Everything else being equal, a new team member with larger, as opposed to smaller,

FWHR would add more value to the team. Negotiators should also allocate appropriate attention and resources to handle negotiation counterparts with larger FWHRs.

These findings were published recently by *Frontiers in Psychology* in an article titled, "Group facial width-to-height ratio predicts intergroup negotiation outcomes." The study developed from an international collaboration, including ShanghaiTech Associate Professor Yang Yu of the School of Entrepreneurship and Management and Professor Thomas Denson of the School of Psychology, University of New South Wales in Australia. Yang's past and present research assistants also contributed to the article. This work was supported by a faculty research grant awarded to Professor Yang by ShanghaiTech University.

Read more at: <https://www.frontiersin.org/articles/10.3389/fpsyg.2018.00214/full>



ChEM Holds Inauguration and Forum

The inauguration of Center for High-Resolution Electron Microscopy (ChEM) and international electron microscopy forum was successfully held in SPST from May 27th to 29th. After nearly three years of construction, under the coordination of the whole university's functional departments, an advanced electron microscopy research and teaching center with excellent equipment and service in the frontier of scientific research has begun to take shape.

After giving a warm welcome, ShanghaiTech President Jiang Mianheng introduced ShanghaiTech University and its vision, and thanked the Shanghai Municipal Government and the Chinese Academy of Sciences for their

support in funding and scientific research. He especially expressed admiration for the efforts of ChEM Director Professor Osamu Teresaki for his contributions to building the center and the faculty team. He spoke of his wish for the important role ChEM would take in educational innovation and future scientific research. Later on, SPST Founding Dean Professor Yang Peidong introduced the school's philosophy, its development and plans for the future, and described how ChEM's name came to be. Finally, he introduced the establishment of ChEM to all the participants, saying that he hoped ChEM will not only work on interdisciplinary research in materials, physics, chemistry and biology, but also contribute to training the next generation of



outstanding young scientists.

Advanced electron microscopes are a powerful tool for the exploration of the micro-world. As a large developing country, China has an urgent need for materials science and technology, especially for electron microscopy in the frontier of emerging materials. The forum speakers discussed the frontiers of this field including electron microscopy and its interdisciplinary applications in materials, physics, chemistry and biology.

Nearly 200 participants from universities, research institutes, and enterprises from around the world came to the opening ceremony, as well as a number of famous experts, including the carbon nanotube discoverer Professor Sumio Iijima, Professor John C H Spence of Arizona State University, Professor Gunnar von Jeijne of Stockholm University, Professor Angus Kirkland of University of Oxford, and Professor Paul Midgley of University of Cambridge. Several outstanding young SPST researchers also demonstrated admirable professionalism in the opening forum. SPST Assistant Professors Ma Yanhang and Yu Yi and Associate Researchers Alvaro Gacia and Peter Oleynikov made impressive talks.

The three-day forum was fruitful, with wonderful talks and discussions. Participants enthusiastically delved into many hot topics in this field, visited the electron microscopy center, and heard a detailed introduction by the center's director and staff engineers.



2018 ROCHE-RSC International Symposium Gathers Scientists to Discuss Drug Discovery

The Roche-RSC International Symposium on Scientific Frontiers to Enable Drug Discovery was successfully held in ShanghaiTech University on June 1, hosted by F. Hoffmann-la Roche AG (Roche) and Royal Society of Chemistry (RSC) and co-organized by ShanghaiTech University and Shanghai Institute of Biophysics. The symposium was jointly chaired by Dr. Shen Hong, head of Medicinal Chemistry at Roche Innovation Center Shanghai, and Professor Liu Zhijie, executive director of ShanghaiTech's iHuman Institute and attended by representatives from more than ten academic colleges, universities, scientific research institutes and industrial companies along with 600 attendees from chemical and biology-related fields.

RSC China General Manager Amy Lam and ShanghaiTech Vice President Yin Jie gave opening remarks, both highlighting the key role of innovative and interdisciplinary research in new drug development and in addressing human health issues and challenges, and also stressing the importance of the collaboration.

