



## **Dr. Stephanie Iring-Sanchez**

Post Doctoral Fellow  
Department of  
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New Jersey Institute of  
Technology

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Sep 9 (Friday)  
11:30am - 1:00pm  
**CKB 217**

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### **“SIDELINE ASSESSMENT OF SYMPTOMS AND CEREBRAL BLOOD FLOW ALTERATIONS IN MEN AND WOMEN RUGBY PLAYERS IMMEDIATELY FOLLOWING A HEAD INJURY”**

#### *Abstract:*

There are up to 3.8 million sports-related concussions in the U.S. each year, which makes it a significant public health issue. Symptoms of concussions are reported to resolve within two weeks, however, increasing evidence shows long-term neurophysiologic abnormalities. There are limitations to current self-reporting assessments and neuroimaging techniques, including the underreporting of symptoms; the unreliability of diagnostic methods; and excessive time lapse for evaluation following an injury. Given the prevalence of sports-related concussions, the development of an on-field assessment protocol is needed to indicate the severity of a concussion for follow-up treatment and to predict which players can return to play. This study looks at the immediate effects of a head injury by evaluating physiological and symptomatic responses. Physiological changes were measured using non-invasive techniques such as transcranial Doppler to record middle cerebral artery blood flow velocity; duplex ultrasound to measure internal carotid artery blood flow; finger plethysmography to measure blood pressure; ECG to monitor heart rate; and capnography to measure end-tidal CO<sub>2</sub> from participating rugby players with a mobile laboratory tent on the field. To assess symptomatic and cognitive changes, the Sport Concussion Assessment Tool 3 (SCAT3) evaluated men and women immediately after the rugby game. An evaluation of cerebral blood flow immediately following injury (95±139 minutes) determined there are significant changes dependent on both body position and sex. Males demonstrated cerebral hypoperfusion in the supine position. In contrast, females were hyperperfused when seated. In addition, males were slightly hypertensive compared to non-injured players, while females did not show any blood pressure changes. This work demonstrates that examination of sex differences and posture are critical in evaluating the extent of sports-incurred head injuries on the field.

#### **About the Speaker**

B.S. 2013 Rutgers, the State University of New Jersey, M.S. 2016 New Jersey Institute of Technology Newark, New Jersey, and PhD 2022 Rutgers Biomedical and Health Sciences. I am a trained biomedical engineer and human integrative physiologist with a focus on advancing cerebral blood flow physiology and sex differences in control of the cerebral circulation. The focus of my doctoral research was to advance the understanding of sex differences in cerebral blood flow control mechanisms following a sports-related head injury. As a post-doctoral fellow, I intend to continue to investigate sex differences and postural control in cerebral blood flow regulation in patients with convergence insufficiency post-concussion.