



NFL, UNDER ARMOUR, GE & NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST) ANNOUNCE FIVE WINNERS OF HEAD HEALTH CHALLENGE III

Open Innovation Challenge to Accelerate the Development of Energy-Absorbing Materials to Protect Against Head Injury

NEW YORK – December 15, 2015 – The National Football League (NFL), Under Armour (NYSE:UA), GE (NYSE: GE), and the U.S. Department of Commerce’s National Institute of Standards and Technology (NIST) today announced the five winners of Head Health Challenge III, an open innovation competition to support the discovery, design and development of advanced materials that better absorb or dissipate impact. The new materials have the potential to improve the performance of protective gear, playing surfaces, and equipment for athletes, members of the military and others.

Each of the winners will receive \$250,000 to advance their work in developing state-of-the-art materials. A panel of leading experts in the field of materials science selected these five winners from 125 entries because they met the challenge’s technical criteria to maximize energy absorption and minimize momentum transfer. One overall Head Health Challenge III winner will be selected from the five awardees to receive a \$500,000 grand prize.

“The innovations in material science that we’ve seen in this challenge will have significant applications in a range of equipment that will better protect our athletes, soldiers, children and others,” said Jeff Miller, NFL Senior Vice President of Health and Safety Policy.

Alan Gilbert, Director healthymagination, GE said, "I'm encouraged to see the progress from our collaboration with NIST. The goal of convening the brightest engineers, scientists and inventors was to advance and produce better materials for preventing injury, better tools for physicians, and better treatments for patients. Based on what we've seen from these five winners, we are moving in a positive direction."

Kevin Haley President, Product & Innovation, Under Armour said, “By utilizing our open innovation platform, we’ve discovered some of the most forward-thinking material innovators that will positively affect the future of impact protection. Our hope is that the groundbreaking work being done by our five winners will help drive material innovation in the name of safety across a variety of applications and we are extremely impressed with the progress made to-date.”

“The winning materials show a great deal of ingenuity in their approaches to energy absorption and have the potential to improve the next generation of protective systems,” said Under Secretary of Commerce for Standards and Technology and NIST Director Willie E. May. “Our NIST experts are looking forward to working with the winning research teams as they further develop their innovative materials.”

The Challenge III award winners are:

- **Alba Technic, LLC** (Winthrop, Maine) has developed a patented, shock-absorbent honeycomb material with an outer layer that diverts the energy from a fall or hit. The material is normally soft and compliant, but upon impact, the outer layer changes into a hard shell to spread the energy and protect the user from injury.
- **Charles Owen Inc.** (Lincolnton, Ga.) made cellular structures that use a stacked, origami-like design to optimize energy absorption. The essential building block of this winning material is a double corrugated sheet of the material, whose ability to fold efficiently was originally developed for applications in areas such as solar array packing in the space industry.
- **Corsair Innovations** (Plymouth, Mass.) has developed a textile that uses tiny, spring-like fibers to repel rotational and linear impacts, thereby reducing potential damage. Unlike foam materials, this textile is washable, breathable, wicks sweat and can be easily engineered to meet impact performance requirements.
- **Dynamic Research Inc.** (Torrance, Calif.) and 6D Helmets LLC are collaborating to evolve 6D’s single-impact suspension technology for use in repeated impact conditions. The suspension technology consists of a multi-

layer, suspended internal liner system that allows the outer layer to move independently of the inner layer in order to reduce the effect of both angular and linear impact forces.

- **University of Michigan** (Ann Arbor, Mich.) researchers designed a lightweight, multi-layered composite that includes a viscoelastic material. This material can be uniquely utilized to help limit the force of multiple and repeated impact events.

The finalists will work with the HHC III partners to optimize their materials over the coming year.

The Challenge III judges were:

