

FEWSTERN Symposium 2019



PROGRAM BOOK

2019 China-US Joint Eco-environmental Symposium
“Research and Innovation at the Nexus of Food, Energy and Water”

October 26-29, 2019



TABLE OF CONTENTS

Introduction.....3

Organizers and Committees.....4

List of Participants7

Abbreviated Conference Schedule.....13

JRCEEC: A 12-Year Retrospective14

SPONSORS

- National Science Foundation
- National Natural Science Foundation of China
- The University of Tennessee
 - UTIA Institute of Agriculture
 - Biosystems Engineering & Soil Science
 - Institute for a Secure & Sustainable Environment
- Washington State University
- Nanjing University
- Agilent Technologies



INTRODUCTION

Climate change, urbanization, population growth, and accelerating consumption of energy and natural resources bring great challenges for regional and global sustainable development. It is becoming imperative that society integrate across the natural and built environments to provide for a growing demand for food, energy, and water while maintaining key ecosystem functions and services. However, addressing the entangled relationships among agricultural, environmental, and socio-economic systems is challenging--especially at a global scale.

The U.S. and China lead the world in the consumption of petroleum products, release of greenhouse gases, and food marketing. Although the two nations are geographically distant and differ substantially in terms of natural resources, energy resources and utilization, political structure and economic models, as well as cultural heritage, China and the U.S. confront many of the same FEWS (food, energy, water systems) and associated environmental challenges.



In recent decades, the urbanized areas in China have expanded from 17% in 1978 to 52% in 2012. Meanwhile, competitive land use for construction has intensified, a trend that impacts energy consumption, agricultural productivity, and water quantity and quality. Without economically feasible models that address food, energy and water production, sustainable resource management, and cost-effective technologies to reclaim degraded and polluted lands, most regions of China will soon experience severe food, energy, and water security issues.

Similar problems, albeit to a lesser extent, exist in the U.S. and many other countries. Although fundamentally different political and economic systems shape the U.S. and China, the two nations share FEWS trajectories in several complementary ways. For instance, numerous opportunities exist for China and the U.S. to collaborate on agricultural modernization, food and feed security, greenhouse gas-neutral energy production, secure water supply, sustainable megacities and green urbanization, and rural re-development.

The governments of the U.S. and China signed a 10-year Energy and Environment Cooperation Framework in June 2008 to facilitate such joint efforts. Therefore, it is essential to bring together researchers, program leaders, government officials, and industry stakeholders to exchange perspectives, assess risks, continue to identify and refine FEWS research grand challenges, generate opportunities for collaboration in science, technology and policy, and ultimately develop a global FEWS research agenda through engagement with other countries. Such interactions will also accelerate the development and transfer of new technologies between countries, create economic opportunities, and contribute to the development of a diverse, internationally competitive, and globally engaged workforce of scientists and engineers. Such efforts will enable and stimulate public debate, and provide a structured rationale for economic and environmental policy decisions and regulations.

This symposium aims to exchange innovations, share ongoing research, and explore new research and partnerships with industry, government leaders, and non-profit organizations. The format of the symposium will emphasize panel presentations and roundtable discussions designed to optimize networking opportunities and encourage collaboration. Attendees will work face-to-face to develop grant proposals, integrate and narrow research plans, and interact across research groups.

ORGANIZERS AND COMMITTEES

HOST

China-US Joint Research Center for Ecosystem and Environmental Change

ORGANIZING INSTITUTIONS

University of Tennessee

Washington State University

Nanjing University

SUPPORTING AGENCIES

U.S. National Science Foundation (NSF)

National Natural Science Foundation of China (NSFC)

PARTICIPATING INSTITUTIONS

Chinese Academy of Sciences

Nanjing University

Zhejiang University

Shanghai Jiao Tong University

South University of Science and Technology

Wuhan University

Hohai University

Hubei University

Nanjing Normal University

Nanjing Agricultural University

Shenyang Agricultural University

Nanjing University of Science and Technology

University of California

Ohio State University

Washington State University

Texas A&M University

University of Illinois at Urbana Champaign

Michigan State University

University of Wisconsin Madison

Oregon State University

John Hopkins University

The University of Texas at Austin

Georgia Institute of Technology

Oak Ridge National Laboratory

New York Institute of Technology

Jackson State University

University of Idaho

University of Minnesota

University of Wisconsin at Madison

Iowa State University

SPONSORS

Agilent Technologies, Inc.

