

QUARTERLY OF THE INDUSTRIAL DESIGNERS SOCIETY OF AMERICA **SUMMER 2010**

# INNOVATION

## Interactive Experiences

EDUCATION ■ PATENTS ■ CONCEPTS





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QUARTERLY OF THE INDUSTRIAL DESIGNERS SOCIETY OF AMERICA

SUMMER 2010

# INNOVATION<sup>®</sup>



**IDSA**<sup>®</sup>

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The quarterly publication of the Industrial Designers Society of America (IDSA), *Innovation* provides in-depth coverage of design issues and long-term trends while communicating the value of design to business and society at large.

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Design for the Majority

# COLLABORATING BETWEEN EAST & WEST



**T**he students and faculty of a collaborative multicultural design course across two universities—Shanghai Institute of Visual Arts (SIVA) at Fudan University in China and San Jose State University (SJSU) in California—came together to innovate with the underprivileged in mind, and to exhibit their work in a historic Chinese town called Ci Cheng. This project gave next-generation designers from the East and West a chance to learn from each other and address issues of social responsibility.

Outside interest in our project came from Huang Yong-Song, a publisher known for his work in preserving the ancient Chinese folk art tradition and the mastermind behind the preservation of Ci Cheng, a quaint, lush town that dates back to the Tang Dynasty (618–907 AD). Contrary to the ever-increasing obsession with economic success in Chinese society today, the idea of “design for the majority” seemed like a breath of fresh air to Huang. **It intrigued him that we were (and are) raising awareness of social responsibility among the future generation of designers with actual industrial design tools to help people live better lives.**

This project was also a useful bridge between the East and the West—while the students in Shanghai were troubleshooting for the aging low-income communities in Anhui Province, China, their friends from San Jose, led by my teaching partner Leslie Speer, IDSA, were solving transportation problems in Liebialem, Cameroon, West Africa. Moreover, for many of our Chinese students of the single-child generation, this exercise represented a novel step outside of their daily comforts. Huang enthusiastically invited us to hold a student show in Ci Cheng, to exhibit the work coming out of our collaborative course, sharing the syllabi, schedule and student projects.

The Shanghai students were responsible for writing the content in both languages, designing the exhibit system and panel grid layouts, and coordinating with client subcontractors. The students in San Jose were responsible for providing their part of the content in English following our layout and sharing CAD drawings for Z-Print fabrication in China.

Eventually, we shortlisted five topics each from our respective institutions: Agricultural Transportation Tools, Hydro-Powered Washer, Tea-Picking Tool, 3-D Agriculture and Food Storage Designs from the Shanghai Institute of Visual Arts and Backpack, River Light, Wheelbarrow, Amigo and Market Cart Designs from San Jose State University. Below is a discussion of a few interesting innovations that are applicable to the rural China of today.



The resulting exhibit, Design for the Majority, is now a part of the renowned 2010 Shanghai Expo Tour.

### Tea-Picking Tool

Tea leaves are the soft, tender growths sprouting at the tip of a tea branch. They are small and difficult to locate on the bush. Snipping tea leaves with fingers all day results in a fatigued wrist and numb fingertips. For plantation workers, there are other problems: the oxidation of tea alkali turns fingers black and is hard to wash off. During harvest season, fatigue in the fingers, arms and lower spine causes much discomfort and often leads to long-term physical anomalies. Tea picking is generally an intensive career, involving a daily regime of 10 hours straight, which typically results in only about six to eight pounds of fresh leaves.

Our goal was to seek a solution that would facilitate a more efficient way to gather tea leaves: a tool that would be low cost, environmentally friendly and easy to operate and allow for a single action from picking to gathering in tea baskets carried along the waists of the tea ladies.

Our final solution reflected all these desired attributes: a cutting tool made of steam-bent bamboo with a sharpened edge for cutting young tea leaf sprouts. It consists of two halves of a bamboo section that automatically encases tea leaves after the cut. The back end of the bamboo tool is connected to a tunnel made of fabric, which in turn is connected to the collecting sack that enables a single action for tea collection. The best part: the materials to assemble it cost \$4.





