



PERSONALIZING

MEDICINE

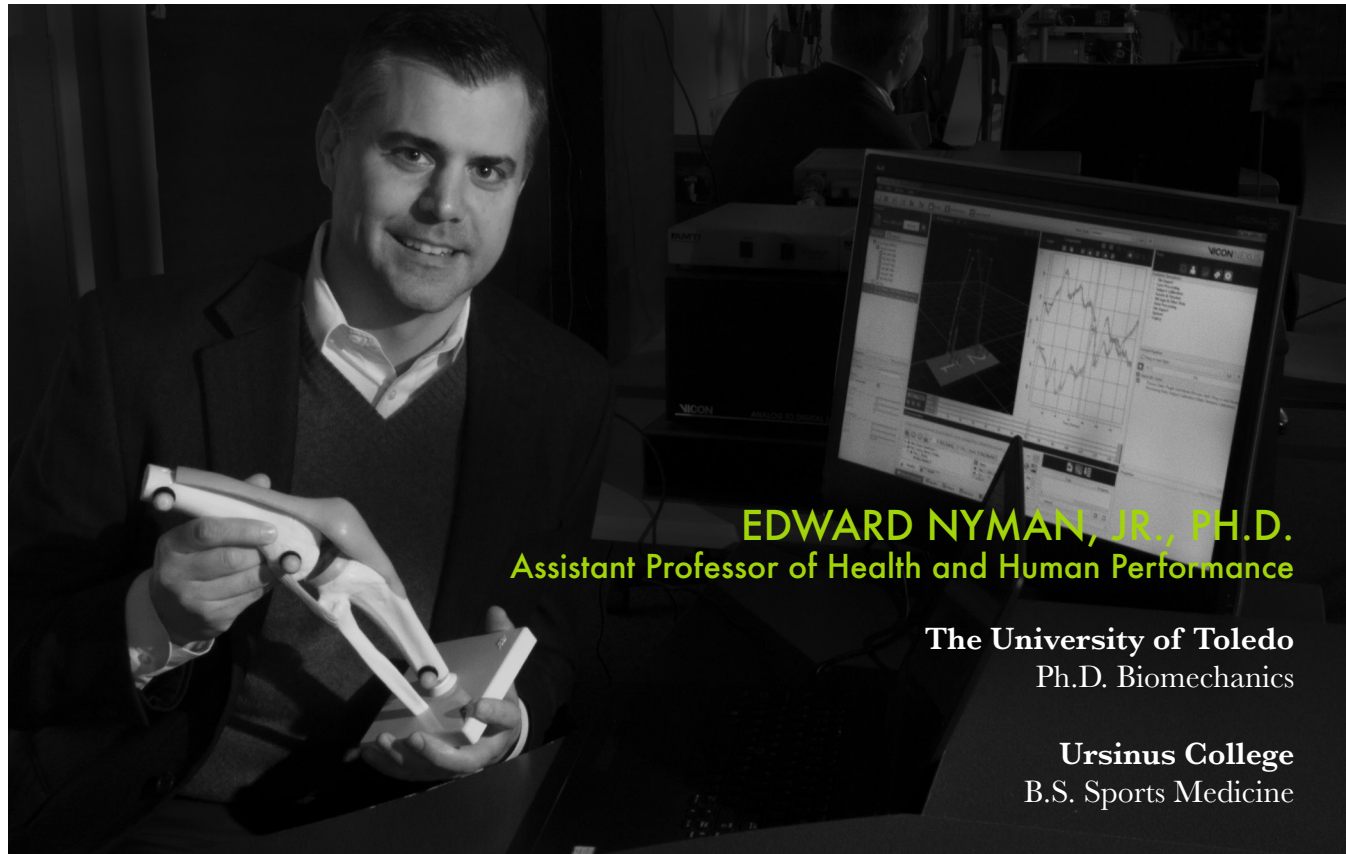
KEY TO INJURY-FREE FUTURE?

We're sometimes struck by the dramatic injuries we see while watching the Olympics. Those are the ones that stick out in our minds; often career-ending and illustrating the "agony of defeat." Ed Nyman, Ph.D., UF assistant professor of Health and Human Performance, has worked with elite athletes on injury prevention, but he also develops tools and studies to benefit the entire population.

"I work to decrease Aunt Suzy's risk of falling, or Mr. Smith's gait, affected by Parkinson's Disease," said Nyman. "Musculoskeletal injuries are devastating to everyone, not just athletes."

Nyman believes that personalized medicine ... prevention and treatment geared to the individual, may be the answer to reducing, if not eliminating, musculoskeletal injuries in athletes and the general population. Focusing largely on the lower extremities, he uses motion sensor cameras, advanced 3D computational modeling and other technology to record movement. This motion tracking technology approach provides accurate quantitative data on the physics behind why some people are more prone to injury than others.

