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NIH and VentureWell announce winners of undergraduate biomedical engineering design competition

Undergraduate teams design devices targeting longstanding healthcare problems and underserved communities

Hadley, MA—August 23, 2016—Six innovative projects focused on improving global health won the Design by Biomedical Undergraduate Teams (DEBUT) Challenge. The winners showed exemplary initiative in designing tools for a myriad of healthcare challenges including diagnosing tuberculosis (TB) in children and a safer alternative for central line placements. DEBUT is a biomedical engineering design competition for teams of undergraduate students, managed by the National Institute of Biomedical Imaging and Bioengineering (NIBIB), part of the National Institutes of Health (NIH), and VentureWell, a non-profit that fosters new ventures from an emerging generation of inventors and supports the ecosystems critical to their success. The NIBIB prizes were awarded based on four criteria: the significance of the problem being addressed; the impact on clinical care; the innovation of the design; and the existence of a working prototype. In selecting its prizes, VentureWell considered two additional criteria: market potential and patentability. $75,000 in prizes will be awarded in a ceremony at the annual Biomedical Engineering Society (BMES) conference in October.

NIBIB awarded the first place prize, $20,000, to a team from Purdue University that developed a "smart pill" to diagnose TB in children. The pill collects a gastric acid sample from pediatric patients who cannot cough hard enough to provide a sputum sample. With correct antibiotic treatment, 93% of patients with TB survive; however, diagnosis is difficult for pediatric patients who lack the force to cough up sputum, and instead swallow it. Current diagnostic practices are invasive, require stable electricity, and must be overseen by a trained clinician. In low resource settings it can be difficult, if not impossible, to conduct these procedures. The smart pill is swallowed and collects gastric samples from the stomach. It stays intact as it moves through the digestive system. The pill is low-cost, far less painful for the children, and can be used in areas where experts are not available.

Second place, with an award of $15,000, went to "Point-of-Care Sepsis Stratification." The team from the University of Illinois at Urbana-Champaign developed a new disposable chip that uses biomarkers to diagnose sepsis with higher sensitivity and specificity than currently possible. Sepsis kills up to 1.5 million people in the United States annually, more than breast cancer, prostate cancer, and HIV/AIDS combined. "This project's strength was integrating a microfluidic device with a controller and mobile app to achieve a complete package that can determine the stage of sepsis, from a single drop of blood," said Zeynep

Erim, Ph.D., who manages the DEBUT competition for NIBIB. “A new way to more easily and effectively diagnose sepsis could potentially save millions of lives.”

NIBIB’s third place prize was shared by two projects, each receiving $10,000. The first, “cerVIA,” developed by a team from Columbia University, integrates a speculum-fitted custom camera system with cancer detection algorithms to create a handheld cervical cancer detection device that can be used with a smartphone. The second third place winner, “CatheCare”, also from Columbia University, created a safe, easy-to-use device that eradicates 99.9% of bacteria that builds up in a central venous catheter. This device could significantly decrease the number of infections in critically ill patients.

The Venture Prize was awarded to “Ballistra Guidewire Advancer” and will receive $15,000. The team from Yale University designed a device to help physicians place central lines in patients. Placing a central line in a patient is not an easy procedure and mistakes are made up to 10% of the time. The Ballistra Guidewire Advancer was designed to allow physicians to place a central line with one hand instead of two, which means that they do not need to put down the ultrasound device showing the placement of the needle in the vein. Thus, the entire procedure can be conducted under ultrasound guidance. This could greatly reduce the number of errors made while placing a central line.

VentureWell’s Design Award and $5,000 went to “The TempStent™,” designed by a team from Temple University. The device aims to slow cellular metabolism and reduce inflammation caused by acute pancreatitis with a cooling stent. Pancreatitis has very few treatment options, which results in lengthy hospitalizations and costs $4 billion a year in the United States. The team hopes that the TempStent™, could one day help patients suffering from acute pancreatitis.

“Joining forces with NIBIB in this combined DEBUT challenge created an opportunity to elevate the profile of the program and engage a broader group of institutions,” said Phil Weilerstein, President of VentureWell. “The winning teams demonstrated the innovative capability of emerging undergraduate students from across American higher education. The diversity and creativity of all the solutions presented by the 72 entries from 30 universities in 17 states was impressive.”

“This year is a milestone for the DEBUT challenge—it is the fifth year that NIBIB has supported this challenge for undergraduates and the first year that we have joined forces on it with VentureWell,” said NIBIB Director Roderic I. Pettigrew, Ph.D., M.D. “This public-private partnership made it possible to recognize more of the highly novel and creative projects we received this year.”

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About the National Institute of Biomedical Imaging and Bioengineering (NIBIB)
NIBIB’s mission is to improve health by leading the development and accelerating the application of biomedical technologies. The Institute is committed to integrating the physical and engineering sciences with the life sciences to advance basic research and

medical care. NIBIB supports emerging technology research and development within its internal laboratories and through grants, collaborations, and training. More information is available at the NIBIB website: http://www.nibib.nih.gov.

About the National Institutes of Health (NIH)
NIH, the nation's medical research agency, includes 27 institutes and centers and is a component of the U.S. Department of Health and Human Services. NIH is the primary federal agency conducting and supporting basic, clinical, and translational medical research, and is investigating the causes, treatments, and cures for both common and rare diseases. For more information about NIH and its programs, visit www.nih.gov.

About VentureWell
VentureWell is a nonprofit that fosters new ventures from an emerging generation of inventors and supports the innovation and entrepreneurship ecosystems that are critical to their success. We do this by building innovative communities of practice, including faculty from multiple disciplines, and by funding and training science and technology innovators at the earliest stages of developing products and ventures with high potential for socially-beneficial impact. Inventions created by VentureWell grantees are reaching millions of people in more than 50 countries. Visit www.venturewell.org to learn more and connect with us.