A glance of excellence in chemical science and engineering at Tianjin University: A special issue dedicated to the University's 120th anniversary

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Founded on October 2 in 1895 as Peiyang University by Mr. Xuanhuai Sheng under emperor Guangxu's authorization, Qing Dynasty, Tianjin University (TJU) will celebrate its 120th anniversary on October 2, 2015. Thanks for the guidance and support from Professor Jingkang Wang, Editor-in-Chief of the *Frontiers of Chemical Science and Engineering*, we are honored to edit this special issue as part of the celebration program.

To meet the national needs, Peiyang University set up law, civil engineering, mining and metallurgy, and civil and mechanical engineering departments in early stage. In 1949 when the People's Republic of China stood up, the university was expanded into 14 departments and 5 research institutions. In 1951, Peiyang University was renamed as Tianjin University during the higher education reform by Ministry of Education, and had become a comprehensive university strengthening on engineering in China. TJU was among the first 16 National Key Universities designated by the government in 1959, and is also among the first group of universities to be included into the "211" and "985" Projects of national investment for developing world class universities. As the pioneer of modern higher education in China, TJU has been committed to the mission of revitalizing the country through education ever since its foundation. TJU upholds the motto "Seeking Truth from Facts" from its foundation while the faculty follows the guideline of precise learning and strict teaching. TJU adheres to its mission of training high caliber talents with innovative abilities. While moral quality is strongly emphasized in education at TJU, the university maintains a multi-disciplinary system for the well-rounded development of students. The 120-year history of TJU is the epitome of the progress of Chinese modern higher education. During this period of time, over 200000 outstanding individuals have been educated at TJU, who contribute greatly to the progress in science and technology as well as to the prosperity of the country. A significant portion of TJU alumni has become international and national recognized experts in their respective areas. Now, TJU has grown into a world-recognized university with distinctive qualities and strengths in education, research and social service.

TJU Weijin Road Campus has been used ever since 1951, which covers an area of 1.82×10^6 km² and a floor area of 1.425×10^6 km². The campus enjoys garden-like school environment with beautiful lakes and the annual crabapple blossoms in middle April. The university now has 4556 faculty and staff members. There are 29350 full-time students, with 16044 undergraduate students, 10353 master candidates and 2953 PhD candidates. To improve the conditions of running the university, a new campus, the TJU Beiyangyuan Campus, was constructed under the principle of "integrated planning, installment construction, and step-by-step implementation", covers a total area of 1.3×10^6 km². This year, the first-stage project is finished with an area of over 0.9×10^6 km², including the main building, the administrative building, the integrated experimental building, the library, the stadium, the staff activity center, the student activity center etc. We are going to celebrate the 120th anniversary of TJU in Beiyangyuan campus. After its completion, overall relocation will be implemented with a total student number of 21000. The new campus will take responsibilities of teaching and research, while the Weijin Road Campus will be the base of high-level training, emerging discipline development, key scientific problem tackling, and cultural originality.

Research on chemical engineering and technology at TJU began in the 1930s. In 1952, upon restructuring in

China, a number of top chemical engineering departments in Northern China including Peiyang University, Nankai University, Yenching University, Fu Jen Catholic University, Peking University, Tsinghua University, Hebei University of Technology and Tangshan Railway Institute were merged into the Chemical Engineering Department at TJU. In 1997, the School of Chemical Engineering and Technology (SCET) was formally established mainly based on the Chemical Engineering Department. It has become the most important cultivation base for highly qualified chemical engineers in China, fostering generations of elites in science, management and engineering fields. Now, there are 11 departments with 7 undergraduate programs, 14 master's programs, and 7 doctoral programs in SCET. This was a result of the reform of management system of TJU, marking an era of new development. Among the 11 departments, 4 national key disciplines are granted in China: Chemical Engineering, Chemical Technology, Industrial Catalysis, and Biochemical Engineering. The main research fields of Chemical Engineering include interface transfer science and distillation processes, industrial crystallization and particle process science and technology, meso-scale science and application, reaction engineering, etc. The main research fields of Chemical Technology include green chemical technology, nano-material science and technology, membrane process, enzyme catalysis, environmental chemical engineering, etc. The main research fields of Biochemical Engineering include bioinformatics, biological separation process, biochemical reaction and metabolic engineering, cell cultured process, environmental bioengineering, protein refolding and signal transduction of eukaryotic cell, etc. The main research fields of Industrial Catalysis include catalytic engineering, the catalysis of rare-earth and transition metals, industrial catalysis design, membrane catalytic reaction process, etc. After years of development and construction, SCET has produced outstanding achievements in education, research and professional training. Since 2003, the chemical engineering program has been consecutively recognized as the top one in 2003, 2006 and 2012 by the Ministry of Educational Committee of China. It is worth mentioning that the BEng program of Chemical Engineering Technology in SCET received "Master Level" accreditation by IChemE, Institute of Chemical Engineering in England, which is the first honored BEng program in China by IChemE.

SCET houses several research programs, including those that focus on separation science and technology, reaction engineering and catalysis, thermodynamics, transport phenomena, biochemical and bioprocess engineering, particle technology, and material science and engineering. We have 1 state key laboratory, 4 state engineering research centers, 2 state key centers for promotion of scientific and technological achievements, 3 key laboratories of the Ministry of Education, and 3 key laboratories of Tianjin. Our research activities and facilities have greatly benefited from long-standing support by the Ministries of Science and Technology, National Natural Science Foundation of China, chemical industries in China and international companies. A big event is that Tianjin Collaborative Innovation Center of Chemical Science and Engineering (COIC-CSE) became one of the first 14 collaborative innovation centers in China (known as the "2011-Project"), which is mainly based on SCET of Tianjin University and School of Chemistry in Nankai University with national engineering centers and key laboratories supported by the central and local governments.

There are 256 faculty and staff members at SCET including 1 member of the Chinese Academy of Sciences (CAS), 2 members of Chinese Academy of Engineering (CAE), 5 "Cheung Kong Scholars" professors, 6 National Nature Science Foundation of China Outstanding Young Investigators, 4 National Science Foundation of China Excellent Young Investigators. In addition, the members are active in international academic exchange. We have several fellows of Royal Society of Chemistry (RSC), fellows of Institution of Chemical Engineers (IChemE), editors or consultants of international academic journals. SCET has set-up solid collaboration with international research institutes and universities in Europe, USA, Canada, Australia, etc. Since the foundation of chemical engineering discipline in TJU, we have fostered generations of elites making their contributions in China and abroad. Most of SCET alumni now working abroad have been employed by industry, academia, and government agencies. Some of them have been recognized as senior experts at national and/or international levels.

This special issue includes 13 excellent scientific reviews and original research papers from SCET alumni who have been employed in USA, Canada, Australia, and Singapore. These papers capture some of the latest studies on biochemistry and biotechnology, catalysis and reaction engineering, clean/renewable energy, nano-sciences and technologies, pharmaceutical sciences, organic chemistry, etc. Some of them are truly state-of-the-art and have great implications for future development.

It is our privilege and great pleasure to edit this special issue of *Frontiers of Chemical Science and Engineering*. We hope this special issue will provide a unique opportunity to share the academic achievements of the authors and enhance the interactions among the alumni of Tianjin University and others in the global scientific community. It is our sincere wish that publication of this special issue can stimulate more innovative researches in the broad area of chemical science and engineering. We would sincerely thank all the authors for their excellent contributions and

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