# CAS Announces Winners of International Scientific Cooperation Award 2017

The 2017 CAS Award for International Scientific Cooperation went to three scientists based in Europe or the United States: experimental physicist David Neely from the Rutherford Appleton Laboratory, UK; marine chemist Peter G. Brewer from the Monterey Bay Aquarium Research Institute, US; and condensed matter physicist Yimei Zhu from the Brookhaven National Laboratory, US.

The announcement came on January 23, 2018, followed by CAS President BAI Chunli conferring the certificates and medals to the three laureates at an awarding ceremony in Beijing.

David Neely is the principal investigator and head of the experimental science division of the Central Laser Facility at the Rutherford Appleton Laboratory in the United Kingdom. He is one of the world's best known experimental physicists with many outstanding and original contributions to the field of intense laser-matter interaction. He has been working with the CAS Institute of Physics for alwost two decades, and helped the institute to achieve a series of major advances in fields such as hot electron transport, proton acceleration and terahertz generation. His team provided the Chinese side with advanced technologies and design drawings of some key facilities, including a broadband proton spectrometer, a portable soft X-ray spectrometer, a real-time ion detector and a dual plasma mirror. The collaboration has enhanced China's ability to develop

At the awarding ceremony of the 2017 CAS Award for International Scientific Cooperation, from left to right: David Neely (UK), CAS President BAI Chunli, Yimei Zhu (US), Peter G. Brewer (US).

advanced experimental diagnostic equipment in high energy density physics and laser fusion. The two sides have also worked together on the design and development of the world's first saturated soft X-ray laser. Meanwhile, Neely has helped CAS to train talents and offered them opportunities to conduct research in world-class laboratories.

Peter G. Brewer is a distinguished marine chemist, former president of the Monterey Bay Aquarium Research Institute, and Einstein Visiting Professor of CAS. He is an advocate and pioneer of studies in oceanic carbon cycles and ocean acidification, and one of the proposers of $CO_2$ deep-sea sequestration and discoverers of the deep-sea hydrothermal system. Brewer has worked closely with CAS for over 10 years. He has provided critical support to the customization, design, testing, and scientific application of the research vessel "Kexue" and the underwater vehicle "Faxian". He has also participated in the Western Pacific Ocean System Project, and provided guidance and assistance to core tasks like exploratory research of deep-sea hydrothermal vents, cold seeps, and seamounts, as well as independent R&D of large facilities for deep-sea detection and sampling. He has helped train doctoral students for China, and created opportunities for young CAS scientists to join different US deep-sea detection cruises.

Yimei Zhu is a tenured scientist at the Brookhaven National Laboratory of the United States, and a world-renowned condensed matter physicist and top expert in electron microscopy. Zhu has long worked to promote bilateral science cooperation between China and the US. He has facilitated the establishment of intergovernmental bilateral cooperation mechanisms in the field of superconductivity and quantum materials, and opened up new grounds of cooperation between CAS and the US Department of Energy. With his coordination and assistance, CAS has successfully developed China's first custom-made Lorentz electron microscopy. He also played an active part in the construction of China's large-scale advanced electron microscopy platform. Thanks to his direct support, CAS successfully built the country's first 200-kiloelectron-volt four-dimensional ultrafast electron microscopy. Zhu has played a key role in the cultivation of Chinese talents in electron microscopy, and facilitated CAS' overseas talent recruitment.

At the ceremony, the CAS institutes which the awardees have worked with — the Institute of Physics, the Institute of Oceanology, and the Ningbo Institute of Material Technology and Engineering — were also recognized for their efforts in the cooperation.

The Award for International Scientific Cooperation of the Chinese Academy of Sciences, first given out in 2007, honors top foreign talents who have been in long-term collaboration with and made outstanding contributions to the Academy.

# Nobel Laureate Encourages Young People to Pursue Their Interest

"The electromagnetic phenomenon is an incredible miracle of our universe, and to reveal mysteries behind it will need the efforts of younger generations of scientists," said Chen-Ning Yang, who shared the 1957 Nobel Prize in Physics for the discovery of parity non-conservation of weak interaction.

In his New Year talk "Conceptual Origins of Maxwell Equations and of Gauge Theory of Interactions" given at the National Astronomical Observatories, Chinese Academy of Sciences (NAOC) in Beijing on January 3, Yang revisited the century-long history from the birth of electromagnetism to the early development of particle physics, including his work on the Yang-Mills Theory which is considered the most significant part of his scientific career.

The Yang-Mills Theory proposed by Yang and Mills in 1954 is a fundamental contribution to modern physics. By extending Maxwell's unified theory of electromagnetism to describing the behavior of nuclear particles, the Yang-Mills Theory explains how three

of the four basic interactions in the universe (the electromagnetic, weak and strong forces) work. Their theory forms the basis of our understanding of the Standard Model. It was selected as one of the seven Millennium math problems by the Clay Mathematics Institute of Cambridge in 2000, and was eventually confirmed with the detection of the Higgs boson at LHC in 2012.

The talk attracted a crowd of nearly 300 people to tightly pack NAOC's auditorium, as well as more than 60,000 to watch online.

After his talk, Yang took questions from the audience. He used his own childhood and college experiences to emphasize the importance of identifying and pursuing personal interest. The key to success is to "follow your interest and ability," he told young researchers. He also offered suggestions to middle school students on how to better learn physics.

The world-renowned physicist also envisioned the future of physics research. The unification of the Standard Model and General Relativity has been the biggest challenge over the past forty years, he said, and "since it has so many physical and mathematical complications, I don't see any quick solution coming within the next decade or two." And even the puzzle is solved one day, it is still not the end of the story. "We need to answer ultimate questions like 'why are we able to understand the universe?'", Yang said.

Born in Hefei in 1922 to a mathematician and a housewife, Yang showed huge interest and talent in math and physics as a kid. He attended the National Southwestern Associated University in Kunming for seven years during the Sino-Japanese War, before moving to the US to pursue his PhD at the University of Chicago. After that he worked at the University of Chicago, Princeton, and Stony Brook until his retirement in 1999. Yang has received numerous awards for his pioneering work on statistical mechanics and particle physics, including the Nobel Prize in Physics (1957), the National Medal of Science (1986), the Benjamin Franklin Medal (1993) and the Albert Einstein Medal (1995). He moved back to China a few years ago. At the age of 95, he is now honorary director and professor at the Institute for Advanced Study, Tsinghua University in Beijing.

Yang has been a strong supporter of Chinese astronomy. He serves as chairman of the board of adjudicators for the famous Shaw Prize, known as "the Nobel Prize of the East" which awards outstanding individuals in the fields of astronomy, mathematics and life sciences. Last October, he visited the Five-hundred-meter Aperture Spherical radio Telescope built and run by NAOC in Guizhou.

Chen-Ning Yang, co-winner of the 1957 Nobel Prize in Physics, gave a talk at the National Astronomical Observatories to inspire young people to follow what they are interested in. (Photo: National Astronomical Observatories, Chinese Academy of Sciences)