Department of Biosystems Engineering and Soil Science, University of Tennessee

Institute for a Secure and Sustainable, University of Tennessee

SCIENTIFIC COMMITTEE

Chairs:

Dr. Jan Boll, Washington State University

Dr. Guibin Jiang, Chinese Academy of Sciences

Dr. Frank Löffler, University of Tennessee & Oak Ridge National Laboratory

Members:

Dr. Fengwu Bai, Shanghai Jiao Tong University

Dr. Virginia Dale, University of Tennessee and Oak Ridge National Laboratory

Dr. Baohua Gu, Oak Ridge National Laboratory

Dr. Terry Hazen, University of Tennessee and Oak Ridge National Laboratory

Dr. Zengqian Hou, National Natural Science Foundation of China

Dr. James Jones, U.S. National Science Foundation

Dr. Hongqiang Ren, Nanjing University

Dr. Gary Sayler, University of Tennessee

Dr. Wendy Tate, University of Tennessee

Dr. Jennifer Turner, Woodrow Wilson International Center for Scholars

Dr. Qidong Wang, National Natural Science Foundation of China

Dr. Jun Xia, Wuhan University

Dr. Jianming Xu, Zhejiang University

Dr. Ming Xu, University of Michigan

Dr. Guirui Yu, Chinese Academy of Sciences

Dr. Fangjie Zhao, Nanjing Agricultural University

Dr. Yan Zhu, Nanjing Agricultural University

ORGANIZING COMMITTEE

Chairs:

Dr. Brad Gaolach (Washington State University)

Dr. Cheng Gu (Nanjing University)

Dr. Mingzhou Jin (University of Tennessee)

Members:

Dr. Julie Carrier, University of Tennessee

Dr. Markus Flury, Washington State University

Dr. Keith Kline, Oak Ridge National Laboratory

Dr. Kan Li, Nanjing University

Dr. Junguo Liu, Southern University of Science and Technology

Ms. Sherry Redus, University of Tennessee

Dr. Tim Rials, University of Tennessee

Dr. Wendy Tate, University of Tennessee

Dr. Jenna Tilt, Oregon State University

Dr. Shihui Yang, Hubei University
Dr. Yangjian Zhang, Chinese Academy of Sciences
Dr. Yan Zhu, Nanjing Agricultural University
Dr. Jie Zhuang, University of Tennessee

CONTACT FOR INFORMATION:

Ms. Sherry Redus, sredus@utk.edu
Dr. Kan Li, likan@nju.edu.cn
Ms. Regan Wagner, rwagne11@vols.utk.edu



您的实验室能否与时俱进？

如今的分析实验室面临着不断变化的挑战。您需要用合适的工具和仪器来确保实验室紧跟时代和技术的发展。

Agilent 6546 LC/Q-TOF 让您更快获得可靠无疑的答案，并以前所未有的深度剖析复杂样品。集高灵敏度、高分辨率和宽动态范围于一台仪器，让您无需妥协。

Agilent 6546 LC/Q-TOF 大大增强您的分析能力，让您的实验室时刻保持领先。

www.agilent.com/chem/6546



免费客户服务热线：800-820-3278
© 安捷伦科技（中国）有限公司，2019

PARTICIPANTS

US PARTICIPANTS:

Dr. Meghna Babbar-Sebens

Associate Professor, Water Resources Engineering School of Civil and Construction Engineering
Oregon State University
Email: meghna@oregonstate.edu

Dr. Jefferey Bielicki

Associate Professor, Department of Civil, Environmental and Geodetic Engineering
Ohio State University
Email: bielicki.2@osu.edu

Dr. Jan Boll

Professor, Department of Civil and Environmental Engineering
Interim Director, Center for Environmental Research, Education and Outreach (CEREO)
Washington State University
Email: j.boll@wsu.edu

Mr. Joshua Brugeman

Business Unit Manager, Sustainable Supply Chain
NSF International
Email: jbrugeman@nsf.org

Dr. Julie Carrier

Professor & Department Head, Department of Biosystems Engineering and Soil Science
Institute of Agriculture, University of Tennessee
Email: dcarrie1@utk.edu

Ms. Soomin Chun

PhD student, Environmental Science
Ohio State University
Email: chun.170@buckeyemail.osu.edu

