Winners announced in 2010 Collegiate Inventors Competition

EurekAlert

Washington, DC (October 27, 2010) — Recognizing the innovative ideas of today's college and university students, the Collegiate Inventors Competition, a program of Invent Now, today announced that a way to implant human liver cells in mice to facilitate drug testing and a way to manufacture composite structural poles have won top honors in this year's competition. Alice Chen of the Harvard/MIT Health Sciences and Technology Program received the $15,000 graduate first prize for her work with tissue-engineered liver mimetics in mice, and Mark Jensen of Brigham Young University, received the $10,000 undergraduate first prize for his manufacturing methods for composite lattice pole structures. The Competition, sponsored by the Abbott Fund, the non-profit foundation of the global health care company Abbott, and the United States Patent and Trademark Office (USPTO), announced the winners this morning at the National Press Club in Washington, D.C.

Graduate students Erez Lieberman-Aiden and Nynke van Berkum, of Harvard/MIT and the University of Massachusetts Medical School received second prize for their work, and Bozhi Tian and Tzahi Cohen-Karni of Harvard received third prize. Undergraduate students Devon Anderson, Jonathan Guerrette, and Nathan Niparko of Dartmouth were the second prize winners in their category, and Leyla Isik, Salina Khushal, Michael Shen, and Emilie Yeh of Johns Hopkins University received third prize. Lieberman-Aiden and van Berkum were recognized for their method for genome sequencing in three dimensions and received $10,000, and Tian and Cohen-Karni were recognized for their three-dimensional, flexible nanoscale field effect transistors used as intracellular probes and received $5,000. In the undergraduate category, the Dartmouth team received $5,000 for their creation of an absorbent, bioresorbable surgical sponge and the Johns Hopkins team received $2,500 for an intelligent drill meant for improved orthopedic surgery.

Dr. Don Keck, a Competition judge and an inductee in the National Inventors Hall of Fame for optical fiber, said, "We are very impressed with the quality of work and ingenuity shown—all of these students are winners. More importantly, all of humanity benefits from the breakthrough work in which these students are engaged. We hope this will encourage more college students to celebrate invention as part of their science and technology endeavors. Further, the Competition is a wonderful example of government agencies, non-profit, and industry coming together to encourage and inspire future generations of innovators."

Experts from industry, government, and academic research initially judged student entries on the originality of the idea and the potential value and usefulness to society. On October 26th, five undergraduate finalists presented their inventions to a panel of judges, and five graduate finalists also made presentations to a judging panel. Both panels were comprised of inductees of the National Inventors Hall of

Fame and representatives from the USPTO, Abbott, the NIH and the White House Office of Science and Technology Policy.

"The Collegiate Inventors Competition provides an important opportunity to honor today's most promising young inventors and scientists, and to highlight the importance of innovation in our daily lives," said Dale Kempf, Distinguished Research Fellow, Global Pharmaceutical Research and Development, Abbott. "At Abbott, our business is focused on scientific discovery. Supporting the Competition is part of our broader effort to help inspire today's science and engineering students—who may go on to help us discover tomorrow's breakthrough medicines and medical devices."

"It is a great privilege for me to join in honoring this year's winners of the Collegiate Inventors Competition," David Kappos Under Secretary of Commerce for Intellectual Property commented. "They are not only bright innovators but embody the spirit of entrepreneurship, which has always fueled our economy and created jobs. At this critical time for our nation, this year's winners strengthen our belief that America's best days lie ahead."

Graduate winner Alice Chen knew that although mice are widely used in medical research, they are often not helpful for pharmaceutical testing. The liver is where many drugs are broken down, or metabolized, and mouse livers and human livers metabolize substances differently. Chen has developed a way to implant human liver cells in mice. Her approach is different from other techniques in that she implants a matrix that contains functioning human liver cells and the nutrients they need directly into a healthy mouse. The matrix, once implanted, performs functions much like a human liver, making it beneficial for drug testing and other therapeutic applications. Chen, 29, is currently a doctoral candidate in Harvard-MIT's joint program in Health Sciences and Technology.

Second place graduate winners Erez Lieberman-Aiden and Nynke van Berkum call their invention Hi-C, showcasing how DNA is folded into the nucleus of a cell in an efficient and functional way. Until this invention, researchers have been unclear on how a genome folds six-feet of itself into a tiny nucleus. The pair's three dimensional genome sequencing allows them to focus on questions about genome folding and how the folds change. They speculate that aberrations in genome folding could relate to human disease, which would provide the potential to help prevent or treat devastating diseases such as cancer. Third place winners Bozhi Tian and Tzahi Cohen-Karni have developed a tiny electronic cell probe that is capable of observing and monitoring the inner electrical workings of living cells. This team's method allows them to use a V-shaped silicon nanowire as a field-effect transistor, which can be inserted into cells such as cardiomyocytes and neurons to monitor signals within. Their work has the potential to greatly enhance basic medical science investigations.

When undergraduate winner Mark Jensen was young, his father invented IsoTruss struts, poles made of specially braided cords hardened with resin that were lightweight but structurally, very strong. The IsoTruss never received widespread use, however, because of the difficulty in manufacturing the complex braiding

patterns necessary to build it. Jensen thought about the challenges that his father faced and invented a new machine to produce structures like the IsoTruss. The machine is programmable, fault-tolerant, and capable of intricate braiding patterns, far beyond the capabilities seen in other industrial machines. A 2010 graduate in chemical engineering from Brigham Young University, Jensen, 23, lives in Provo where he is the CEO of Altus Poles, the company he founded to manufacture composite poles and where he works on developing his machinery.

The second place Dartmouth team of Devon Anderson, Jonathan Guerrette, and Nathan Niparko tackled the problem of surgical sponges that are used during surgery, but are forgotten and left in the patient's body, leading to infections and other complications. They designed a new kind of absorbent sponge using a novel combination of materials, including cellulose and alginate, and a novel fabrication method involving electrospinning. If accidentally left in a patient's body, the sponge can break down into harmless substances that can be absorbed by the body. The team is continuing their research to further develop their sponge. The third place Johns Hopkins team of Leyla Isik, Salina Khushal, Michael Shen, and Emilie Yeh invented a device that can be attached to orthopedic surgical drills to detect sudden changes in drilling speed and also changes in tilt and direction of the drill. Surgeons would no longer need to rely on practice, skill, and intuition when working with a drill. Their device involves using an accelerometer on a standard surgical drill, and they hope that their drill guidance device will soon be used to train and guide orthopedic surgeons everywhere.

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