Understanding Humans in Extreme Environments with Computational Biomechanics

Reuben Kraft
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CURRENT RESEARCH

How the computer has become scientists newest tool for preventative conditions resulting from extreme loading conditions

Extreme environments or loading include space, vehicular accidents, explosions, impacts in sports, falls, thermal fatigue and sometimes even medical procedures. Therefore, it is important to understand extreme environments and the ways in which the human body is affected by these environments. Computational biomechanics has been a necessary tool in better understanding extreme environments because it helps explore numerical methods and investigations of injury mechanisms that may result from extreme loading conditions. Imagine rather than waiting for an accident to happen, being able to conduct computer simulations that can accurately illustrate the ways our bodies are impacted because of extreme loading conditions. This is exactly what scientists at the Computational Biomechanics Group at Pennsylvania State have been working hard to do.

Dr. Reuben Kraft leads the Computational Biomechanics Group at Pennsylvania State University. His research focuses on understanding the mechanics and physics of biological systems using computational methods. In so doing, the power of high performance computing is used as a tool to understand the response of humans in extreme environments. One primary focus of his research portfolio is traumatic brain injury. Dr. Kraft created connectome neurotrauma mechanics which allows, for the first time, for a physics-based model to be linked to a network-based analysis that establishes a coupled computational method to study the effects of localized structural damage or lesions. In short, Dr. Kraft is able to virtually understand injuries which therefore allows scientists to study these injuries on the smallest scale possible leading to breakthroughs in preventative care, treatments,...

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AFFILIATION

Pennsylvania State University

EDUCATION

- B.S. in Mechanical Engineering 2004,University of Maryland, Baltimore County
- M.S. in Mechanical Engineering 2006 ,The Johns Hopkins University
- Ph.D. in Mechanical Engineering 2008 ,The Johns Hopkins University

AWARDS

- Oak Ridge Institute for Science and Education Faculty Research Participation Program at U.S. Army Research Laboratory, 2013
- Presidential Early Career Awards for Scientists and Engineers (PECASE), 2011

RESEARCH AREAS

Technology, Computational Sciences / Mathematics, IOT, Devices, Data, Veteran's Causes

FUNDING REQUEST

Your contributions will support the continued research of Dr. Kraft as he works to create technology and make discoveries that will help our society become a better place. Specifically his work towards understanding humans in extreme environments will allow him to create new technologies that can mitigate risks for our military, our athletes, and for individuals. Donations will cover the costs of graduate student stipends, personnel salaries, and equipment.