

## **Summary Report on Two Intercultural and International Initiative (QEP) Grants**

Z. John Ma and Qihong Zhao  
Department of Civil and Environmental Engineering (CEE)  
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“Ready for the World: The International and Intercultural Awareness Initiative” is part of a long-range plan to transform the campus into a culture of diversity that best prepares students for working and competing in the 21st century. In responding to this initiative, the Department of CEE has applied for and received two grants from the Ready for the World program. The main objectives of these grants were (1) to allow undergraduate students from CEE to meet and compete with students from other countries so that we can transform Undergraduate Curriculum to enhance International and Intercultural content and (2) to improve our Faculty Engagement in International and Intercultural Education.

### **Grant #1: The Fourth International University Structure Design Competition, Tongji University, Shanghai, China, April 20 – 25, 2007**

We were honored to be invited to attend Tongji University’s 4<sup>th</sup> Annual Inter-University Structural Design Competition, held at Tongji University in Shanghai, China. A total of 20 teams from China, Korea, and USA were invited in this competition. UTK team was the only USA team attending the competition. Students wishing to go submitted resumes and the final representatives were selected from a panel of instructors. Four students, Shane Bragg, David Ritter, Jake Suer, and Mieah Turner, were chosen to attend along with three members of the faculty, Dr. Greg Reed, Dr Qihong Zhao, and Dr. Baoshan Huang.

The objective of the competition was to design a spatial structure, similar to a dome, to support a series of compressive loads along with an impact load from dropping a steel ball on the structure. Teams were required to predict the overall deflection of their structure. To make the competition even more challenging, the foundation of the structure was sand and any and all settlement must be factored into the over all deflection. Teams were given three days to construct their structures at Tongji University from Balsa wood. Overall scoring would be based on: Aesthetics, Actual Deflection versus Estimated Deflection in relation to weight, and technical report.

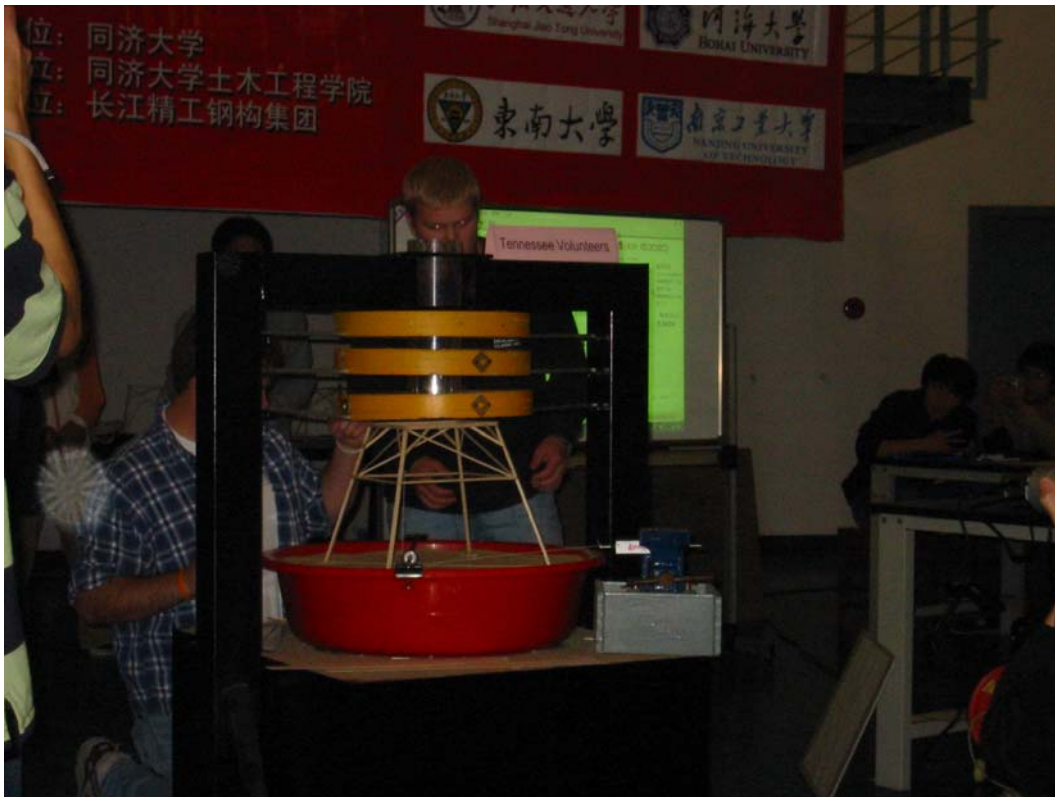
UT's team spent numerous hours preparing before the event, brainstorming and practicing their ideas. The primary idea the team decided on was an octagonal dome like structure made from composite boxed members for vertical members with a composite I-beam on the top. Footers were spread out as much as possible with the provided balsa wood panels.

