Instant testing for sore throats wins CIMIT prize

EurekAlert

Imagine finding out before you leave the pediatrician's office if your child has strep throat, or even something more serious requiring a different treatment. A novel application for applying DNA "nanobarcodes" in a clinical assay could help primary-care physicians quickly and more accurately determine what's causing a patient's acute pharyngitis from an easy throat swab.

Mark R. Hartman, a Cornell University PhD candidate in Biological and Environmental Engineering will lead the team chosen to receive the $150,000 top honor in the 2010 CIMIT Prize in Primary Healthcare competition. His team's project seeks to apply novel DNA-based "fluorescence nanobarcodes" as a platform technology for multiplexed rapid clinical diagnoses in primary care. Second place and $100,000 is awarded to another Cornell-based, student-led team. Third place and $50,000 goes to a team at the MIT Media Lab.

In announcing the winners of the 2010 CIMIT Prize for Primary Healthcare, Ronald Newbower, CTO and Co-Founder of CIMIT remarked, "We are delighted with the passion this Prize competition has elicited amongst engineering students. They are clearly eager to develop innovative technologies to address our national challenges in primary care. The winners of our major awards are headed toward terrific careers and may well serve as role models for others in their field. CIMIT is proud to be able to support their efforts."

Rewarding Innovative Students

Top prize and $150,000 has been awarded to the project, "Rapid Multiplexed Detection of Pathogens with DNA Nanobarcodes". The novel technology offers the promise of a one-step quick point-of-care test for an array of pathogens possibly responsible for pharyngitis. This diagnostic tool would allow timely and accurate triage of sore throats. It is based on a powerful platform technology, first developed by scientists at Cornell several years ago, and licensed by them to a startup company.

One goal of the CIMIT Prize is to challenge engineers, early in their careers, to consider healthcare as a career option. This prize seems to have inspired the student to consider the common problem of proper diagnosis of sore throats at the primary-care level, rather than only using the platform technology in more acute applications like diagnosing septic patients in intensive care.

Second prize rewards a second Cornell-based team of innovative students for their project that uses continuous ultrasound therapy for more efficient help in managing chronic pain. Beyond the initial use of pain-management drugs, patients with chronic conditions such as osteoarthritis and sciatica are most often referred for periodic short therapy treatments with ultrasound. The $100,000 award will support

clinical evaluation of "Wearable Low-Intensity Ultrasound Therapy". Led by George K. Lewis, Jr., a doctoral candidate in Biomedical Engineering, the team's hypothesis is that this wearable technology, which would deliver low-power ultrasound to promote pain relief and even healing, could be dispensed as a disposable device at the front lines of primary care, where diagnosis warrants.

And, recognized with the $50,000 third prize is "Cardiocam: Technology for Non-Contact Multi-Parameter Physiologic Measurements". Led by Ming-Zher Poh, a MIT-HST doctoral candidate in the Media Lab, this project has pilot data showing that they can capture some physiologic data purely by image analysis over the internet from a web-cam looking at a patient's face. Already, the team has captured heart-rate with great accuracy, during ordinary video-conferencing remote interactions. Respiratory rate and blood oxygenation are their next two goals. This approach correlates well with the evolving paradigm of offering more primary care through outreach and by delivering care at the right time, in the right place and if possible, without requiring office visits.

A National Competition

CIMIT CEO John A. Parrish, MD stated, "This nation-wide annual competition is designed to encourage graduate and undergraduate engineering students to develop creative technological solutions that could enhance the delivery of care at the frontlines of medicine. Each project has the potential to create tools that help the physician, benefit the patient and generally improve the delivery of care."

The national competition was open to graduate and undergraduate engineering students from accredited engineering programs. In particular, the primary care prize offers the next generation of visionary engineers a unique opportunity to leverage ubiquitous technologies in a patient-centric way. The CIMIT Prize competition seeks to accelerate this pace of change by recognizing and rewarding innovative, collaborative student-lead teams whose novel approaches have the potential to impact the delivery of care.

Areas of particular interest include improving access to medical care, leveraging the skill of caregivers, automating routine tasks, increasing efficiency of workflow, supporting patients dealing with chronic diseases, increasing compliance with care protocols, and developing tools to enhance the physician-patient relationship.

The competition attracts a wide variety of ideas for technology-enabling approaches to improve primary care. Each year, CIMIT awards $400,000 in prizes to the most innovative of these student-led technology projects. With these 2010 awards, the portfolio of student-led primary-care projects supported by CIMIT Prize money has expanded to seven, with a total of $800,000 in prizes to date. In 2009, CIMIT rewarded four novel approaches that promote a patient-centric approach to primary care. That year's technologies included: Collaborhythm - Primary Care Teamwork Anywhere at Any Time. iAbetics Web 2.0 Diabetes Management System. Aptazime-Mediated Signal Transduction, and a Novel Therapeutic Game for Children with Autism Spectrum Disorder.

Primary Healthcare

Generally speaking, primary healthcare is, or should be, the first level of contact people have with the health system. Prevention and promotion of wellness are of increasing importance in primary care, as it is the care environment where health problems are best identified, managed or referred in the context of early intervention.

CIMIT's overall mission is to improve healthcare by seeking, selecting and supporting teams of clinicians and technologists. A goal in this particular competition is to offer major awards to encourage undergraduate and graduate engineering students to develop technological innovations that have potential to enhance patient care at that initial point of contact with the healthcare system.

The annual CIMIT Prize for Primary Healthcare has been made possible through a generous gift from the Gelfand Family Charitable Trust.

"The challenge of delivering affordable excellent primary care presents an opportunity for those students interested in engineering solutions to make truly profound contributions" said Mark Gelfand, a principal in the trust. "I am pleased with CIMIT's success in the first two years of running this unique annual competition. Innovation in primary care could help many families, and I am confident that much good will result from these inspiring projects. "

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