Dr. Dan Cronan

Assistant Professor, Landscape Architecture Program
University of Idaho
Email: dcronan@uidaho.edu

Ms. Melissa Demmit

Student, Department of Ecology and Evolutionary Biology
University of Tennessee
Email: qzz929@mocs.utc.edu

Dr. Ziqian (Cecilia) Dong

Associate Professor, Department of Electrical and Computer Engineering
New York Institute of Technology
Email: ziqian.dong@nyit.edu

Dr. Markus Flury

Professor, Department of Crop and Soil Sciences
Washington State University
Email: flury@wsu.edu

Dr. Bradley Gaolach

Professor and Director, Metropolitan Center for Applied Research and Extension
Washington State University
Email: gaolach@wsu.edu

Dr. David Griffith

Research Assistant Professor, Center of Resilient Communities
University of Idaho
Email: griffith@uidaho.edu

Dr. Baohua Gu

Corporate Fellow, Oak Ridge National Laboratory
Email: gub1@ornl.gov

Dr. Fengxiang Han

Associate Professor, Department of Chemistry
Jackson State University
Email: fengxiang.han@jsums.edu

Mr. Eric Helmreich

Account Manager, Western Washington Region
Agilent Technologies
Email: eric_helmreich@agilent.com

Dr. Andrea Hicks

Assistant Professor, Department of Civil and Environmental Engineering
University of Wisconsin at Madison
Email: hicks5@wisc.edu

Dr. Chad Higgins

Associate Professor, Department of Biological and Ecological Engineering
Oregon State University
Email: chad.higgins@oregonstate.edu

Dr. Mingzhou Jin

Professor, Department of Industrial and System Engineering
Director, Institute for a Secure and Sustainable Environment
University of Tennessee
Email: jin@utk.edu

Dr. Keith Kline

Environmental Sciences Division
Oak Ridge National Laboratory
Email: klinekl@ornl.gov

Ms. Jacque Klug

Recycled Water Project Manager, King County, Washington

Email: jacque.klug@kingcounty.gov

Dr. Ratten Lal (video presentation)

Distinguished Professor, School of Environment and Natural Resources

Ohio State University

Email: lal.1@osu.edu

Dr. Frank Löffler

Governor's Chair Professor, University of Tennessee & Oak Ridge National Laboratory

Director, Center for Environmental Biotechnology

Email: frank.loeffler@utk.edu

Ms. Kellie May

Student, Department of Biosystems Engineering & Soil Science

University of Tennessee

Email: kmay10@vols.utk.edu

Ms. Jessica McCord

Program Manager, Center for Renewable Carbon

Institute of Agriculture, University of Tennessee

Email: jfox16@utk.edu

Ms. Kat McDearis

Owner, Kat McDearis MultiMedia LLC

Email: katmcdearis@gmail.com

Ms. Sherry Redus

Program Manager, Institute for a Secure and Sustainable Environment

University of Tennessee

Email: sredus@utk.edu

Dr. Timothy Rials

Professor and Associate Dean, Center for Renewable Carbon

Institute of Agriculture, University of Tennessee

Email: trails@utk.edu

Dr. Steven Ripp

Research Professor, Center for Environmental Biotechnology

University of Tennessee

Email: saripp@utk.edu

Dr. Sarah Ryan

Professor, Department of Industrial and Manufacturing Systems Engineering

Iowa State University

Email: smryan@iastate.edu

Dr. Gary Sayler

Distinguished Professor Emeritus
Department of Microbiology and Biosystems Engineering and Soil Science
Center for Environmental Biotechnology
University of Tennessee
Email: sayler@utk.edu

Dr. Brandi Schottel

Environmental Engineering & Sustainability Cluster
Chemical, Bioengineering, Environmental, and Transport Systems (CBET)
National Science Foundation
Email: bschotte@nsf.gov

Dr. Wendy Tate

Professor, Department of Supply Chain Management
University of Tennessee
Email: wendy.tate@utk.edu

Mr. Jim Thebaut

President/Executive Producer
CHRONICLES GROUP, INC
Email: JamesThebaut@msn.com

Dr. Jenna Tilt

Assistant Professor, College of Earth, Ocean and Atmospheric Sciences
Oregon State University
Email: tiltj@onid.orst.edu

Ms. Regan Wagner

PhD Student, Biosystems Engineering and Soil Science
University of Tennessee
Email: rwagne11@vols.utk.edu