### Shoulder Pole Redesign

The shoulder pole, called *biandan* in Chinese, harks back 6,000 years. A simple transportation device that allows people to carry two hanging items, one on either side of a long pole that rests on their shoulders, it has played a vital role in the development of agrarian culture. Its effectiveness still commands a presence in Chinese farmers' daily lives.

But our research showed that local small-acreage farms are run by the elderly; the young and middle-aged rural workers have moved to the cities. Many of these aging farmers have shoulder or lumbar problems, arthritis or are generally sickly and find it difficult to take part in the everyday activities required to maintain a small farm. We identified this group as our target audience.

The traditional shoulder pole design places all the weight on a single shoulder, putting the shoulder under great pressure and making the spine prone to injuries. Our goal was to address this issue with a new apparatus that would allow for better posture. We took inspiration from sporting goods and hiking products, which can accommodate heavy loads while walking. The key would be to even out the weight distribution across the pole.

Based on this research, we came up with a shoulder frame in padded fabric coupled with the resilient yet flexible bamboo pole at waist level to create a more balanced design that is easy for transporting fertilizer and agricultural goods. During the load-bearing test, we took account of the distance that the rural elderly walk every day and the average weight they bear. Trials showed that the waist-level

carrying pole can accommodate 22–33 pounds on either side while walking up to 0.6 miles. The result is an efficient transport tool that is easier on an aging body.

### Wheelbarrow

Our ethnographic study in Xiuning County, Anhui Province, identified a few unique attributes about this mountainous terrain with miles after miles of rice paddies that would make the redesigned *biandan* unusable here. First, the narrow paths between the paddies are basically low ridges with an average width of 12–16 inches. It is impossible for most vehicles to weave through. The terrain is naturally hilly and the ups and downs of daily walks further add to the burden of carrying heavy loads (an average of 90 pounds), especially for older people.

Our findings made it clear that a different solution was in order. For over 2,000 years, the wheelbarrow has been a flexible yet affordable means of transport, carrying several times more weight than a human or an animal. The conventional wheelbarrow, for example, might be a good fit; its advantage being the minimal width required for its single wheel to operate on. However, the traditional wheelbarrow is bulky and a chore to balance. Our goal became simple: improve the traditional wheelbarrow to make it easily maneuverable.

Fabricating the prototype from used bicycles, we added two small balancing wheels for support, preventing the wheelbarrow from falling. We raised the height of the handrail, preventing users from having to bend over. A load-



ing surface on top of the wheel was added to facilitate load bearing. Additionally, wire folding baskets were added on both sides to increase carrying capacity. This resulted in a new wheelbarrow design that is lightweight and can stably carry more goods.

We tested the model by inviting a migrant worker to use it during his regular working day. In the field test, he commented that the revised design can be handled easily. The test also proved that it can bear nearly 120–130 pounds.

Making the prototype out of repurposed material also paves the way for an environmentally responsible design.

### Hydro-Powered Washer

For Xiuning County of Anhui Province, the average 2006 monthly expenditure for a family is approximately \$14. This includes transportation, energy, education and clothing. Electricity is in short supply in these parts, and even if available, it is expensive. Most of the people wash their clothes in the river.

Again, our ethnography identified several problems: the river is polluted by local industry and is often mixed with sand washed in from the rainy season. The water was so dirty that people can't get their clothes clean and exposure



to polluted water is not helping their health. Additionally, washing clothes in the river is potentially dangerous when the water current is strong, further exacerbated by the lack of light at night during the busy harvest season. Washing for long hours squatting and bending over is not friendly to their backs either. We wanted to design a washer that saves energy and water, is environmentally friendly and physically benefitted the end users.

We were inspired by the Tibetan hydraulic prayer wheels, which are a part of the Tibetan daily life and a religious emblem. Strong rapid water drives the prayer wheel to spin. Its kinetic energy is highly efficient, a natural resource that will not deplete. Other inspirations included the tradi-

tional Chinese “dragon-bone water lift,” an irrigation device propelled by running water as the power driver for a pair of big wooden gears. It brings power from the rotational wheel to the axis of the water lift and lifts the water to irrigate.

