“Progression of Ocular Injury Following Blast Exposure”

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Abstract
Blast exposure is the leading cause of eye injury in the armed forces. In three recent military conflicts, Operation Enduring Freedom, Operation Iraqi Freedom, and Operation New Dawn, 13% of all casualties had visual system injury. There is also increasing civilian exposure to blasts through terrorism, manufacturing plant explosions, and regular use of minor explosive devices by police to manage domestic conflict. Despite this increasing exposure, the mechanisms and outcomes of blast exposure to eye injury have not been well investigated. Ocular damage can be severe and immediately recognizable. However there are many closed-globe injuries that are diagnosed weeks or months after the exposure. To date, there exist only a few studies performing computational, in vivo, or in vitro experiments in the field, and more effort is needed to understand the progression of eye injury following blasts, and develop strategies to mitigate damage following blast exposure. In this presentation, I will discuss methods for recreating a blast in the laboratory, illustrate the unique temporal time course of ocular injury following blast exposure, and present our preliminary work developing a scaling relationship to translate laboratory experiments to battlefield exposures. These data will be used to improve detection of subtle closed-globe injuries, provide insight into treatment strategies, and lead to more effective design of wartime ocular protective devices.

Biography
Dr. Brittany Coats is an Associate Professor in Mechanical Engineering at the University of Utah and holds affiliated positions in Ophthalmology and Visual Sciences, Pediatrics, and Bioengineering. Her research focuses on injury mechanics of the brain and eye, with specific interest in understanding microstructural features and properties that lead to better prevention, detection, and treatment strategies for injury. She graduated with a BS in Mechanical Engineering at the University of Utah and a PhD in Bioengineering at University of Pennsylvania. Her post-doctoral research forged collaborations with neurosurgeons and ophthalmologists at the University of Pennsylvania to investigate the effect of repetitive head trauma on brain and ocular injury. Her current research efforts are supported by grants from the Department of Defense, National Institutes of Health, National Science Foundation, and National Institute for Justice.

Faculty, students, and the general public are invited.