

**Video Article**

**March 2013: This Month in JoVE**

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**Abstract**

Here are some highlights from the March 2013 issue of Journal of Visualized Experiments (JoVE).

This month, JoVE features several video articles in the Clinical and Translational Medicine section. In the ophthalmology department, Connors et al. of Massachusetts Eye & Ear and Harvard Medical School have developed an audio-based virtual environment simulator to help blind people improve their navigation skills. The simulator allows users to build cognitive maps of three-dimensional spaces in the context of a video game- using only audio cues. The users were not aware that the virtual building in the game represents an actual building; furthermore, the users were never asked to recall the building layout while playing. Nonetheless it appears that the game can help them navigate through unfamiliar spaces.

At Massachusetts General Hospital and Harvard Medical School, Lin et al. are developing an improved method to noninvasively measure brain metabolism and blood flow in newborns. This method combines measurements of hemoglobin oxygen saturation (SO<sub>2</sub>) with cerebral blood flow index (CBF<sub>i</sub>), which provides accurate measurements of cerebral metabolism and hemodynamics. This method also complies with neonatal ICU policies, making it potentially useful for assessing brain health, development, and response to therapy in newborns.

Also in this section, Lee et al. of UC San Francisco/VA Medical Center demonstrate how a biopolymer gel, derived from polysaccharides found in brown algae, can help patients with heart failure. The alginate-based biopolymer is injected into the area between the base and apex of the left ventricle free wall. This reduces left ventricle size and thickens its free wall; it also reduces left ventricular wall stress, as assessed by mathematical modeling. This therapy, called Algisyl-LVR, is currently in clinical development for treating patients with dilated cardiomyopathy.

In JoVE Immunology and Infection, Robinson et al. of University of Texas Health Science Center-Houston demonstrate a noninvasive technique for imaging lymphatic vessels, which are involved in many physiological and disease processes. A near-infrared fluorescent dye, such as indocyanine green (ICG), is injected intradermally-allowing the lymphatic vasculature to be visualized using a near-infrared fluorescence imaging system.

The JoVE Applied Physics section features a method in the field of fluid mechanics, developed at Brigham Young University in collaboration with the Naval Undersea Warfare Center of Newport, Rhode Island. Truscott et al. describe a novel technique for quantitative three-dimensional imaging of fluid flow fields, such as the airflow passing over a set of synthetic vocal folds, or bubbly flow fields. This method can help resolve a range of problems in the area of fluid mechanics.

This summary provides a preview of the cutting-edge video publications appearing this month in JoVE. Visit the website and check out 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 <http://www.jove.com/video/5066/>

**Protocol**

**Non-invasive Optical Imaging of the Lymphatic Vasculature of a Mouse**

**Holly A. Robinson, SunKuk Kwon, Mary A. Hall, John C. Rasmussen, Melissa B. Aldrich, Eva M. Sevick-Muraca**

Center for Molecular Imaging (CMI), University of Texas Health Science Center-Houston

Recently developed imaging techniques using near-infrared fluorescence (NIRF) may help elucidate the role the lymphatic system plays in cancer metastasis, immune response, wound repair, and other lymphatic-associated diseases.

## Non-invasive Optical Measurement of Cerebral Metabolism and Hemodynamics in Infants

Pei-Yi Lin<sup>1</sup>, Nadege Roche-Labarbe<sup>1, 2</sup>, Mathieu Dehaes<sup>3</sup>, Stefan Carp<sup>1</sup>, Angela Fenoglio<sup>3</sup>, Beniamino Barbieri<sup>4</sup>, Katherine Hagan<sup>1</sup>, P. Ellen Grant<sup>3</sup>, Maria Angela Franceschini<sup>1</sup>

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We combined frequency-domain near-infrared spectroscopy measures of cerebral hemoglobin oxygenation with diffuse correlation spectroscopy measures of cerebral blood flow index to estimate an index of oxygen metabolism. We tested the utility of this measure as a bedside screening tool to evaluate the health and development of the newborn brain.

## Reduction In Left Ventricular Wall Stress And Improvement In Function In Failing Hearts Using Algisyl-LVR

Lik Chuan Lee<sup>1</sup>, Zhang Zhihong<sup>1</sup>, Andrew Hinson<sup>2</sup>, Julius M. Guccione<sup>1</sup>

<sup>1</sup>Department of Surgery, UCSF/VA Medical Center, <sup>2</sup>Clinical & Regulatory, LoneStar Heart, Inc.

This article describes procedures for implanting a novel hydrogel in failing hearts and quantifying its effect on left ventricular wall stress and function. These procedures have been successfully applied in dogs and humans.

## Development Of An Audio-based Virtual Gaming Environment To Assist With Navigation Skills In The Blind

Erin C. Connors<sup>1</sup>, Lindsay A. Yazzolino<sup>1</sup>, Jaime Sánchez<sup>2</sup>, Lotfi B. Merabet<sup>1</sup>

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## Determining 3D Flow Fields Via Multi-camera Light Field Imaging

Tadd T. Truscott<sup>1</sup>, Jesse Belden<sup>2</sup>, Joseph R. Nielson<sup>1</sup>, David J. Daily<sup>1</sup>, Scott L. Thomson<sup>1</sup>

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A technique for performing quantitative three-dimensional (3D) imaging for a range of fluid flows is presented. Using concepts from the area of Light Field Imaging, we reconstruct 3D volumes from arrays of images. Our 3D results span a broad range including velocity fields and multi-phase bubble size distributions.

## Disclosures

No conflicts of interest declared.