More than 20 renowned speakers from China and abroad were invited to give scientific speeches, including from University of Dundee (UK), University of Chicago, Rice University, UC San Diego Medical College, University of Bonn (Germany), Korea Seoul National University, Peking University, Tsinghua University, Shanghai Institute of Organic Chemistry, ShanghaiTech University, Roche, Novartis, and WuXi APP. The renowned scholars, young scientists and industrial researchers who focus on the frontiers of organic chemistry, pharmaceutical chemistry, chemistry and structural biology, immunology, and other areas that contribute to new drug development, introduced new research advances and discussed cutting edge scientific research in related fields. iHuman Institute Founding Director Professor Raymond Stevens and iHuman Research Associate Professor Hua Tian were invited to give talks.

During the symposium, Dr. Richard Kelly, executive editor of RSC's Journal of Organic and Chemical Biology, introduced RSC's work in addressing global challenges in health-related areas, including various academic seminars, research exchange grants, journals and books. Dr. Liang Yan, the founder of Beauty of Science program, introduced the application and role of molecular visualization in chemical research, molecular biology education, and pharmaceutical company marketing.

Three young Chinese investigators from Roche were awarded medals during the

symposium in recognition of their outstanding contributions in the following studies: cancer immunotherapy and understanding of the mechanism of T cell depletion (Professor Liao Xuebin, Tsinghua University), development of new synthetic methodology (Professor Dong Guangbin, University of Chicago), and new discoveries in fluoride chemistry (Dr. Shen Qilong, Shanghai Organic Institute). In addition, five winners out of 30 were awarded Best Poster Award Winners. The winners were nominated by a professional team composed of Roche researchers.





ShanghaiTech Hosts SWEDCS 2018

From June 4th to 5th, ShanghaiTech hosted SWEDCS 2018, offering a platform for top scientists and experts in emerging devices, circuits and systems to share their research results and inspire the next generation of researchers in all areas of information science and technology. SWEDCS 2018 focused on the theme of “Internet of Things” (IoT), and included a technical program covering four sessions in electromagnetic imaging and sensing, optical electronic devices, IoT systems, and wireless power transfer. The workshop attracted more than 200 attendees from across the country. Provost and Vice President Professor Yin Jie, and Vice Dean of School of Information Science & Technology Professor Yu Jingyi, gave welcoming remarks. Professor Alberto L. Singiovanni-Vincent from UC Berkeley, Professor Lihong V. Wang

from CalTech, and Professor Wayne Luk from Imperial College were keynote speakers for the two-day program which consisted of 26 talks in total.

The academic program of the workshop began with the “Electromagnetic Imaging and Sensing” session and an informative keynote speech from Professor Lihong V. Wang. Professor Wang is currently the Bren Professor of Medical Engineering and Electrical Engineering at the Andrew and Peggy Cherg Department of Medical Engineering at CalTech. He is a member of the US National Academy of Engineering and a fellow of IEEE, OSA, SPIE, and AIMBE. In his presentation, he showed that the depth of photoacoustic tomography can be largely enhanced by wavefront shaping technique

to obtain information deep inside biological samples, beyond the ability of conventional photoacoustic imaging. The most impressive images Professor Wang exhibited were several photoacoustic images obtained from volunteer patients, which clearly depicted complicated blood vessels and tumors inside human breasts with proper depth information labeled in different colors. He also shared the latest progress on the fastest camera in the world developed by his group using compressive sensing technique. Several attractive animations illustrated the interaction of light with matters captured by this magic camera, such as reflection, refraction, racing of light beams in two materials, absorption, and optical Mach cone. A junior student Sun Yifei from SIST raised a very technical question to Professor Wang regarding the comparison of several parameters of photoacoustic imaging and thermoacoustic imaging. Professor Lalita Udpa (IEEE fellow) from Michigan State University showed their work on utilizing perfect microwave metamaterial lens for super-resolution near-field imaging and detection. Professor Song Liang from Shenzhen Institute of Advanced Technology shared their latest work on multimode modality integrating photoacoustic imaging, fluorescent imaging,

and ultrasound imaging. Professor Zheng Yuanjin from Nanyang Technology University talked about low-frequency electromagnetic-acoustic imaging mechanism and measurement of blood oxygen and blood glucose by photoacoustic sensors. Professor Nie Liming from Xiamen University discussed his research on photoacoustic tomography of animal heart in vivo.