Once in Shanghai and at the competition at Tongji University, the UT team realized they had a lot of work to do and needed to make numerous changes to their design. After speaking with the numerous other teams attending the competition (from South East China and one from South Korea), it became evident how much of a factor the overall weight of the structure played in the competition. Originally, UT's team over designed the structure to make sure all load tests could be completed, believing it was better to be heavy and pass than light and fail. This proved to be unnecessary, as they were the only team to approach with this method. All the teams were more than willing to add in their own advice and help the UT team draft up plans for a much light structure. After much deliberation and drafting, the UT team came up with a design similar to their original 8 sided figure, but this time cut down to four sides (as shown in Figure 1).



**Figure 1: UT's Final Model Before Testing**

After three days of designing and manufacturing, all the teams tested their structure, as shown in Figure 2. UT held strong and were able to have one of the smallest deflections of the teams at the competition and were quite comparable to their estimated deflection. After all the other aspects of grading were taken in, UT finished 9<sup>th</sup> out of 18. This was enough to be able to place in the overall competition and receive a trophy and small cash prize for their hard work.



**Figure 2 UT's Final Model Under Testing**

This competition was far from a simple structural design competition. This was a once in a lifetime opportunity to travel abroad to make new friends, network, and see not only what engineering is like in another country, but life in general as well. While staying in Shanghai, teams spent a lot of time together socializing and learning about each other, while touring around the magnificent city. Seeing and experiencing life first hand in a foreign country as different as China is from the US teaches lessons that could never be learned from any book or class. These lessons last even longer than the journey, as the experiences are shared among friends and family of those who attended. And the relationships not only between the UT team itself, but between the UT team and all the other students from China, will last even longer.

**Grant #2: The Fifth Inter-University Invitational Civil Engineering Competition (5IUICEC), Tongji University, Shanghai, China, January 26 – 30, 2008**

On January 24, 2008, five students (Maria David, Carrie Groseclose, Eric Guffey, Melissa Lindquist, David Ritter) and one professor (Dr. Z. John Ma) from the Department of CEE left for Shanghai, China to participate in a Balsa Wood Structural Competition. Figure 3 shows participants with some of students from the host team.



**Figure 3 UT's Participants with Students from Tongji**

The goal in this competition was to build a Balsa Wood Crane that could take three different loads with minimal deflection due to each load. The first load that was applied to the crane was a 60 N vertical load, applied at the end of the arm of the crane. After the first load, a 20 N horizontal load was applied. If the crane survived these two loads without breaking or exceeding the deflection limit, the third load, which was a horizontal impact load of 20 N, was applied. The winner of the competition was the crane that had the least deflection. Figure 4 shows our model under load testing.



**Figure 4 UT's Model Under Load Testing**

Eighteen teams from all around the world competed. Fifteen teams were from well known Civil Engineering schools in Asia. Three teams were special guests. These included a team from DY-Link, the sponsor of the competition; University of IUAV of Venice, Italy; and University of Tennessee, Knoxville, USA. The host team of Tongji University in Shanghai had three teams participate in the competition. The UTK team received an outstanding participation award. A brief summary from each participant of the University of Tennessee is included below. These summaries express the very important experiences that each of these students had the opportunity to enjoy while competing in China.

**Melissa Lindquist**

This trip was one of the most interesting experiences that I've been able to have while at UT. The competition itself was very interesting, and seeing the different designs that each team came up with was very educational. There were some very innovative and elaborate designs that we had not considered before coming on this trip. I believe that our team could have done better if we had had more time to prepare and possibly some more contribution from the staff earlier in the design process like many of the other teams received.

We were able to meet people from many different places including Malaysia, Korea, Italy, Singapore, and China. All the people were so friendly and accommodating and did everything in their power to make us feel as comfortable and welcome as possible. Our guides, Janet and Pamela, and many other students, were continually making sure we had everything we need. We couldn't have asked for a friendlier group of students to interact with.

The trip was much more than just participating in the competition. We were able to meet a wide variety of new people and experience how they live, even if only for a little while. Nothing helps you to expand your worldview like visiting another culture. We develop many ideas about what a different society is like through the media, but it is nothing like experiencing it for yourself.

The only thing that I would have added to the experience would have been to have additional time to experience more of the Chinese culture. We did not have a chance to do much sight seeing, and that was disappointing since we came so far. Overall, I really enjoyed this trip and I would recommend the experience to other students interested in a world experience.

### **Maria David**

We are very grateful to have been selected to assist the 5<sup>th</sup> IUICEC Structural Competition in Shanghai, China. It was a great experience being part of a team of five students who represented the University of Tennessee because we were not only able to understand the importance of support, teamwork and preparation when competing at international levels, but also we had the opportunity to learn a little more about Chinese culture.

The design team designed a structure that was light and strong enough to support the different type of loads that were going to be applied to the structure. The design basically consisted of a tower and an arm made out of several layers of balsa wood, which formed a basic crane structure. Many challenges were encountered by the design team when preparing for the competition. Many of the challenges included rules arriving only one month before the competition during Christmas' break, not giving us enough time to build and test our model. The materials used during the competition were stronger than what we were able to find locally in Knoxville, Tennessee. If we had known this in advance, we would have design a lighter structure. The facility where we were building our structure (Figure 5) was not heated and temperature ranged from 10 to 32 degree Fahrenheit making it very hard for us to feel comfortable and work efficiently.



