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Probing the Mystery of the Venus Fly Trap's Botanical Bite

San Diego, Calif., Nov. 16 – Plants lack muscles, yet in only a tenth of a second, the meat-eating Venus fly trap hydrodynamically snaps its leaves shut to trap an insect meal. This astonishingly rapid display of botanical movement has long fascinated biologists. Commercially, understanding the mechanism of the Venus fly trap's leaf snapping may one day help improve products such as release-on-command coatings and adhesives, electronic circuits, optical lenses, and drug delivery.

Now a team of French physicists from the National Center for Scientific Research (CNRS) and Aix-Marseille University in Marseille, France, is working to understand this movement. They will present their findings at the meeting of the American Physical Society's (APS) Division of Fluid Dynamics (DFD), held Nov. 18 – 20, 2012, in San Diego, Calif.

The work extends findings by Dr. Yoël Forterre and researchers from Harvard University who discovered several years ago that the curvature of the Venus fly-trap's leaf changes while closing due to a snap-buckling instability in the leaf structure related to the shell-like geometry of the leaves. Mathieu Colombani, Ph.D. student in Forterre's laboratory is now conducting experiments to elucidate the physical mechanisms behind this movement. "The extremely high pressure inside the Venus fly trap cells prompted us to suspect that changes with a cell's pressure regime could be a key component driving this rapid leaf movement," he notes.

The Colombai team uses a microfluidic pressure probe to target and measure individual cells. This is a tricky experiment because it requires the living plant to be immobilized with dental silicone paste while the probe is inserted using a micromanipulator guided by binoculars. They take pressure measurements before and after leaf closure. They also measure cell wall elasticity by injecting or removing a known amount of liquid and recording the cellular responses, as well as take other measurements. "By measuring osmotic pressure and elasticity of leaf cells we hope to come closer to explaining the snapping mechanism," Colombani explains.

Presentation: "How the Venus flytrap actively snaps: hydrodynamic measurements at the cellular level," is at 4:45 p.m. on Sunday, Nov. 18, in Room 28C.
Abstract: http://meeting.aps.org/Meeting/DFD12/Event/177924

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MORE MEETING INFORMATION
The 65th Annual Meeting of the American Physical Society (APS) Division of Fluid Dynamics will take place from November 18-20, 2012, in San Diego, Calif. It will bring together researchers from across the globe to address some of the most important questions in modern astronomy, engineering, alternative energy, biology, and medicine. All meeting information, including directions to the Convention Center, is at: http://apsdfd2012.ucsd.edu/

USEFUL LINKS
Main Meeting Web Site: http://apsdfd2012.ucsd.edu/
Searchable Abstracts: http://meeting.aps.org/Meeting/DFD12/APS_epitome
Directions and Maps: http://apsdfd2012.ucsd.edu/?page=Venue_and_Maps

PRESS REGISTRATION
Credentialed full-time journalists and professional freelance journalists working on assignment for major publications or media outlets are invited to attend the conference free of charge. If you are a reporter and would like to attend, please contact Charles Blue (dfdmedia@aps.org, 301-209-3091).

SUPPORT DESK FOR REPORTERS
A media-support desk will be available. Press announcements and other news will be available in the Virtual Press Room (see below).

VIRTUAL PRESS ROOM
The APS Division of Fluid Dynamics Virtual Press Room will be launched in mid-November and will feature news releases, graphics, videos, and other information to aid in covering the meeting on site and remotely. See: http://www.aps.org/units/dfd/pressroom/index.cfm

GALLERY OF FLUID MOTION
Every year, the APS Division of Fluid Dynamics hosts posters and videos that show evocative images and graphics from either computational or experimental studies of flow phenomena. The outstanding entries are selected for their artistic content, originality, and ability to convey information. They will be honored during the meeting, placed on display at the 2013 APS March Meeting, and appear in the annual Gallery of Fluid Motion article in the American Institute of Physics' journal, Physics of Fluids.

Selected entries from the Gallery of Fluid Motion will be hosted as part of the Fluid Dynamics Virtual Press Room. In mid-November, when the Virtual Press Room is launched, another announcement will be sent out.

This release was prepared by the American Institute of Physics (AIP) on behalf of the American Physical Society's (APS) Division of Fluid Dynamics (DFD).

ABOUT THE APS DIVISION OF FLUID DYNAMICS
The Division of Fluid Dynamics of the American Physical Society (APS) exists for the advancement and diffusion of knowledge of the physics of fluids with special emphasis on the dynamical theories of the liquid, plastic and gaseous states of matter under all conditions of temperature and pressure. See: http://www.aps.org/units/dfd/