The afternoon session “Optical Electronic Devices” began with an invited talk from Professor Kuo Haochung of Taiwan ChiaoTung University. He mainly shared with the audience his research results about blue, green microLEDs. Professor Kuo and his team used GaN microrods and MOCVD growth technique to obtain controllable green LED array based on rod-sidewall emission, which would help mitigate green gap, a notorious phenomenon about efficiency drop in the green and yellow regions. Professor Kuo also demonstrated colorful GaN microLED using quantum-dots materials and color conversion based on photoluminescence. In the end of his presentation, Professor Kuo discussed fabrication details of microLEDs, and the difference of implementation of the active microLED array and passive microLED



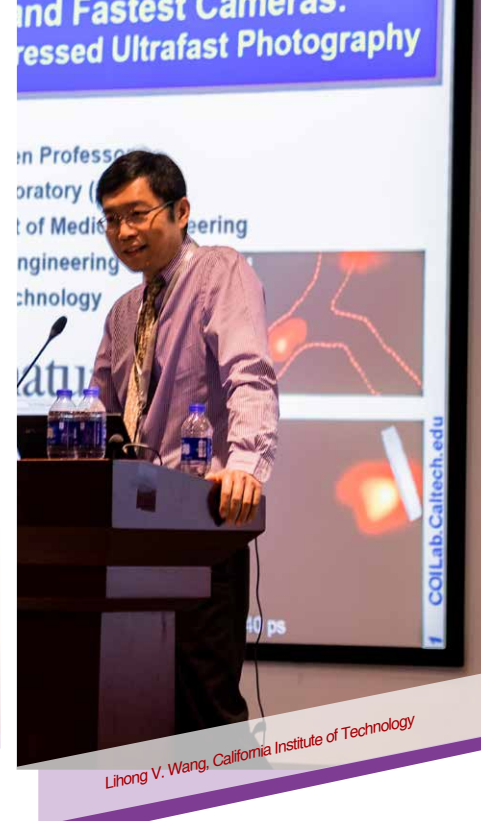
Alberto L. Singiovanni-Vincent, University of California at Berkeley



Chris Mi, San Diego State University



Young Jae Jang, Korea Advanced Institute of Science & Technology



Lihong V. Wang, California Institute of Technology

array. Professor Johann Peter Reithmaier of the University of Kassel, Germany reported thermal-stable semiconductor devices based on quantum dot gain materials. The devices developed in Professor Reithmaier's group included directly modulated laser diodes, semiconductor optical amplifiers (SOA), and widely tunable narrow linewidth lasers, all of which are key devices and fundamentally important to coherent communications. Professor Hu Weida of Shanghai Institute of Technical Physics, CAS, explicitly reported his design and device results of infrared photodetectors based on 2D-materials. Director Deng Jiangdong of Harvard University introduced precious experience accumulated during the design, construction, maintenance, and management of the cleanroom environment at Harvard University. Professor Liu Lei from Notre Dame University reported the implementation of tunable and reconfigurable mmw-terahertz devices and their applications in imaging and adaptive communications. Professor Wang Zheng brought to the audience an impressive talk about on-chip conversion between optical waves and acoustics. Professor Alan Xiaolong Wang from Oregon University

demonstrated a hybrid Si-TCO nanocavity modulator, which holds superior merits including low optical loss, high E-O efficiency, and low energy consumption.