- **Jeff Crandall, professor in Engineering and Applied Sciences at the University of Virginia.** Crandall's research focuses on mechanisms of injury under impact loading.
- **Sharon Glotzer, Ph.D., professor of Chemical Engineering at the University of Michigan.** Glotzer's research focuses on the ability to manipulate matter at the molecular, nanoparticle, and colloidal level to create "designer" structures.
- **Heinrich Jaeger, Ph.D., professor of Physics at the University of Chicago.** Jaeger's team at the University of Chicago is involved in projects ranging from the assembly of next-generation nanostructures to investigations of the complex nonlinear behavior of granular materials, including grain, gravel, pharmaceutical pills and ultrafine powders.
- **Michael Maher, program manager for the Defense Sciences Offices at the Defense Advanced Research Projects Agency (DARPA).** Maher's current interests include development of new technologies to reduce the manufacturing cycle time and novel lightweight multifunctional material systems.
- **Tresa Pollock, Ph.D., chair of the Materials Department at the University of California – Santa Barbara.** Pollock's current interests include the mechanical and environmental performance of materials in extreme environments, unique high temperature materials processing paths, ultrafast laser-material interactions, alloy design and 3-D materials characterization.
- **Alton D. Romig, Ph.D., vice president and general manager of Advanced Development Programs Engineering and Advanced Systems, known as Skunk Works, for Lockheed Martin Aeronautics.** In this role, Romig focuses on generating breakthrough technologies and designs for aircrafts and is known as the leader in aerospace innovation.
- **Alan Taub, Ph.D., professor of Materials Science and Engineering at the University of Michigan.** Taub is pursuing research in advanced materials and processing and leading an initiative to establish a new center within the U-M College of Engineering that will focus on advanced manufacturing of lightweight material structures for automotive and aerospace applications.

Head Health Challenge III, part of the larger Head Health Initiative, a four-year, \$60 million collaboration between GE and the NFL, is one of three open innovation challenges to invest up to \$20 million in research and technology development to better understand, identify and protect against brain injury. [Challenge I](#) focused on discovering imaging and methods for diagnosis and prognosis of mild traumatic brain injuries, and in July 2015, six grand prize winners were awarded \$500,000 to further their revolutionary research. [Challenge II](#) focused on new technologies to monitor, identify and protect against mild traumatic brain injury, and in December 2015, three grand prize winners were announced. The winners could receive up to \$1 million over the next year to continue to advance their innovations.

The Head Health Challenge III collaboration helps implement a pledge by NIST and the Department of Commerce to invest resources to accelerate the development of materials that can protect against concussions, made at the [White House's Healthy Kids and Safe Sports Concussion Summit](#) in May 2014.

For more information about the Head Health Challenge, visit headhealthchallenge.com.

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About The National Football League

The National Football League has no higher priority than the health and safety of its players. The league has instituted 39 rule changes in the last decade to improve safety and makes significant investments in independent research to drive changes to rules, protective equipment, sideline technology, training of players and coaches, the prevention, diagnosis and treatment of injuries and the wellness of retired players. The league's commitment also extends beyond professional football. At the youth level, through partnership with the Centers for Disease Control and Prevention and USA Football—including the Heads Up Football program—the NFL has helped pass youth concussion laws in all 50 states and works with parents, coaches, clinicians and athletes to enhance health and safety for young players. The league's investments in scientific research include a \$30 million grant to the Foundation for the National Institutes of Health for brain research, a partnership with the U.S. Army to improve the health of soldiers and players and the \$60 million Head Health Initiative collaboration with GE and Under Armour to accelerate the research, prevention, diagnosis and treatment of head injuries. With a deep commitment to continuous progress, the NFL is using its platform to advance the health and safety of football players of ages, as well as athletes in other sports, the military and society at large. For more information, visit NFLhealthplaybook.com.

About Under Armour, Inc.

Under Armour (NYSE: UA), the originator of performance footwear, apparel and equipment, revolutionized how athletes across the world dress. Designed to make all athletes better, the brand's innovative products are sold worldwide to athletes at all levels. The Under Armour Connected Fitness™ platform powers the world's largest digital health and fitness community through a suite of applications: UA Record, MapMyFitness, Endomondo and MyFitnessPal. The Under Armour global headquarters is in Baltimore, Maryland. For further information, please visit the Company's website at www.uabiz.com.

About GE

GE (NYSE: GE) is the world's Digital Industrial Company, transforming industry with software-defined machines and solutions that are connected, responsive and predictive. GE is organized around a global exchange of knowledge, the "GE Store," through which each business shares and accesses the same technology, markets, structure and intellect. Each invention further fuels innovation and application across our industrial sectors. With people, services, technology and scale, GE delivers better outcomes for customers by speaking the language of industry. www.ge.com

About NIST

As a non-regulatory agency of the U.S. Department of Commerce, NIST promotes U.S. innovation and industrial competitiveness by advancing measurement science, standards and technology in ways that enhance economic security and improve our quality of life. Founded in 1901, NIST is one of the nation's oldest physical science laboratories. Today, NIST measurements support technologies from the smallest nanoscale devices to the largest and most complex engineering systems. As part of Challenge III, NIST's measurement expertise in materials science will be essential to identifying promising technologies, testing the winners' products under state-of-the-art laboratory conditions and providing technical guidance to the winners as they seek to improve their innovations. To learn more about NIST, visit www.nist.gov.

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