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Flying Snakes, Caught on Tape

Virginia Tech Researchers Analyze Secrets of Gliding Reptiles
Presentation at Fluid Dynamics Meeting Today in Long Beach, CA

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EMBARGOED for release until 8:00 p.m. Eastern time (U.S.) on Monday, Nov. 22, 2010

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WASHINGTON, D.C., November 22, 2010 -- Five related species of tree-dwelling snakes found in Southeast and South Asia may just be the worst nightmares of ophidiophobes (people who have abnormal fears of snakes). Not only are they snakes, but they can "fly" -- flinging themselves off their perches, flattening their bodies, and gliding from tree to tree or to the ground.

To Virginia Tech biologist Jake Socha, these curious reptiles are something of a biomechanical wonder. In order to understand how they do what they do, Socha and his colleagues recently studied *Chrysopelea paradisi* snakes as they launched themselves off a branch at the top of a 15-meter-tall tower.

Four cameras recorded the curious snakes as they glided. This allowed them to create and analyze 3-D reconstructions of the animals' body positions during flight -- work that Socha is presenting today at the American Physical Society Division of Fluid Dynamics (DFD) meeting in Long Beach, CA.

The reconstructions were coupled with an analytical model of gliding dynamics and the forces acting on the snakes' bodies. The analyses revealed that the reptiles, despite traveling up to 24 meters from the launch platform, never achieved an "equilibrium gliding" state -- one in which the forces generated by their undulating bodies exactly counteract the force pulling the animals down, causing them to move with constant velocity, at a constant angle from the horizon. Nor did the snakes simply drop to the ground.

Instead, Socha says, “the snake is pushed upward -- even though it is moving downward -- because the upward component of the aerodynamic force is greater than the snake’s weight.”

“Hypothetically, this means that if the snake continued on like this, it would eventually be moving upward in the air -- quite an impressive feat for a snake,” he says. But our modeling suggests that the effect is only temporary, and eventually “the snake hits the ground to end the glide.”

The presentation, "Gliding flight in snakes: non-equilibrium trajectory dynamics and kinematics" is at 5:06 p.m. on Monday, November 22, 2010 in the Long Beach Convention Center Room: Grand Ballroom B. This research is being published in the journal Bioinspiration and Biomimetics. See: http://iopscience.iop.org/1748-3190/

ABSTRACT: http://meetings.aps.org/Meeting/DFD10/Event/133681

Videos of the gliding snakes are available on Jake Socha's laboratory Web site: http://www.esm.vt.edu/~jjsocha

NOTE: Images are available for use by reporters.

CAPTION The flying snake *Chrysopelea paradisi*.

CREDIT: Copyright Jake Socha.

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MORE MEETING INFORMATION

The 63rd Annual DFD Meeting is hosted this year by the University of Southern California, California State University Long Beach, California Institute of Technology, and the University of California, Los Angeles.

It will be held at the Long Beach Convention Center, located in downtown Long Beach, California. All meeting information, including directions to the Convention Center is at: http://www.dfd2010.caltech.edu/

USEFUL LINKS

Main meeting Web site: http://www.dfd2010.caltech.edu/
Search Abstracts: http://meetings.aps.org/Meeting/DFD10/SearchAbstract
Directions to Convention Center: http://www.longbeachcc.com/

PRESS REGISTRATION

Credentialed full-time journalist 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 Jason Bardi (jbardi@aip.org, 301-209-3091).

ONSITE WORKSPACE FOR REPORTERS
A reserved workspace with wireless internet connections will be available for use by reporters in the Promenade Ballroom of the Long Beach Convention Center on Sunday, Nov. 21 and Monday, Nov. 22 from 8:00 a.m. to 5:00 p.m. and on Tuesday, Nov. 23 from 8:00 a.m. to noon. 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 contain dozens of story tips on some of the most interesting results at the meeting as well as stunning graphics and videos. The Virtual Press Room will serve as starting points for journalists who are interested in covering the meeting but cannot attend in person. 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 stunning images and graphics from either computational or experimental studies of flow phenomena. The outstanding entries, selected by a panel of referees for artistic content, originality and ability to convey information, will be honored during the meeting, placed on display at the Annual APS Meeting in March of 2011, and will appear in the annual Gallery of Fluid Motion article in the September 2011 issue of the American Institute of Physics' journal, Physics of Fluids.

This year, selected entries from the 28th Annual 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.

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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/

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