The second day's program began with a keynote speech by Professor Alberto L. Sangiovanni-Vincent, a member of US National Academy of Engineering, who reviewed developments in a number of exciting fields, such as Industry 4.0, energy efficiency, synthetic biology, autonomous aircraft and cars, where advances are constantly made towards the mastering of distributed, autonomous systems. The third keynote speech was given by Professor Wayne Luk from Imperial College, also a Fellow of Royal Academy of Engineering. His talk covered recent research on field-programmable technology and machine learning and described how such research can lead to advances in reconfigurable systems that can support improvements in both performance and reliability. Professor Luk demonstrated several of their custom computing examples, including an accelerator for on-board hyperspectral image classification, and a run-time monitoring system. Professor Xu Li Da's

talk outlined the current research of IoT, key enabling technologies, major IoT applications in industries, and identified possible research trends and challenges.

Professor Zheng Lirong presented the low power design of CMOS chipset for the sensor to cloud interconnections, through trade-offs for computing, communication, and circuits. Professor Shi Yiyu systematically discussed the representation power of quantized neural networks. He proved the universal approximation of quantized ReLU networks and provided an upper bound of storage size given the approximation error bound and the bit-width of weights. The last speaker of the morning session, Professor He Lei presented the recent research work of AI Chips for IoT Edge Devices. The Shanghai Institute of Microsystems Professor Zhang Xiaolin's research group introduced recent developments in bionic vision systems, and demonstrated a lot of application videos that their group has developed in various scenarios. Kneron Inc. founder Dr. Albert Liu introduced a reconfigurable CNN accelerator they have developed, and demonstrated a Chinese-English bi-directional conversation translation application. Professor Zhu Qi introduced a cross-layer modeling, simulation, synthesis and

verification framework for connected vehicle applications, with timing and security as the major challenges.

Alongside the IoT session, there was a parallel session on Wireless Power Transfer (WPT), this year co-organized by ShanghaiTech Center for Advanced Power and Energy Systems (CAPES) and IEEE Industrial Electronics Society Shanghai Chapter. Five speakers from the United States, Japan, Korea, Macau, and Mainland China were invited to give technical talks on WPT. About 150 students and professionals from both academia and industry attended this session. The session was well organized and highly evaluated by both the speakers and audiences.

Following the success of SWEDCS '16 and '17, SWEDCS 2018 featured the workshop as a regional influential platform for researchers from both academic and industrial community to share their expertise and inspire each other. The SWEDCS 2018 couldn't have been put on without support from our organizational partner, the Expert Center of Chinese Ministry of Industry and Information, and corporate sponsorship from 15 international and domestic companies.





SSIST Holds Annual Symposium on Information Science and Technology

The Annual ShanghaiTech Symposium on Information Science and Technology was held from July 2-4, 2018.

Focusing on artificial intelligence and computer vision, the symposium aims to provide a forum on state-of-the-art information technology that is “international, high-level, and application-oriented.” Nearly 800 people from both academia and industry participated in the symposium and many top scholars as well as several industry researchers from companies such as Microsoft were invited to share their latest research and experience in AI and vision.

Professor Ivan Sutherland (Portland State University), a member of the US Academy of Engineering and US Academy of Sciences and

a Turing Award winner, delivered the keynote address. Professor Sutherland invented the revolutionary computer program Sketchpad while doing his PhD and pioneered the field of computer graphics, which earned him the Turing Award in 1988, the highest honor in computer science. In his keynote speech entitled Stop the Clock, Professor Sutherland discussed three important paradigm shifts in the history of computation, namely the rise of personal computing, the invention of 3D computer graphics, and the development of integrated circuits. He also highlighted the upcoming shift in computing — from the now widely used clocked circuits to self-timed asynchronous circuits in the future. Asynchronous circuits have many key advantages, including energy efficiency, design modularity, and scalability. At the same time,

asynchronous circuits face many challenges, including the need to change the synchronous way of thinking about computation for almost all computer scientists.