"One day in the not-too-distant future, there will be a 3D printer in every hospital to customize implants, prosthetics, or orthotics for each individual patient," Nyman stated. "We'll even be able to create small medical devices in our homes."



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The University of Toledo
Ph.D. Biomechanics

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B.S. Sports Medicine

FROM ATHLETIC TRAINING TO ACADEMIA TO THE FDA

Nyman's early career started as a coach at the University of Pittsburgh after graduating from Ursinus College, Collegeville, Pennsylvania, with a Bachelor of Science in Sports Medicine and Athletic Training. He re-located to Wauseon, Ohio, in 2002, and developed The Sports Performance Center, a division of New Heights Athletics. Here, he was able to immerse himself in creating injury prevention and sports specific training programs for individual athletes and high school and college teams. It's been non-stop ever since.

Nyman moved on to more challenging positions within the field of sports performance and rehabilitation. He served on the development team and as program director of a large physical therapy, orthopaedic surgery, and sports performance training facility called the Institute for Athletic Medicine, in Michigan. Later, he was responsible for high-end sports-performance, therapy step-down and wellness center operations for SportsCare Excel, a division of ProMedica Health System, Toledo,

Ohio. Drawn to the research side of sports performance and physical therapy, he was an integral part of a multidisciplinary team that developed hardware and software for a biotechnology firm that focused on the design and development of physical therapy and athletic performance devices.

Working as a graduate research assistant while pursuing his Ph.D. in Biomechanics at The University of Toledo (2009-2013), Nyman conducted human performance and rehabilitation studies for his own research as well as to support other research teams. His dissertation work on the use of low-cost clinically deployable ("Kinect-based" or "motion sensor") 3D tracking systems for improving musculoskeletal health has been published internationally. During this time, he also taught biomechanics laboratory sections, human anatomy, and other human performance courses.

EVALUATION, REVIEW AND CONSULTATION

Although we equate the Food & Drug Administration (FDA) with approval of medications, the organization is also responsible for testing and evaluating all medical implants and prostheses. In 2014, after earning his doctorate, Nyman received the ORISE Post-Doctoral Fellowship to work as a researcher in the Division of Biomedical Physics at the FDA headquarters in Silver Spring, Maryland. During the yearlong fellowship, he served as the primary laboratory researcher for a hip implant functional performance research project funded by the Office of Women's Health.

During his time at the FDA, Nyman was also a primary biomechanics technical reviewer of grant proposals submitted for upper extremity robotic neural prostheses through the U.S. government's Defense Advanced Research Projects Administration (DARPA) HAPTIX program. To this day, Nyman continues to act as a "network of experts" consultant to FDA organizations in the area of "Kinect-based" tracking devices.

He returned to Ohio in 2014, serving as a research assistant professor in the Department of Bioengineering (University of Toledo) and Orthopaedic Surgery (University of Toledo Medical Center), where he served as a research team leader for a multi-million dollar National Institute of Health (NIH) grant focusing on advanced musculoskeletal modeling of the risk of ACL injury, and successfully won separate grant funding for computational musculoskeletal modeling research from the National Science Foundation's Center for Disruptive Musculoskeletal Innovations.

Joining the University of Findlay in December 2015, as assistant professor in the Department of Health & Human Performance and Physical Therapy, Nyman "hit the ground running," teaching graduate and undergraduate courses in biomechanics, pathomechanics and research design. After quickly settling in at Findlay, Nyman saw a need to provide more undergraduate research opportunities for UF's "best

and brightest" and in May 2016 wrote and successfully earned UF Goal Getter grant funding for a "Summer Scholars" program. Summer Scholars will launch in the summer of 2017 and provide research stipends to six students across a number of disciplines.

NYMAN SAW A NEED TO PROVIDE MORE UNDERGRADUATE RESEARCH OPPORTUNITIES FOR UF'S "BEST AND BRIGHTEST"

"Findlay is a model University for this type of program," Nyman added. "It's large enough to have the faculty needed to mentor these students, yet small enough to allow easy interdisciplinary relationships between colleges and departments."

Nyman's excitement is obvious as he talks about expanding research opportunities for UF undergraduate students, not just in the sciences and health professions, but also in the humanities.

"The Summer Scholars program is a good start," he said. "It's great that the University of Findlay is funding student research. This will attract students who, otherwise, couldn't give up a summer job to pursue their academic interests."

Currently, Nyman is expanding multi-disciplinary research efforts at Findlay and in conjunction with other research institutions across the U.S., with an emphasis on low-cost advanced clinical measurement

and mitigation of injury risk. He provides technical consultation to numerous external organizations, pro-bono education on injury risk reduction to sporting governing bodies such as USA Gymnastics, and seeks to involve more undergraduate and graduate students in research that extends beyond the classroom.