Dr. Mike Wolcott

Distinguished Professor and Associate Vice President
Department of Civil and Environmental Engineering
Washington State University
Email: wolcott@wsu.edu

Mr. Matthew Yourek

PhD student, Washington State University
Email: matthew.yourek@wsu.edu

Dr. Jie Zhuang

Professor, Department of Biosystems Engineering and Soil Science
Center for Environmental Biotechnology
Institute for a Secure and Sustainable Environment
University of Tennessee
Email: jzhuang@utk.edu

Mr. Mengqi Zhao

PhD Student, Department of Civil and Environmental Engineering
Washington State University
Email: mengqi.zhao@wsu.edu

CHINESE PARTICIPANTS:

Dr. Fengwu Bai

Distinguished Professor, School of Life Science and Biotechnology
Shanghai Jiao Tong University
Email: fwbai@sjtu.edu.cn

Ms. Jing Chen

Program Manager, Division of American and Australian Affairs
Bureau of International Cooperation
National Natural Science Foundation of China (NSFC)
Email: chenjing@nsfc.gov.cn

Dr. Cheng Gu

Professor and Associate Dean, School of the Environment
Nanjing University
Email: chenggu@nju.edu.cn

Dr. Zengqian Hou

Vice President and Distinguished Professor
National Natural Science Foundation of China (NSFC)
Email: houzq@nsfc.gov.cn

Dr. Guibin Jiang

Distinguished Professor and Dean, Research Center for Eco-environmental Sciences
Chinese Academy of Sciences
Email: gbjiang@rcees.ac.cn

Dr. Kan Li

Associate Professor, School of the Environment
Nanjing University
Email: kan_li396@163.com

Dr. Meiling Li

Assistant Professor, Institute of Geographic Science and Natural Resources Research
Chinese Academy of Sciences
Email: liml@igsnrr.ac.cn

Dr. Junguo Liu

Professor and Director, School of Environmental Science and Engineering
Southern University of Science and Technology
Email: liujg@sustech.edu.cn

Dr. Zhigang Sun

Assistant Professor, Institute of Geographic Science and Natural Resources Research
Chinese Academy of Sciences
Email: sun.zhigang@igsnr.ac.cn

Dr. Qidong Wang

Executive Deputy Director General
Department of Earth Sciences
National Natural Science Foundation of China (NSFC)
Email: wangqd@nsfc.gov.cn

Dr. Qiufeng Wang

Associate Professor, Institute of Geographic Science and natural resources Research
Chinese Academy of Sciences
Email: qfwang@igsnr.ac.cn

Dr. Bing Wu

Associate Professor, School of the Environment
Nanjing University
Email: bwu@nju.edu.cn

Dr. Fangjie Zhao

Professor, College of Resources and Environmental Sciences
Nanjing Agricultural University
Email: Fangjie.Zhao@njau.edu.cn

Dr. Liang Zhu

Associate Professor, Department of Environmental Engineering
Zhejiang University
Email: felix79cn@hotmail.com

Dr. Yan Zhu

Professor of Information Agronomy
Dean, College of Agriculture
Chief Scientist, National Engineering and Technology Center for Information Agriculture
Nanjing Agricultural University
E-mail: yanzhu@njau.edu.cn

Abbreviated Conference Schedule

[A detailed Conference Agenda is available separately]

Saturday, October 26, 2019		
	Hotel Check-in	
6:00 – 8:00 PM	Reception/Social Mixer	Reception includes hors d’oeuvre and cash bar
Sunday, October 27, 2019		
7:30 – 8:30 AM	Continental Breakfast provided at hotel and Registration	
8:30 – 9:00 AM	Welcome and Opening Remarks	
9:00 – 10:00 AM	Keynote Sessions	
10:00 – 10:30AM	Coffee Break & Group Photo	
10:30 – 12:00 PM	Keynote Sessions	
12:00 – 1:00PM	Lunch provided at hotel	
1:30 – 2:00 PM	Funding Opportunities Overview	
2:00 – 3:00 PM	Participant 3-Minute Presentations	
3:00 – 3:30 PM	Group Discussion	
3:30-4:00PM	Coffee Break	
4:00 – 5:00 PM	Participant 3-Minute Presentations	
5:00-5:30PM	Group Discussion	
6:00 – 8:00 PM	Banquet and cash bar provided at hotel	
Monday, October 28, 2019		
7:30 – 8:30 AM	Continental Breakfast provided at hotel	
8:30 – 10:00 AM	Three Concurrent Break-Out Sessions	
10:00 10:30 AM	Coffee Break	
10:30 – 12:00 PM	Three Concurrent Break-out Sessions	
12:00 – 1:00 PM	Lunch provided at hotel	
1:30 – 2:30 PM	Session Chair’s Presentations	
2:30 – 3:00 PM	Coffee Break	
3:00 – 4:30 PM	Team Meetings	
4:30 – 5:00 PM	Closing Remarks	
5:00	Conference Concluded	
6:00 – 8:00 PM	Optional Dinner Buffet provided at hotel	