24 internationally renowned AI researchers were invited to give talks, including nine IEEE Fellows and four NSFC Distinguished Young Scientists / Yangtze River Scholars. Professor Rama Chellappa (ACM/IEEE Fellow) from the University of Maryland shared his latest research on deep representation, adversarial learning, and domain adaptation of images and videos; Professor Alan Yuille (IEEE Fellow) from Johns Hopkins University discussed three major challenges in computer vision – sensitivity of deep networks to adversarial attacks, limited supervised training data, and how to couple deep networks with traditional machine learning methods – and introduced how to solve the above problems using the latest deep learning technology; Professor

Mark Johnson (ACL Fellow) from Macquarie University analyzed the impact of deep learning on the field of natural language understanding. Through several case studies, he pointed out that deep learning has the advantages of being fast, accurate and economic in constructing NLP applications, but traditional linguistic knowledge is still useful to NLP systems in the aspects of representation, evaluation and training data generation. Many other scholars such as Professor Hong Jiang (University of Texas at Arlington, IEEE Fellow), Professor Rene Vidal (Johns Hopkins University, IEEE Fellow), Professor Wei Wang (University of California, Los Angeles, ACM/IEEE Fellow), and Professor Dong Xu (University of Sydney, IEEE Fellow) also led in-depth discussion of the latest progress in AI algorithm design, hardware-software co-design, medical image understanding, biomedical informatics, real-world scene analysis, and audiovisual computing in virtual reality.



Alan Yuille



Ivan Sutherland



Rama Chellappa



Patrick Naylor

At the symposium, well-known domestic scholars such as Wang Liang (Institute of Automation, Chinese Academy of Sciences, Distinguished Young Scientist), Wang Yongtian (Beijing Institute of Technology, Yangtze River Scholar / Distinguished Young Scientist), Yang Xiaokang (Shanghai Jiao Tong University, Yangtze River Scholar / Distinguished Young Scientist), Zhou Jie (Tsinghua University, Distinguished Young Scientist), Cheng Mingming (Nankai University), and Xue Xiangyang (Fudan University) delivered wonderful talks on the research topics of image segmentation, image compression, neural network structure design, multi-task learning, augmented reality display, and dynamic behavior analysis. Industry researchers including Hua Gang (Chief Scientist of Microsoft Research, IAPR Fellow), Sun Jian (Chief Scientist of Face++), Shen Dinggang (United Imaging, IEEE Fellow / Thousand Talents), Xiao Jing (Chief Scientist of Ping An Technology, Thousand Talents), Jia Jiaya (Tencent outstanding AI scientist, IEEE Fellow), and Yan Shuicheng (Chief of Qihoo 360 AI Research Institute) shared their experience in the success and challenge of the industrial application of deep learning,

human-like visual perception, medical image processing, image generation, etc.

In addition to the wonderful talks, the symposium received more than 100 posters from the participants, among which 30 were selected for display. The poster authors also participated in a poster presentation competition in which one best poster and two runner-up posters were selected by the invited speakers. ShanghaiTech undergraduate student deeply impressed the symposium speakers and attendees.

Since 2015, the School of Information Science and Technology of ShanghaiTech University has held annual symposiums on information science and technology that focused on the frontiers and hotspots of the field and invited top domestic and international scholars to share their latest breakthroughs in the field of information science and technology. The symposiums have also received strong support from well-known domestic and international IT companies. This year, the online live broadcast of the symposium attracted tens of thousands of watchers over the three days of the symposium.



Multiple Faculty Positions at ShanghaiTech University

Newly established ShanghaiTech University offers a stimulating environment for pursuing studies and impactful research. Officially approved to open on September 30th 2013 by Ministry of Education, ShanghaiTech University, located at the core of ZhangJiang Comprehensive National Science Center, was jointly established by Shanghai Municipal Government and Chinese Academy of Sciences (CAS). ShanghaiTech is dedicated to be an academically excellent research university and a dynamic people-centered hub where innovative research, education, and community service meet to provide a multi-disciplinary approach to learning and to solving global challenges.