**Figure 5 Model-building Site**

One particular thing that the design team noticed is that the civil engineering program at the University of Tennessee lacks more training when utilizing computer programs to analyze structures. The Chinese teams especially were very computer oriented when analyzing their designs, which probably helped them design very light and efficient structures. The hosting team from the University of Tongji won the competition.

Overall, the design team was able to utilize the good training we have been provided with at the university of Tennessee and also realize that there are things that the civil engineering program could improve to prepare its students to be more competitive.

The most important thing that we obtained from this competition was having the opportunity to visit the beautiful city of Shanghai in China and learning about the Chinese culture. All the students and staff members from Tongji involved in this competition were very hospitable and made us feel safe. Even though, there are a lot of differences between the Chinese and American culture, we were able to look at the similarities and not at the differences between cultures. It was a remarkable experience to be able to make friends from all over the world and to become closer with your classmates because it makes you realize the importance of relationships between people.

### **Eric Guffey**

The trip to Shanghai, China was very interesting to me. I had never been outside of the country or outside of the Southeast USA for any period of time. It was a real culture shock for me to go to the other side of the world.

During the trip we got to meet new people from all around the world. Talking to them and getting to know them and the way they live in their country was interesting. We met people from Italy and from many places in Asia.

While in China, we had to overcome many difficulties. The team had to learn to work together and talk things over with one another. We also had to overcome the absence of food that we liked. The food was really different from what we were accustomed to. We did find some American food that helped us out when we really needed some food. Another difficulty was trying to stay warm. While we were there, it snowed every day. It was the first time in sixty years that it had snowed in Shanghai. We fabricated our model crane in the basement of the Civil Engineering building, which was really cold and did not have heat.

The main reasons I went to the competition were to visit the other side of the world, to meet new people who lived there, and to see how everything was different. I liked seeing all the buildings and the way they were constructed. It is really different than it is in the USA. The tour guides and the students that were assigned to our group were really nice and helpful.

Overall, it was a good trip, and we learned how to become closer and more of a team. It also gave us a view of what China is really like and the way its people live their lives each and every day.

### **David Ritter**

My trip to China was an experience of a lifetime. It marks my second time going to China and Tongji University. Going on these trips through *Ready for the World* was a great opportunity and honor. Visiting Tongji and China has given me the opportunity to meet and build new relationships that will last me a lifetime. I now have many new friends from Tongji that I am able to keep in touch with. I am even excited to say I know many of the students who will be visiting UT when they come to compete in our competition at the end of March 2008. I have also been able to make many other friends

from all over the world I have met while in China. I now have many friends from places such as Korea, Maldives, Singapore, and Italy.

Besides building new relationships, has not only allowed me to build stronger relationships with my fellow teammates as we not only learned more about each other but more about ourselves. Traveling to the other side of the world to participate in a competition can be quite stressful, especially when we are forced to adapt to new working conditions and materials. Our working conditions were in a cold room for two days of long hours full of construction. We had to make several changes to our design based on not only materials and time, but also based on the level of competition from the other schools. Before our trip we were unable to see any other examples of ideas and works used by other teams, where as the other teams in China had already competed amongst each other, seeing and testing multiple designs and models. These challenges have given me great experience to make me and my friends be truly ready for the world. This trip has given us an opportunity to learn how to react and adapt to real life situations and challenges the world will pose.

My overall experience in China was one that will last with me forever. It helped me learn how to make friends and network with people all over the world and how to adapt with my friends to new and challenging situations. These lessons will help make us all ready for the world.

## **Summary**

Our faculty and students appreciate the help in funding our trip to Tongji University in Shanghai, China. Shanghai is amongst the leading cities in the world for civil development and technological advancement. Tongji University, which is one of the most prestigious engineering universities in China, recently celebrated its 100<sup>th</sup> anniversary and expresses similar goals as UTK's QEP by hosting this competition and other invitational events. This unique opportunity effectively promotes cooperation between higher education institutions and elevates international/intercultural awareness. The entire event undoubtedly provided a platform for faculty networking and opened the lines of communication for formal university relationships.

In addition, this competition builds on the existing relationship the UTK Department of CEE has already established with the College of Civil Engineering at Tongji. We have hosted Tongji undergraduate students for our ASCE Southeast Student Chapter competition in 2006 and 2007. In March 2008, the Department of CEE hosted two faculty members and nine undergraduate students from Tongji University in Shanghai, China. They traveled with our undergraduate students, staff and faculty to the American Society of Civil Engineers (ASCE) 2008 Southeast Student Conference in Orlando, Florida. We competed against 22 other universities from throughout the southeast in 12 different engineering related events. Our Tongji guests competed in the steel bridge, geotech and technical paper events. These interactions with undergraduates from the Tongji College of Civil Engineering have also reinforced the graduate student agreement

we have with Tongji, which includes a joint PhD program and a program of aggressive recruiting of highly qualified students from Tongji to our graduate program.