JRCEEC: A 12-YEAR RETROSPECTIVE

SUMMARY OF ACTIVITIES

In July 2006, the China-US Joint Research Center for Ecosystem and Environmental Change (JRCEEC) was established to promote international interdisciplinary collaboration between Chinese and US scientists in the research areas of bioenergy and environment. The center's partners include the University of Tennessee (UT), Oak Ridge National Laboratory (ORNL), Purdue University, three top research institutes in ecology and environment of the Chinese Academy of Sciences (CAS—the powerhouse of science and technology in China), and the University of Science and Technology of China (USTC—a top five comprehensive university in China). Later, annual meetings and many topical workshops were held in China or the US to create and broaden partnership-based collaborations in frontier research areas. Many of the meeting activities were funded by US National Science Foundation (NSF), US Department of Energy (DOE), and National Natural Science Foundation of China (NSFC), and sponsored by industry companies and partnering institutions

In May 2011, as a milestone, the Center was competitively accepted, along with other US top universities (such as Duke), into the China-US EcoPartnership Program to address environmental sustainability issues between the two nations. This JRCEEC-based, Purdue-led program was jointly managed by the US Department of State (USDOS) and the China National Development and Reform Commission (NDRC), and annually reports to the US-China Annual Strategic and Economic Dialogue (SED—the highest government platform for strategic dialogue between the two nations). In June 2016, the program successfully accomplished its five-year mission and graduated with high marks.

In June 2013, JRCEEC began providing a service to students by organizing summer research internship activities. In summer 2013, two UT Haslam Scholars (Kenna Rewcastle and Imani Chatman) performed eight-weeks of research at the Institute of Applied Ecology, Chinese Academy of Sciences, Shenyang, China, with living stipends covered by the host laboratory and travel expenses jointly covered by the UT Haslam and US NSF programs. In fall 2015, three Chinese graduate students visited Purdue University with support from Purdue. In summer 2016, Hannah Woo and Nannan Jiang (Microbiology PhD students) spent five weeks studying in Beijing and Shenyang, with travel funded by US NSF. In August 2016, the Education Office of the Chinese Embassy offered UT scholarships for two undergraduate students every year to any academic institution in China for summer study. In January 2017, a former visiting student (Xiangfeng Zeng) with UT's Center for Environmental Biotechnology was invited by USDOS for a two-week visit to Washington DC and US universities and attended the US-China Advanced Forum for Young Scientists (only ten were invited from China). This JRCEEC student exchange program served to enhance communications and mutual understanding for the next-generation of leaders in the US and China.

In October 2014, JRCEEC was awarded a three-year competitive grant by the world's largest non-profit scholarship organization—CSC—for recruiting outstanding Masters students (10 per year) from China to study at UT for doctorate degrees in the areas of environment and energy. The program, named “China-US Doctoral Environment and Energy Program (DEEP),” plans to recruit 100 PhD students for UT in 10 years and so it is also called the “100-PhD Program.” The DEEP program is based on a MOU, which was signed by UT Chancellors (Cheek and Arrington) and the presidents of three Chinese partnering institutions (China Agricultural University, Nanjing University, and the Institute of Applied Ecology of the Chinese Academy of Sciences) in early 2014. The DEEP program is the first and largest collaborative PhD program between the US and China thus far in the 21st century, with living stipends, medical insurance, and round-trip international air tickets provided by CSC (a total of \$22,800 per student per year), out-of-

state tuition covered by a fellowship granted by the UT Chancellors Office, and in-state tuition paid by UT faculty. Thus far, the program has successfully recruited more than 30 PhD students for nine UT departments. The program, a collaboration among approximately 100 UT and 100 Chinese faculty, is rapidly developing, with the support of UT colleges, particularly the AgResearch program. This program was hailed as the best program by the North America Division of CSC in October 2016 to celebrate the 20th anniversary of the founding of the CSC and highlighted as a model of “People-to-People” program at the 2017 China-US Annual Economic and Strategic Dialogue in Washington DC.