Focusing on science and technology, ShanghaiTech consists of five schools - School of Physical Science and Technology (SPST), School of Information Science and Technology (SIST), School of Life Science and Technology (SLST), School of Entrepreneurship and Management (SEM), and School of Creative Arts (SCA) – along with three research institutes - Shanghai Institute for Advanced Immunochemical Studies (SIAIS), iHuman Institute, and Institute of Mathematical Sciences (IMS).

ShanghaiTech actively leads frontier research projects and large-scale-user facilities, such as Soft X-Ray Free Electron Laser Facility, Living Cell Imaging Facility, Ultra-Intense and Ultrashort Pulse Laser Facility, Second phase of Shanghai Synchrotron beamlines, Hard X-Ray Free Electron Laser Facility and Multiple Spatial-scale and Time-scale Bio-imaging Platform and Machine Learning & Virtual Reality Platform, etc.

ShanghaiTech is committed to serving the national development strategy. The university seeks innovative solutions to address the challenges that China is facing in the fields of energy, materials, environment, life sciences, pharmaceutical development, human health, data science, artificial intelligence (AI) and electrical engineering, thus improving productivity driven by innovation, and contributing to the restructuring and development of China.

ShanghaiTech is building up a strong faculty of 1000 professors, including 500 tenure-track/tenured professors recruited globally and 500 adjunct professors from CAS institutes and other prestigious universities or institutes. Among our current faculty (468 by May 2018) are four Nobel laureates, ten National Academy of Sciences (USA) members, three Royal Society (UK) fellows, 34 CAS members and three Chinese Academy of Engineering Members.

For more Information about the university, please visit www.shanghaitech.edu.cn.

ShanghaiTech focuses on creating an international working and living environment. We are seeking overseas talent to join our faculty at all ranks in the following fields:

1. School of Physical Science and Technology

Energy, System Materials, Photon and Condensed State, Material Biology, Environmental Science and Engineering

2. School of Life Science and Technology

Molecular Biology and Cell Biology, Structural Biology, Neuroscience, Immunology, Stem Cells and Regenerative Medicine, System Biology and Biological Data, Molecular Imaging, Biomedical Engineering

3. School of Information Science and Technology

AI, VR, AR, Electrical Engineering, Electronic Science and Technology, Computer Science and Technology, Information Engineering, Communication Engineering, Statistics

4. School of Entrepreneurship and Management

Economics, Finance, Management, Marketing, Strategy and Entrepreneurship

5. School of Creative Arts

Film Production, Life Drawing, Photography, VR and Game Coding, Illustration and Visualization, Performing Arts

6. Shanghai Institute for Advanced Immunochemical Studies

Immune Antibody

7. iHuman Institute

Drug Development Targeting GPCR, Cell Biology and Biomedicine, Pharmacology, Chemical Biology, Computational Biology

8. Institute of Mathematical Sciences

Pure Mathematics, Applied Mathematics, Theory of Computing

Successful applicants should have a doctoral degree and are expected to establish a record for independent, internationally recognized research, supervise students and teach high-quality courses.

ShanghaiTech University will offer attractive compensation packages, including:

Initial Research Support Package: reasonable start-up funds, research associates and post-doctoral fellows, laboratory space that meets research needs.

Compensation and Benefits: highly competitive salary commensurate with experience and academic accomplishments, and a comprehensive benefit package.

Subsidized housing: on-campus, 80/100/120 m² faculty apartments will be available at low rents for tenure and tenure-track faculty.

Relocation & Travel Allowance: reimbursement of expenses for household relocation and family's one-way travel.

Family Assistance: support with children's education, and affiliated kindergarten, primary and middle schools are under construction.

We warmly welcome international talents to join our vibrant community!

To apply: Submit a Cover Letter (Firstname_Lastname_Cover_Letter.pdf), a Research Plan (Firstname_Lastname_Research_Plan.pdf), a CV (Firstname_Lastname_CV.pdf) to hr@shanghaitech.edu.cn.

Applications are reviewed on a rolling basis.

For other openings, please visit: jobs.shanghaitech.edu.cn.

