

Rube Goldberg would have loved the competition that tops off the summer program offered by the OU College of Engineering to its entering freshmen.

# Bridging the Gap

BY SARAH LOBBAN

**T**he main bay in the ExxonMobil Lawrence G. Rawl Engineering Practice Facility looks like a cross between a mad scientist's lair and a modern art installation. A crowd of people watch from the balcony as the first of six bizarre and intricate contraptions is set in motion.

Janella Clary, of League City, Texas, presses the "on" button of a disco ball mounted atop a platform. As the globe lights up and starts to spin, it nudges a precariously balanced golf ball over the edge and onto the switch of an electric fan. The fan blows over the first of a chain of dominoes with predictable effect, and the final domino sends a toy car down a ramp, triggering a pulley system which—several steps later—lights a candle below a string.

When the string burns through, the brush it was holding up is released. The brush drops and swishes over the top of a dress shoe, and a cheer goes up from the assembly. Clary and her teammates grin. One by one, the remaining five teams demonstrate their inventions.

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Joshua Tingle, of Sulphur, sets up one section of his team's entry in the Rube Goldberg challenge portion of the Summer Bridge Program for incoming students who will be part of the College of Engineering's freshman class.

Steve Sisney, The Oklahoman



This is the last day of the AT&T Summer Bridge Program, a four-week residential program for incoming engineering freshman at the University of Oklahoma. Students in the program take three credit hours of accelerated math courses, but the highlight of Summer Bridge is the Rube Goldberg machine competition.

Named after Reuben Goldberg, an engineer and cartoonist in the mid-1900s, the machines are made to be intricate and needlessly complex. Over the course of Summer Bridge, future engineers are tasked with building a 15-step-minimum Goldberg contraption to accomplish a simple task, such as shining a shoe.

"I guess you could say it's the opposite of what engineering is about, which is making things more efficient," says Lisa Morales, director of Diversity and Multicultural Engineering Programs at OU. "But it's a fun competition, and it lets the kids work together creatively."

This year's program presented an additional challenge that threw some of the students for a loop. After dividing into teams and spending two days drawing up the blueprints for a machine, the groups learned that they would have to swap designs and build someone else's idea.

"Changing the designs definitely made it more challenging," says participant Jordan Galvan, of Fort Gibson. "Sometimes the instructions weren't quite clear, or an idea wasn't conveyed well on paper."

This scenario may seem familiar to professional engineers of all disciplines, who frequently have to work with products in whose design they had no input. Although the mix-up was initially daunting, the results were worth the struggle. The finished machines incorporated everything from stuffed animals



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Incoming freshman Matt Brafford, of Charleston, West Virginia, explains the steps involved in the design of his team's Rube Goldberg-inspired project at the conclusion of the Summer Bridge Program at the OU College of Engineering.

to balloons and miniature sailboats to a Nerf gun. No two looked alike, but all of them functioned.

"We had a budget, so we basically used everything we had, even the box from the disco ball, in our machine," says Clary. "We worked on it every weekday, and each time it worked a little better."

Although all of the machines were a hit with the audience, the five-person panel of judges from OU engineering schools ultimately awarded first place to the team Bridge Kids. Galvan designed the miniature guillotine that was the final step in their machine.

"It took a bunch of hot glue and burns," recalls Galvan, "but it was very fun."

So much fun, in fact, that he is reconsidering the petroleum engineering degree he had planned to pursue. Working on his team's Rube Goldberg project gave Galvan a taste for mechanical engineering, and he's not the only one. Clary, too, heard the siren call.

"I'm looking into chemical engineering, but I'm also considering mechanical after this," she says. "I really liked all the hands-on stuff we did. I still haven't solidified my choice."

No matter what major they choose, there is no denying that Summer Bridge has a positive impact on students' college experience. The first-year retention rate among students who participated in Summer Bridge is greater than the average retention rate among engineering students.

"Summer Bridge gives our students a realistic taste of what's to come," says Morales. "Even if they don't understand the true value of that experience at the time, they will later."

A higher retention rate isn't the only benefit Summer Bridge can bring to OU and the young engineers. To build their Rube Goldberg machines, the students get to utilize the ExxonMobil



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Each team in the concluding competition at Summer Bridge must design a Rube Goldberg-type project of a minimum 15 steps, then at mid-point, switch and complete another team's design. Here Nicholas Thoendel, of Sperry, fine-tunes his team's entry.

Lawrence G. Rawl Engineering Practice Facility. Over the course of the program, they develop familiarity with the staff there and the equipment in the facility.

The same rooms used by Summer Bridge are used later in the semester by OU's competitive student teams, such as Sooner Electric Racing, Sooner Competitive Robotics and the Sooner Racing Team. Morales hopes getting to use the practice room equipment in Summer Bridge will inspire more students to join the teams, especially women and minorities.

Summer Bridge is a relatively small program, although it has grown from 16 people in 2007 to 40 in 2014. Morales is thrilled more young engineers are getting to participate, but she admits it takes a lot of work to keep it running. She and OU Diversity Programs Assistant Director Tafara Cameron are a two-woman



Karen Kelly

Sophomore counselors Sean English, Moore (in suit), and Alex Powell, from Tulsa, discuss a Showcase project with attendees, far left, Marquez Byrd, Tulsa; Whitney Sennett, Houston; Ryshard Marchbanks, Lawton; and Austin Sheffield, far right, Oklahoma City.

team when it comes to getting Summer Bridge running each year. A significant amount of funding is required to keep the costs low—\$400 per student—and during the year Morales and Cameron are preoccupied with making sure their MEP students have adequate scholarships. Usually, it isn't until January that they are able to start working with recruitment services to find potential Summer Bridge attendees and planning the rest of the program.

"It's a lot of work, but it's so worth it for the students and their futures," says Morales. "There's a lot of tradition in our program. The students who participate have a lot of pride in what they accomplish, and it's because of them we continue to do what we do."

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