In January 2018, the program was successfully renewed after CSC panel review, and the maximum number of scholarship approved by CSC increased from 10 to 15 per year. Meanwhile, the scope of discipline areas was expanded to include food production and security. Participating institutions were extended to include all of the 120 research institutes of the Chinese Academy of Sciences and Nanjing Agricultural University. In 2019, CSC suggested adding a number of 2-year postdoctoral fellowships and/or visiting PhD student scholarships to the program to catalyze and strengthen faculty collaboration for mutually beneficial research.

In October 2016, a new joint Center for Soil Productivity and Environmental Conservation (SPEC) was launched within the framework of JRCEEC and a MOU was signed in June 2016 between UT and Shenyang Agricultural University (SYAU). The SPEC aims to develop long-term innovative scientific collaboration in the areas of soil science and nutrient management through faculty exchanges, student internships, joint curriculum, facility sharing, and even jointly hired faculty. The SPEC was developed from a JRCEEC collaborative research group on biogeochemistry and climate change, which started in January 2013. The collaboration involves a number of other top agricultural institutions, such as the Chinese Academy of Agricultural Sciences, Nanjing Agricultural University, Inner Mongolia Agricultural University, Institute of Applied Ecology, Institute of Soil Science of the Chinese Academy of Sciences, Jilin Agricultural University, Purdue University, and the Environmental Sciences Division of Oak Ridge National Laboratory.

In May 2017, a new grant from the US National Science Foundation was awarded to faculty and scientists at the University of Tennessee (UT) and the Oak Ridge National Laboratory (ORNL). The project supported the development of a Research Coordination Network (RCN), designed to identify transdisciplinary research opportunities for scientists in the US and China focusing on the nexus of food, energy, and water systems (FEWS). This grant, termed “Food-Energy-Water Systems Transdisciplinary Environmental Research Network (FEWESTERN),” partnered with three NSF-China awards to three teams of Chinese institutions, led by Nanjing University, Southern University of Science and Technology, and Remin University of China, respectively, to develop research priorities transcending US and Chinese grand challenges. The first project meeting was held in Nashville on December 6-9, 2017.

To meet the FEWS research needs, in June and November 2017, Joint Research Center for Agricultural Plant Biotechnology (CAPB) and Joint Center for Biomass Science and Technology (CBST) were established to promote US-China collaboration in plant science, forestry, pathology, and bioenergy. Major partners of CAPB and CBST are Nanjing Agricultural University (with a top ten world ranking in agriculture) and Chinese Academy of Forestry (with a top ranking in forestry in China), respectively. These centers include participation by many other institutions, such as Nanjing Forest University, Southwest Forest University, and China Agricultural University.

As a successful and large international partnership, JRCEEC has greatly promoted research networking and collaboration and student training in the areas of environmental sustainability between the US and China. JRCEEC has engaged many central governmental agencies to explore opportunities for joint

programs, such as China's Ministry of Science and Technology (MOST), Ministry of Agriculture (MOA), and Natural Science Foundation (NSFC), as well as the US Department of Energy (USDOE) and National Science Foundation (NSF). JRCEEC has organized 12 annual academic conferences and 27 topical research workshops, published six special journal issues on focused research topics, five proceedings, and more than 150 joint research papers. It has assisted in preparation of nearly 20 research proposals (40% funded but mostly single-side funding), arranged more than 150 Chinese visiting scholars for 6-24 months of joint research at UT, ORNL, and Purdue University, and coordinated and hosted week-long academic visits for approximately 550 faculty, program managers, and administrators of partnering institutions. The JRCEEC has engaged nearly 5,000 researchers in China and the US and has continuously made advances in the transformation from knowledge exchange into systematic integration of research, education, and stakeholders. The JRCEEC will endeavor to serve as a Union of Science, Technology, and Environmental Policy (U-STEP) during the next decade of its growth by making practical contributions to economy-beneficial international collaborations between these two nations and beyond.

