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Gahanna Middle School East Team Named Gold Medal Winner in National Science/Community Service Competition Held at Walt Disney World®

Students develop a hyperboloid-shaped house to withstand earthquakes

WASHINGTON, D.C.—June 17, 2014—Bright ideas, solid research, and teamwork won three students from Gahanna Middle School East, in Gahanna, Ohio, a top prize in the Christopher Columbus Awards, a nationwide program of the Christopher Columbus Fellowship Foundation, that challenges middle-school students to explore opportunities for positive change in their communities, utilizing STEM techniques and processes.

Students Julie Bray, Luke Clay, and Ashton Cofer, along with their coach, Haruna Cofer, won a Gold Medal and a \$2,000 scholarship for each team member for their entry. Known as the **Hyperboloid House Team**, the students created a hyperboloid-shaped house, made from interlocking, high-strength bamboo connected to flexible joints, that is intended to help withstand an earthquake, with minimal destruction and loss of life.

The 7.0 magnitude earthquake that hit Haiti on January 12, 2010, killing 221,000 people, had a personal impact on the team, as one of the members met with a group of visiting students from Haiti. The experience left the team interested in earthquakes and how to protect human life in the event of a quake.

Because “earthquakes don’t kill people, buildings do,” the team decided to find a safer building design that would be simple to construct and use locally available, low-cost materials. With the help of a civil engineer, they reviewed various potential shapes and their limitations. They settled on a hyperboloid, similar to the shape of the cooling towers at nuclear power plants, constructed of a strong, locally available type of bamboo.

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To test its theory, the team built scale-model houses made of concrete and of bamboo, and then used a vibration table at Battelle Labs to simulate an earthquake. Using a standard earthquake testing procedure, they measured the peak ground acceleration and frequency at which each of the model houses fractured or failed. The vibration tests showed that the Hyperboloid House did not fail at any frequency or amplitude, while the other concrete-based models failed. The flexible joints allowed the Hyperboloid House to bend, but not break.

“Our Hyperboloid House could save thousands of lives and protect against millions of dollars in damage because of its superior flexibility and strength during an earthquake,” the team remarked. “The Hyperboloid House would be applicable not only in Haiti, but in all developing countries that experience earthquakes.”

Team Wins a Trip to Walt Disney World®

Eight finalist teams and their coaches won an all-expense-paid trip to the *Walt Disney World®* Resort, where they competed in the **Christopher Columbus Awards' National Championship Week**, and participated in the **Christopher Columbus Academy**, a custom-designed educational program. Conducted by scientists, engineers, and educators, the program reveals the science and technology behind the thrills and excitement of the *Magic Kingdom®* and *Disney's Hollywood Studios*.

Positive Community Change

The Christopher Columbus Awards challenge teams of middle-school students to explore and discover opportunities for positive change in their communities using science and technology. The program is now in its 18th year and has attracted more than 20,000 students from diverse backgrounds all across the U.S.

The program is sponsored by the Christopher Columbus Fellowship Foundation (CCF), a Presidentially appointed independent Federal Agency. It is endorsed by the Association of Middle Level Education. Past winners have included a team from San Diego that has secured a provisional patent for a specialized seat cushion design that uses sensory feedback to train people to maintain a healthy posture while sitting at a computer, and a group of students from Illinois who developed a multifaceted recycling awareness campaign that increased recycling in their community by 60 percent in just four months.

Strong Participation from Girls, Minorities

The program attracts many students who may not typically enter a science competition. More than half of the entrants are girls, and nearly a third are from diverse ethnic and cultural backgrounds, statistics that are higher than those of most science competitions. The CCF believes the teamwork aspect and community focus draw a broader range of students to enter.

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About the Sponsor

Founded in 1992, upon the 500th anniversary of the discovery of the Americas, the Christopher Columbus Fellowship Foundation (CCF) is an independent Federal government agency that encourages and supports research, study, and labor designed to produce new discoveries in all fields of endeavor for the benefit of mankind. Governed by a Presidentially appointed Board of Trustees, the Foundation seeks to nurture and recognize community service through science and technology by middle and high school students. In addition to the *Christopher Columbus Awards*, the Foundation is restoring the *Agriscience Awards* and *Life Science Awards*, programs promoting the innovations of middle and high school students advancing and bettering the world around them. For more information about the CCF, please visit www.christophercolumbusfoundation.gov.

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