Head cases

TGen, Riddell partner on sports concussion study

Update: TGen

TGen will base its concussion study on a technique created by Dr. Kendall Van Keuren-Jensen, for studying molecular information at a micro level.

PROVIDED BY TGEN

BY STEVE YOZWIAK

In a move that could help revolutionize football player safety, the Translational Genomics Research Institute and Easton-Bell Sports through its Riddell brand will study how to advance athlete concussion detection and treatment. The study will help develop new football headgear and refine player-monitoring technology.

"TGen welcomes this remarkable opportunity to join Riddell in a major research study with the goal of helping to objectively monitor a player on the field" with microelectronics combined with nucleic acid sequencing, says Dr. Jeffrey Trent, TGen president and research director. "TGen's work over the past several years in the area of head trauma is accelerating new insights to the critical study of concussion injury."

The genesis of this potentially groundbreaking study is to merge a player's genetic information with real-time microelectronic information captured by Riddell's Sideline Response System. A sophisticated, data-intensive system, SRS provides researchers, athletic staff and players with a range of valuable information on the number and severity of head impacts a player receives during games and practices.

The study seeks to answer whether the effects of sub-concussive hits are identifiable through blood-based molecular information "Based on our current information, we believe this study will have the unique ability to provide a molecular 'risk' and 'recovery' score, enabling physicians to better identify when a player might be expected to recover from the effects of the concussion and get back on the field," said Dr. Kendall Van Keuren-Jensen, TGen assistant professor, whose technique for studying molecular information at a micro level will drive the research.

As part of the study, TGen will work with the Barrow Neurological Institute whose Barrow Resource for Acquired Injury to the Nervous System, or BRAINS, program treats patients who have sustained a traumatic brain or spinal cord injury. Joining Barrow will be athletic trainers from Missouri's A.T. Still University and SAFE Football, which teaches alternative game-play techniques that reduce the number of head impacts while increasing competitiveness.

Steve Yozwiak is the senior science writer for the Translational Genomics Research Institute.

UA working to keep teachers on the job

Update: UA

A program launched by The University of Arizona's College of Education is convincing math and science teachers to stick with their profession by giving them the chance to put their skills to work outside the classroom.

The Math and Science Teacher Education/Retention Industry Partnerships Program was created to partner businesses and teachers to improve STEM teaching and learning. In the program, middle and high school teachers earn master's degrees in teaching and teacher education at sites in Tucson, Chandler, or remotely via simulcast technology. Those teachers also participate in three consecutive six- to eight-week summer internships paid for by participating companies.

A bonus is teachers report the financial and professional support provided in the program helped remain in teaching. A program analysis reveals 46 of the 48 teachers who started the program were still employed as teachers — an attrition rate of approximately 4 percent during the four years of the program. Donna Jurado, human resources manager at Orbital Sciences Corp., maker of space and launch systems, reported to program evaluators that a mechanical engineering analysis database developed by its intern continues to be used by the company.

There is a need for more corporate participants, says Martha Ostheimer, assistant director of the UA STEM Learning Center. While Orbital Sciences has locations in Chandler, the program has stronger participation in southern Arizona due to the UA's location. Program leader would like to take it statewide with companies from across Arizona participating, she says.

Converting big data into smart data

Update: SFAZ

BY WILLIAM HARRIS

Our increasingly interconnected world has the potential to impact the global economy in a manner similar to the introduction of the personal computer. From smartphones, social media and GPS signals to sensors used to gather information related to climate, railcars and wind turbines, there are enormous volumes of unstructured data being developed daily. Indeed, according to IBM, we create 2.5 quintillion bytes of data every day.

The biggest challenge for the United States is ensuring we have the capacity to leverage this massive opportunity and remain globally competitive.

A recent McKinsey Global Institute Report calls big data "the next frontier for innovation, competition and productivity." For the United States to remain an innovation leader, we need a workforce that has the educational background to capture, extract and use this information.

By 2018, the McKinsey report estimates the nation will face a shortage of more than 140,000 people with the proper skill sets and 1.5 million managers with the ability and expertise to address these needs.

Arizona is currently well-positioned to compete given the Management Information Systems Department of the Eller College of Management at the University of Arizona as well as facilities at the Thunderbird School of Global Management and Arizona State University's Global Institute of Sustainability.

However, staying competitive requires a new understanding of the need to have a world-class K-12 system. In order to prepare our children for the worldwide marketplace, they must be grounded in science, technology, engineering and mathematics, and benefit from the Common Core State Standards.

William Harris is president and CEO of Science Foundation Arizona.

NAU aims for linguistics grading on new software

BY SYLVIA SOMERVILLE

Most people studying English as a second language want to sound like a native American speaker. This requires practice and testing — currently a very time-intensive, expensive and subjective process because it uses human raters. Although there are automated machine scorers on the market, their accuracy is still low and they have limited uses.

Okim Kang, assistant professor of applied linguistics at Northern Arizona University, proposes a way to improve on existing systems by incorporating communicative features into the voice recognition software. These features are absent in existing programs although Kang's research demonstrated they are largely responsible for non-native speakers' intelligibility.

Foezur Chowdhury, a postdoctoral associate and speech recognition expert, joined NAU to help Kang quantify her research findings. Chowdhury adds to Kang's linguistic background with his training in engineering, modeling and speech communication recognition and processing. "We want machine scoring to work like a teacher," he says.

Update: NAU

The effort is part of a growing initiative at NAU to develop research capacity through informatics applications. Not only are large databases being analyzed and interpreted through creative statistical methods, but researchers are modeling complex systems and running simulations to find the best interpretations and outcomes. Innovative software applications are one result of these new efforts.

According to Kang, the potentially new software should result in more valid, fair and reliable testing, and might even affect how non-native speakers learn English and other languages.

Kang

Sylvia Somerville is a writer and editor in Northern Arizona University's research division.