For our final design, we chose a horizontal axis because of its water-saving nature. The horizontal washing machine does the washing by tossing the clothes during rotation, drenching them with water, steeping them and scouring them. This human-powered washer was divided into three parts: pedal power, hydro power and purification equipment.

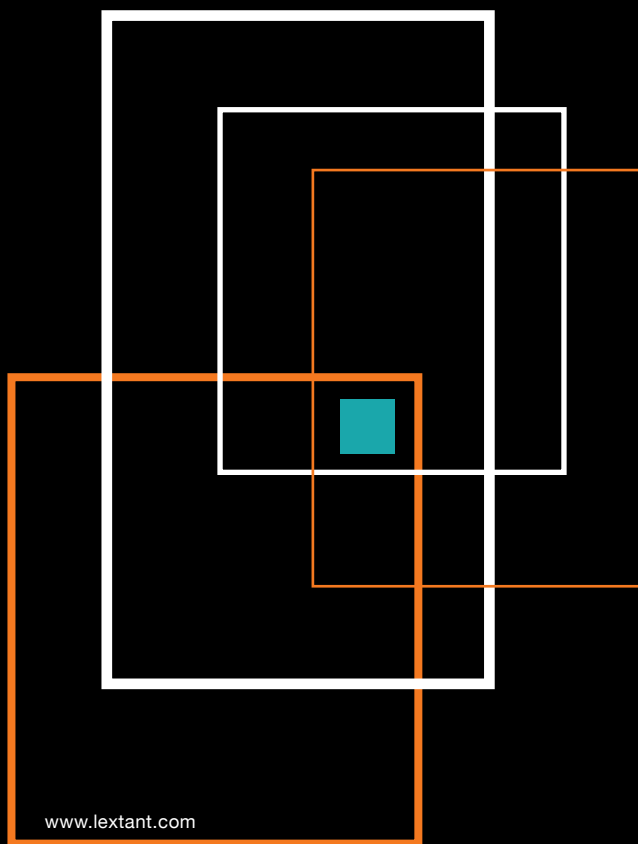
An interesting turn of the project came when the River Light team from San Jose State University (SJSU), which was focusing on developing water-powered lighting solutions for Lebialem, built a functional prototype that when placed in a nearby stream lit up a small LED light. Their video of the prototype test elicited an unexpected response. The Shanghai team saw in the water-wheel generator a design and technology that could be applied to its product. The SJSU students sent us sketches and images, and in the following week's videoconference the SJSU students saw their design, now modified and upgraded, integrated into the SIVA project. This was a truly collaborative design moment, one for which many professionals can only hope.

### Learnings

The Ci Cheng exhibition continues until the end of 2010 and has garnered such interest that it has now become a part of the 2010 Shanghai Expo Tour. For us, this makes for a perfect culmination of what has been a collaboration rich in learning and experience. We realized that a very significant part of the world across Africa and Asia still lives in humble ways and deserves more attention from the rest of us. Devising innovations that cater to these masses requires a lot of creativity.

In terms of our own lessons from this endeavor, it all sounded like fun at first but proved to be not without its challenges. **Language barriers always present colorful situations, but it was inspiring to see how design students from different cultures solve problems.** Skills may vary and we may learn through various means, but we often encountered overlapping thought processes—isn't that the very nature of creativity: to borrow, reapply and improve?

Fortunately, there is now a growing awareness that much of the industrial design services rendered since the postwar era have focused on serving Western countries, which represents a population less than 700 million, while the total global population is bursting at the seams with 7 billion. Design is a discipline that can help real people solve real problems. It should not be used only for increasing market share or winning design awards. How can design best be used for the common good to serve the majority of the global population so that in the end design matters? We learned that designing for the majority, the “other 90 percent,” may be more complicated than most of us presume but also that it is as enriching as it is important. ■



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