Welcome to China

My first cab ride to Beijing was exciting and frightening. Our driver confidently weaved in and out of evening city traffic while making small talk with Xiaolong, a Chinese Ph.D. student in Environmental Science at the University of Tennessee. This was definitely a very different driving culture than in the US. At my side, an American Ph.D. student, Regan nervously readjusted in her seat. It’s her first time in China too.

There were many reasons that we ended up in China for two weeks. First, we gathered with other environmentally-focused professionals to attend the Food, Energy, and Water Systems (FEWS) conference in Yixing, hosted by Nanjing University. Next, Xiaolong and Regan were to teach a microbiology workshop to a group of Master’s students at the Institute of Applied Ecology (IAE).
The last reason we were there was to simply spend some time visiting the hot spots around the country and dabbling in local culture—mostly the food scene. But for Xiaolong, this was time he could use to visit his family for the first time in over two years. He humbly invited Regan and I to be honored guests at his family’s home, an offer we graciously accepted.

Chasms Between the US and China

On our high-speed train ride to Yixing, Regan and Xiaolong discussed political and cultural differences between China and the US. We learned that the Chinese population tends to be less diverse than in the US and as a result, are often excited to see people of different cultures. Many people politely stared or took pictures of Regan and I, stunned to see two caucasian women. After the first couple days, I welcomed pictures and attempted to communicate with my roughly three Chinese phrases: “hello” and “goodbye,” “I speak English,” and “good food, thank you.”

It’s no mystery that politically, China and the US have very different governments. China is an evolving Communist country that doesn’t offer the freedoms of voting, trials of peers, and free speech that we value in the US. Historically, these differences have resulted in tension between the countries, but President Trump’s negative rhetoric has sparked more xenophobic sentiments and fear in many Americans.

However, no person, no country, and no society has all the answers, but we all have something in common: we are all looking for the best answers. One major question is “how are we going to sustain the human existence on the planet?”—not a very small or simple question.

We could see the dense smog suspended in the air through Beijing and on the outskirts of the cities we visited. Xiaolong described the recent government initiatives to combat pollution: solar and nuclear power initiatives, natural gas and electric car tax incentives, and strict driving restrictions in cities. With some resentment, he said that the “Chinese government is making an effort to eliminate pollution but it’s so hard to do that when you wait until it gets polluted so much.”

Every country must come together to help curb the rise of global warming and find a way for humans to sustainably move into the future of food and energy usage. Problems such as these are the main issues for FEWS, a cross cutting research collaboration network focused on how to sustainably meet the growing global demands for food, energy, and water.

We arrived in Yixing, a small town surrounded by beautiful bamboo forests. This year, the Food, Energy, and Water Systems Transdisciplinary Environmental Research Network (FEWSTERN) put on the China-US 2018 Joint Eco-environmental Symposium. The focus of this symposium was “Advances in Critical Needs for the Nexus of Food, Energy, and Water Systems.”

Over the course of three days, we attended overarching keynote presentations as well as smaller, more focused workshops. Attendees included students, professors from US and Chinese Universities, community stakeholders, and industry leaders such as representatives from the Tennessee Department of Environment and Conservation, Oak Ridge National Lab, the National Science Foundation, the Chronicles Group, the National Natural Science Foundation of China, Jiangsu WELLE Environmental Co., and more. All of these environmental leaders gathered to share their unique perspective on how to tackle the pressing issue of sustainable FEWS management.

The conference was opened by keynote presentations from Drs. Loeffler, Sayler, Tao, Basso, and Zhang. All presentations had one theme running throughout: as the two largest industrial countries, it is the responsibility of the US and China to take on and work towards solving the food, energy, and water related issues we face today. Most importantly, we must all work together in order to solve these issues. Water use and pollution, sustainable farming, degradation of land resources, and energy generation costs are not issues specific to just one country. Both the US and China must find ways to improve the sustainability of how humans obtain and use their food, energy, and water.

This global perspective is unique in the FEWS conference. In fact, collaboration is one of the main purposes of this conference in order to establish a trusted research network. Cross county, and in this case trans-global, research and information sharing is not only difficult to coordinate, but it can also be extremely difficult to establish. One of the most valuable aspects of the FEWS conference is the opportunity it gives researchers to connect across the world.

After keynote speeches, the conference attendees split into small workshop groups, each with its own focus. Topics included: Agricultural Sustainability and Revolution; Climate Adaptation, Water Resources, and Disaster Control; Stakeholder-targeted Ecosystem Services and Health; Socio-economic sustainability of Natural Resource Utilization; and many more. Each year industry and researcher connections are made,
leading to valuable advancements in research and knowledge-base. The FEWS research network is an invaluable resource that has arisen through these face-to-face meetings held each year by FEWSTERN. In fact, these meetings often translate into research through joint NSF-USA and NNSF-China grants.

As attending students, Regan and Xiaolong not only learned from the many workshops and presentations, but also had the opportunity to connect with professors and students both national and international. Many undergraduate students were present from host university Nanjing University, as well as many graduate students from universities all over China. The opportunity to attend this conference allows students to conceptualize and visualize the results of their research: industry leaders using scientific advances to operate sustainably.

The opportunity to attend the FEWS Conference in China was very special, and all attendees got the chance to learn about FEWS sustainability issues, connect with research and industry leaders, and experience trans-global collaborations. Most of all, we noticed our countries’ similarities rather than the differences: both countries face environmental issues that we are trying to combat with scientific and industry initiatives.

