

# Impact of the relationship for the development and exchange of agricultural engineering professionals between the U.S. and China

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The United States of America and the People's Republic of China established a formal diplomatic relationship almost thirty years ago. Additionally, this year marks the thirtieth anniversary of the beginning of economic reform in China. It is also coincidentally the thirty-year anniversary of my freshman year at Jilin University of Technology in China. I have been blessed during my lifetime because of the friendly and mutually beneficial relationship between the U.S. and China. As we all know, the world has a large population to feed, and thus there is a large reliance on the sustainable development of agriculture. The professions of Agricultural and Biological Engineering are at the forefront of many of the key issues facing humanity today. Issues such as generating energy, maintaining environmental quality, and feeding a growing world population weigh on many people's minds. In order to come up with the appropriate solutions to the issues facing our world today, the continued cooperation between the U.S. and China is invaluable.

Our profession deals with these key issues by applying engineering principles to a wide spectrum of technologies such as adding value to and preserving food quality and managing the ever-tightening supplies of fresh water. By using scientific principles and information technology to look at the big picture, engineers can continually process the ever-increasing mountain of data collected in our laboratories and field

experiments. The bottom line is that agricultural and biological engineers are working successfully to make the world a better place. The National Academy of Engineering lists the greatest engineering achievements of the 20<sup>th</sup> Century with "electrification" (including rural) as number one and not far after, "agricultural mechanization" as number seven. The American Society of Agricultural and Biological Engineers (ASABE), which celebrates its 100<sup>th</sup> anniversary in 2007, can be very proud of its contribution. As an example of how far we have come, in 1900, nearly 40% of the American population toiled to produce the needed food. Now, it is only 2%.

China has less than 10% of the total farmland in the world, but it produces enough food products to feed about 20% of the world population. This impressive achievement can be attributed to the benefits of scientific research in agricultural engineering. Nonetheless, as the trend of urbanization continues, further reduction of farmland is unavoidable. In the past few years, we have witnessed the price of global grain rise. With limited natural resources and the increasing world population, human beings are facing huge challenges to produce enough food while simultaneously conserving our natural resources and protecting our environment for the sustainable development of agriculture. The only solution to such monumental challenges has to be increased input to scientific research. Scientists and engineers in agricultural and biological engineering bear the responsibility to develop innovative technologies for agricultural production.

The founding and development of the agricultural engineering discipline in China involved many

international experts, especially U.S. scholars such as Dr. J.B. Davidson, the founder of the ASAE (American Society of Agricultural Engineering). International Harvest Company (IHC), the biggest farm machinery manufacturer in the U.S. in the 1940's, also played an important role by sending four famous American agricultural engineers to work in China. Dr. J.B. Davidson was appointed as the team leader. At the time he was the department head of the Department of Agricultural Engineering at Iowa State University. Another delegate was Howard F. McColly, a chief engineer of water conservation in the Farm Administration of the USDA. They left San Francisco for China on January 24, 1947, and their technical guidance in China made impressive contributions to agricultural development everywhere.

During this time, IHC also provided full scholarships to twenty Chinese agricultural engineering professionals for training in America. During 1945, ten of the students studied at the Department of Agricultural Engineering at Iowa State University, and the other ten studied at the Department of Agricultural Engineering at the University of Minnesota. In early 1948, on the eve of completing their American studies and returning to China, they gathered in Stockton, California to brainstorm for an eventual society for Chinese agricultural engineers. In 1949, when the People's Republic of China was founded, the central and provincial governments in China set up many public institutions concerning agricultural mechanization. The same students who trained in the U.S. during the 1940's were assigned to these locations, and many went on to serve as the key leaders in many of these institutions.

In March 1978, China held the first National Science and Technology Conference in Beijing. The conference decided that agricultural engineering was one of the most urgent sciences and technologies needing to be developed. In November 1979, almost thirty years after the initial groundwork was laid in Stockton, the Chinese Society of Agricultural Engineering (CSAE) was finally founded. Chinese students in agricultural engineering started to come to the U.S. to study either as visiting scholars or as graduate students. Some of them returned to China and

played important roles in the development of agricultural engineering. In 1984, Chinese agriculture achieved a bumper harvest, and the Chinese government declared to the whole world for the first time that China had solved her problem of achieving adequate food for its impressive population. This success was mainly due to rural system reform and agricultural mechanization. This was evidenced by the increased number of Chinese farmers buying farm machinery, which were the direct products of agricultural engineering.

Some Chinese students chose to stay in the U.S. to work as scholars and professionals at various universities, corporations, and federal agencies. They also played very important roles in the development of American agricultural engineering. These scholars and professionals are bilingual in Chinese and English and have unique understandings of the economics, culture, and educational systems of both countries. They are the key players for a productive partnership between international institutions that share a common mission and goals, and these Chinese-Americans have worked hard to produce benefits for all partners. With the ardent desires of Chinese scholars and professionals and the warmhearted support from many individuals around the world, the Association of Overseas Chinese Agricultural, Biological, and Food Engineers (AOC) was established in 2001 at Sacramento, California. The AOC is an independent, nonpolitical, nonprofit association for professionals in agriculture and agriculture-related fields worldwide. The AOC has been making professional contributions to the general public, to the engineering profession, and to AOC members. The mission of the AOC is 1) to promote information exchange and networking among agricultural, biological, and food engineers of Chinese origin worldwide; 2) to facilitate collaboration in research; 3) to foster educational exchange; 4) to enable technology transfer; and 5) to encourage professional development. One of the AOC members and AOC current President, Dr. Zhongli Pan, Research Engineer of the USDA-ARS Western Regional Research Center and Associate Adjunct Professor at University of California, Davis was awarded the Presidential Early Career Award in 2007 for his

contributions in innovative research at the frontiers of science and technology and community service demonstrated through scientific leadership and community outreach.

As one of these students who came from China, I arrived in the U.S. on July 22, 1989. I received my B.S. degree (1982) and M.S. degree (1987) from the Jilin University of Technology and my Ph.D. degree (1994) from Texas A&M University. My academic and professional career has led me to the following institutions: Jilin University, Texas A&M University, University of Nebraska-Lincoln, University System of Georgia, and USDA-ARS. I also hold honorary guest professor positions with the China Agricultural University in Beijing, Jilin University in Changchun, Shanghai Jiaotong University in Shanghai, Chinese Academy of Agricultural Mechanization Sciences, and Chinese Academy of Agricultural Engineering. Through my amazing experiences at different institutions both in China and the U.S., I have worked hard to help these institutions establish friendly and cooperative relationships with their international counterparts. These relationships are based on a mutually beneficial principle. For example, the rice fissuring mechanism research I conducted with my advisor Dr. Otto R. Kunze

and others was identified by the ASAE as one of the most Outstanding Agricultural Engineering Achievements of the 20<sup>th</sup> Century. Dr. Kunze and I were invited to give lectures in China many times. In the U.S., we invited visiting scholars from China to come to our laboratories at Texas A&M University, where they not only helped our research projects, but also enhanced their own knowledge of rice fissure problems. When they returned to China, they were able to help the Chinese rice industry gradually solve the fissuring problem.

In summary, the impact of the U.S. and Chinese relationship has had an invaluable influence on the development of agricultural engineering professionals in both countries. I wish that the U.S. and China will continue to have a solid friendship for future generations. It will be not only beneficial for both countries but also for the entire world.

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