Video Article

May 2016 - This Month in JoVE: Cheetah footprints, lens stiffness, and digitally printed solar cells

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Abstract

Here's a look at what's coming up in the May 2016 issue of JoVE: The Journal of Visualized Experiments.

In JoVE Environment, we examine the cheetah-one of Africa's most iconic animals, but also an endangered species. Monitoring the cheetah population is challenging to conservation efforts, especially since current tagging techniques can be invasive, expensive, and unreliable. Jewell et al. present a new approach that uses image classification of footprints to identify individual cheetahs. The footprint identification algorithms can distinguish cheetahs from other species (due to unique species-specific anatomy) and predict individual cheetah identity with high accuracy. This is the first robust footprint identification technique described for cheetahs and is applicable at any site where footprints are found.

In JoVE Medicine, the lens of the eye owes much of its focusing power on its ability to change shape so it can form clear images on the retina. In humans, age-related stiffening of the lens leads to a reduced ability to accommodate or focus on close objects. Like human lenses, mouse lenses become stiffer with age, so Cheng et al. use them as a model for understanding lens pathologies. They present a protocol for determining mouse lens stiffness, applying sequentially increasing compressive loads onto the lens. This method is precise, simple, and reproducible, and can be scaled up to mechanically test lenses from larger animals.

In JoVE Behavior, we feature an experimental analysis of children's capacity to tell lies. In police and forensic interviews, kids have been known to purposely omit information, and even make false denials or accusations. In this study, Wyman et al. have children witness a staged theft, and then ask them to either falsely deny the theft, falsely accuse someone else of the theft, or tell the truth. They measure various aspects of both true and false accounts, and examine the social and developmental factors that influence a child's testimony. These methods can help improve the understanding of testimonies from children.

In JoVE Engineering, scientists are developing alternatives for conventional silicon solar cells, because their production is expensive and consumes a lot of energy. This month, Cherrington et al. present methods for the large-scale production of dye-sensitized solar cells (DSSCs) using inkjet printing. DSSCs have a fundamentally different working principle than silicon solar cells, and their production is less damaging to the environment. With continued development, this inkjet-printing process may be a low-cost, environmentally friendly alternative to conventional solar cells.

You've just had a sneak peek of the May 2016 issue of JoVE. Visit the website to see the full-length articles, plus many more, in JoVE: The Journal of Visualized Experiments.

Video Link

The video component of this article can be found at https://www.jove.com/video/5779/

Protocol

Spotting Cheetahs: Identifying Individuals by Their Footprints

Zoe C. Jewell[1,2], Sky K. Alibhai[1,2], Florian Weise[3,4], Stuart Munro[3], Marlice Van Vuuren[5], Rudie Van Vuuren[5]

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The cheetah (*Acinonyx jubatus)* is an iconic, endangered species, but conservation efforts are challenged by habitat shrinkage and conflict with commercial farmers. The footprint identification technique, a robust, accurate and cost-effective image classification system, is a new approach to monitoring cheetahs.

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An Experimental Analysis of Children's Ability to Provide a False Report about a Crime

Joshua Wyman, Ida Foster, Victoria Talwar

Department of Educational and Counselling Psychology, **McGill University**

The current methodology is designed to provide an ecologically relevant approach for measuring the veracity, length and quality of children's true and false testimonies. Implications of the current methodology for future research and professionals who interview children will also be discussed.

Sequential Application of Glass Coverslips to Assess the Compressive Stiffness of the Mouse Lens: Strain and Morphometric Analyses

Catherine Cheng, David S. Gokhin, Roberta B. Nowak, Velia M. Fowler

Department of Cell and Molecular Biology, **The Scripps Research Institute**

Age-related increases in eye lens stiffness are linked to presbyopia. This protocol describes a simple, cost-effective method for measuring mouse lens stiffness. Mouse lenses, like human lenses, become stiffer with age. This method is precise and can be adapted for lenses from larger animals.

Digital Printing of Titanium Dioxide for Dye Sensitized Solar Cells

Ruth Cherrington, Benjamin Michael Wood, Iulia Salaoru, Vannessa Goodship

Warwick Manufacturing Group, **University of Warwick**

This paper investigates the suitability of inkjet printing for the manufacturing of dye-sensitized solar cells. A binder-free TiO_2 nanoparticle ink was formulated and printed onto a FTO glass substrate. The printed layer was fabricated into a cell with an active area of 0.25 cm^2 and an efficiency of 3.5%.

Disclosures

No conflicts of interest declared.

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