Video Article

JoVE Monthly Highlights: September 2017

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Abstract

From a body of great articles this month, our first article, in JoVE Neuroscience, takes a peep at your peepers. Here, our Authors describe a method to perform spectral domain optical coherence tomography on mouse retinas, to study optic neuropathies. This technique concentrates on retinal ganglion cells in the peripapillary region, and provides a fast and accurate assessment of retinal thickness - allowing for changes, and possible signs of ophthalmic diseases, to be tracked. That's blinking marvelous!

Zooming out from the eyes, JoVE Engineering switches focus to protecting the head. Using an anthropometric test device and high-speed cameras, our Authors simulate helmeted cranial impacts at speeds up to 8.3 m/s. When compared to established human tolerance curves, the data can be used to estimate the risk of diffuse brain and osteoligamentous neck injuries. In turn, this can help determine which helmets provide the best protection - and safety never goes out of style.

Moving from head to toe our next study, from JoVE Behavior, describes a method to synchronously capture lower-limb joint movements and ground reaction force while wearing high-heels. Using three-dimensional motion analysis and a configured force platform, our Authors observe noticeable differences in the biomechanical adaptations adopted by Experienced versus Inexperienced Wearers. This suggests that further studies evaluating gait and footwear biomechanics should take individual experience into account.

Finally, from footwear to the ground beneath, JoVE Environment takes a look at soil erosion. Here, our Authors describe a simple method to map patterns of soil erosion and deposition in agricultural land. The authors use a ground-based differential GPS to accurately measure elevation and then collect soil from prescribed depth intervals. The researchers found significant correlations between change in elevation and soil surface carbonate, illustrating the indirect relationship between crop management techniques and changes in land sustainability.

You've just had a sneak peek of the September 2017 issue of JoVE. Visit the website to see the full-length articles, plus many more, in JoVE: The World's Premier Video Journal.

Video Link

The video component of this article can be found at https://www.jove.com/video/5862/

Protocol

Optical Coherence Tomography: Imaging Mouse Retinal Ganglion Cells *In Vivo*

Jolanta Jagodzinska*[1], Emmanuelle Sarzi*[1], Mélanie Cavalier[1], Marie Seveno[1], Volker Baecker[2], Christian Hamel[1,3,4], Marie Péquignot[1], Cecile Delettre[1]

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This manuscript describes a protocol for the *in vivo* imaging of the mouse retina with high-resolution spectral domain optical coherence tomography (SD-OCT). It focuses on retinal ganglion cells (RGC) in the peripapillary region, with several scanning and quantifying approaches described.

A Test Bed to Examine Helmet Fit and Retention and Biomechanical Measures of Head and Neck Injury in Simulated Impact

Henry Y. Yu, Brooklynn M. Knowles, Christopher R. Dennison

Department of Mechanical Engineering, **University of Alberta**

Using an anthropometric head and neck, optical fiber-based fit force transducers, an array of head acceleration and neck force/moment transducers, and a dual high speed camera system, we present a test bed to study helmet retention and effects on biomechanical measures of head and neck injury secondary to head impact.

Measuring and Mapping Patterns of Soil Erosion and Deposition Related to Soil Carbonate Concentrations Under Agricultural Management

Robert H. Erskine, Lucretia A. Sherrod, Timothy R. Green

Water Management and System Research Unit, Center for Agricultural Resources Research, **USDA Agricultural Research Service (ARS)**

Spatial patterns of soil erosion and deposition can be inferred from differences in ground elevation mapped at appropriate time increments. Such changes in elevation are related to changes in near-surface soil carbonates. Repeatable methods for field and laboratory measurements of these quantities and data analysis methods are described here.

Using Gold-standard Gait Analysis Methods to Assess Experience Effects on Lower-limb Mechanics During Moderate High-heeled Jogging and Running

Yan Zhang[1,2,3], Meizi Wang[1], Jan Awrejcewicz[3], Gusztáv Fekete[4], Feng Ren[1], Yaodong Gu[1,2]

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This study investigated lower-limb kinematics and ground reaction force (GRF) during moderate high-heeled jogging and running. Subjects were divided into groups of experienced wearers and inexperienced wearers. A three-dimensional motion analysis system with a configured force platform captured lower-limb joint movements and GRF.

Disclosures

No conflicts of interest declared.