ANNUAL WORKSHOPS

As part of its mission "to promote research collaboration, academic exchange, student education, and technology training and transfer," the China-US Joint Center for Ecosystem and Environmental Change (JRCEEC) holds annual workshops and periodic topical workshops. The following is a summary the workshops held to date:

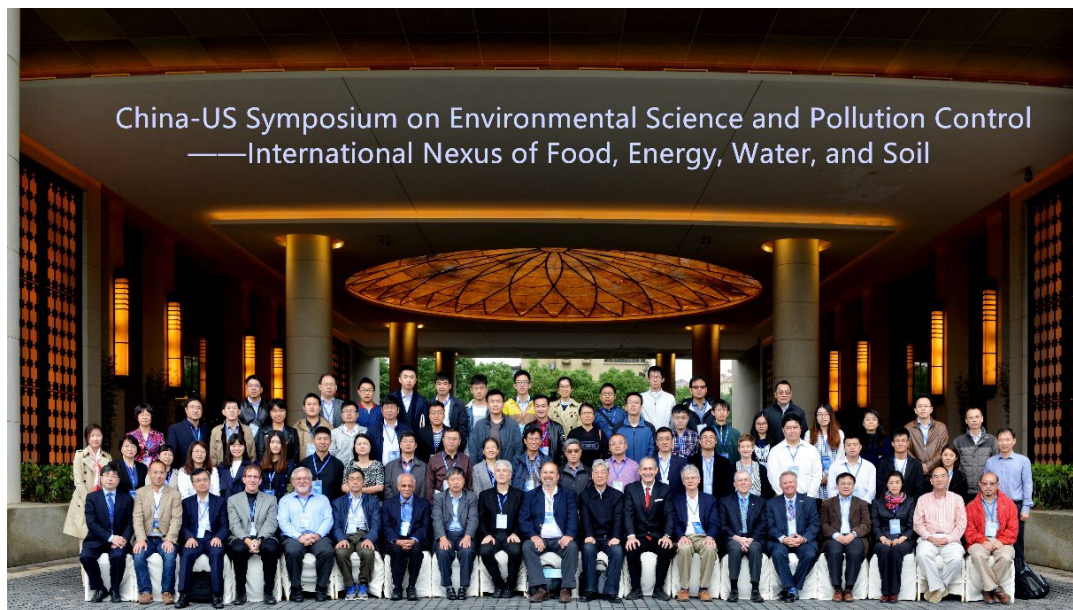
2018 Annual Workshop—"Advances in Critical Needs for the Nexus of Food, Energy, and Water Systems," Yixing Bamboo International Conference Center, Yixing, Jiangsu Province, China., October 24-28, 2018



2017 Annual Workshop—"The Food-Energy-Water Systems (FEWS) Research Network," Franklin Marriott Cool Springs, Franklin, Tennessee, USA, December 7-9, 2017



2016 Annual Workshop—"International Nexus of Food, Energy, Water, and Soil," Howard Johnson Garden Plaza Hotel, Yixing, China, October 27-29, 2018



2015 Annual Workshop—"Critical Zone Science, Sustainability, and Services in a Changing World," Beck Agricultural Center (Purdue University) and the Holiday Inn Lafayette-City Center, West Lafayette, IN. U.S.A., October 22-24, 2015



2014 Annual Workshop—"Water, Energy, and Ecosystem Sustainable Development," Anhui Jinling Grand Hotel, Hefei, China, October 26-28, 2014



2013 Annual Workshop—"Environmental Health and Green Development," Park Vista Hotel, Gatlinburg, Tennessee, USA, November 18-19, 2013



2012 Annual Workshop—"Land Use, Ecosystem Services, and Sustainable Development," Shenyang, China, September 17-19, 2012



2011 Annual Workshop—"Global Sustainability Issues in Energy, Climate, Water, and Environment," Purdue University, West Lafayette, Indiana (USA), September 26-29, 2011



2010 Annual Workshop—"Energy, Ecosystem, and Environmental Change," Beijing, China, September 22-24, 2010



2009 Annual Workshop—"The Climate-Energy Nexus," Oak Ridge, Tennessee, USA, November 11-13, 2009



2008 Annual Workshop—"Bioenergy Consequences for Global Environmental Change," Beijing, China, October 15-17, 2008



2007 Annual Workshop—"Environmental Aspects of Bioenergy Production and Sustainability,"
Knoxville, Tennessee, USA, September 11-13, 2007