**Sharing Lab Techniques in Shenyang**
Once we arrived at Xiaolong’s alma mater, the Chinese Academy of Sciences, Institute of Applied Ecology (IAE), we met up with his former advisor, Dr. Zhuang, who took us to see her labs and showed us all of their equipment. That afternoon and the next day, he and Regan led a workshop for a group of graduate students and professors to teach them about why soil viruses are important and how to study them. Dr. Radosevich, one of Regan and Xiaolong’s advisors, guest lectured at the institute about the importance of soil virus research and information gaps in the field. His lecture covered the basics, from what a soil virus is and how it can potentially impact soil health, to advanced topics such as DNA sequencing techniques used in the field of soil microbiology.

Later that day, Xiaolong and Regan went through the soil virus extraction method in order to show the workshop attendees how to count soil viruses using an epifluorescence microscope. This method involves gathering soil samples, blending with a potassium citrate solution in a phosphate buffer, centrifuging the samples and filtering the virus-laden supernatant onto slides in order to be stained and viewed with the EFM. The final result of this process is a soil virus abundance count. The attendees of this workshop learned these techniques in order to incorporate soil viruses research into their varying fields of study.

The students and educators at IAE eagerly participated in the lab procedure, asking questions and contributing their own ideas. The collaborations between the University of Tennessee and IAE felt similar to those at the conference just days before. We felt hopeful that these scientists might be the generation that will advance environmental research by cooperating globally.

Exploring Chinese Traditions & Family Heritage

Of course we hit the hot spots around China like the Great Wall, Summer Palace, and Olympic Park in Beijing. We stuffed ourselves at a 100-year-old dumpling restaurant and gave ourselves heartburn at a spicy Hot Pot restaurant. We drank local green tea and even tried some fried butterfly cocoons—and yes, they are surprisingly delicious.
The tourist experiences were breathtakingly beautiful and the food was decadent, but the best time in China was spent with Xiaolong's family members. His sister in Dalian treated us to fresh crabs as we watched her talented ten-year-old daughter play the piano for our entertainment. We stayed in his Aunt and Uncle's apartment in Yantai with his cousin, Sha Sha, a college student studying law. Although most of his family didn't speak English, we were still able to communicate through hand gestures, smiles, laughs, and by showing pictures and videos of our families back in the US.

During this period of the trip, we were overwhelmed with gifts from each family member; they wouldn't allow us to pay for any meals and insisted on carrying our heavy luggage. Their kindness was undeniable. Fresh fruits and nuts from Xiaolong's family farm surrounded us at all times, forcing us to learn the phrase “Wo boa le” meaning “I am full” in English.

On our final day with Xiaolong’s family, we travelled out to his childhood home in a small farming village, so far away from the city that the smog dissipated and we could see the blue sky clearly. As we drove down twisting dirt roads, passing stray dogs and stone cottages, Regan and I both began to realize just how different our lives are from Xiaolong’s. Even though Regan and Xiaolong are both Ph.D. students in the same lab with foreseeably similar futures in academia, his upbringing couldn’t be more dissimilar.

We arrived at the family cottage, a stone structure surrounded by terraced farmland and neighbors with chickens and geese. There were no tractors or large machinery that most Americans would
expect but instead, simple tools and the strong and weathered bodies of Xiaolong’s humble parents. Walking around the farm, we saw fields of apples, sweet potatoes, and gords of all types. In the house, his mother cooked us dumplings, fish, steam buns, and veggies over a fire stove that was fed with dead sticks and leaves from the last harvest.

Relaxing on the bed, which was no more than a sheet of wood with a comforter on top, Xiaolong told us stories from his childhood. With sorrow in his heart, he told us about his older sister who could not attend senior high school or college because his family could only afford to send one of them. “She was just as smart, maybe even smarter than me, but they had to choose one,” he explained. I felt ashamed for how much I took for granted in my charmed life. My parents were able to send all three of their children to college, buy us cars, and take vacations, pleasures that many Chinese people might never have.

But Xiaolong’s family isn’t to be pitied. They are as happy and warm-hearted as anyone else, showering us with love, food, and gifts. His mother and aunt took us out to the apple field, cutting their fresh fruit from the trees and filling bags for us.

After over two years without hugging his family, Xiaolong had to say goodbye after just two days with them. As we loaded the bus to start our long journey home, Xiaolong’s entire family waved at us, wiping tears from their eyes. While the bus drove away, Xiaolong fell silent, contemplating his emotions. He said that his feelings were complicated because he was happy to go home to Tennessee to see his wife and baby, but very sad to leave his family again knowing he wouldn’t see them any time soon. Regan explained that a good English term for his feeling is “bittersweet.”
Confidence in the Future

As Regan and I crossed political and cultural divides in China, we learned the value of traveling to foreign places, but more importantly, we felt the value of collaborating with other areas of the world in order to ensure a better future. Environmental issues can’t be solved within one country alone. Instead, we must rely on a global network of societies to work together to combat the degradation of the planet.

At the FEWS Conference and the workshop at IAE, brilliant and caring individuals set aside differences to embrace ideas on how to sustain and improve our environment. This is why collaborations between universities and organizations worldwide are so important. The partnerships between the University of Tennessee, Shenyang University, and IAE set the standard for valuable international collaborations for now and for generations to come. With continuing conferences and collaborations, each participant could have a story like ours, and experience an eye-opening journey leading to continued research, partnership, and environmental discovery.

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Photography provided by Kat McDearis