



**THE PHYSICS OF FLUIDS, SPORTS, MAGNETIC MEDICINE,
ELEPHANT EARS, ICICLES, AND WILDFIRES**
Brief Highlights of the Fluid Dynamics Conference
Minneapolis, Nov. 22-24, 2009

FOR IMMEDIATE RELEASE

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October 28, 2009 -- Many of nature's most fascinating phenomena involve forms of fluid flow -- the motions of liquids and gases -- from the flight of golf and tennis balls to the slip of a red blood cell, the flap of an elephant ear, the line of a wildfire, the spin of a storm, or the formation of a crater on the Moon.

The 62nd Annual Meeting of the American Physical Society's (APS) Division of Fluid Dynamics takes place from November 22-24 at the Minneapolis Convention Center. This is the largest scientific meeting of the year devoted to the dynamics of fluid flows, and it brings together researchers from around the globe to present work with applications in engineering, energy, physics, astronomy, medicine, and mathematics.

Reporters are invited to attend the conference free of charge. The Division of Fluid Dynamics is also creating a Virtual Press Room that will serve as starting points for journalists who cannot attend in person. Registration instructions and other information may be found at the end of this news release.

BRIEF HIGHLIGHTS OF SCIENTIFIC PROGRAM

The following is a brief sampling of some of the 1,611 abstracts to be presented at the meeting.

- 1) The Physics of Sports
- 2) Harvesting Energy from Turbulence
- 3) Why do Elephants Flap their Ears?
- 4) The Growth and Melting of Icicles
- 5) The Physics of Wildfires
- 6) Aerodynamics of Reed Instruments
- 7) Magnetic Drugs
- 8) A New, Grooved Golf Ball
- 9) Dwarf Seahorse Attack
- 10) Tunable Adhesives
- 11) A Computational Estuary
- 12) Red Blood Cells Slip and Slide
- 13) Sorting with Bubbles
- 14) Crater Formation

1) THE PHYSICS OF SPORTS

Aerodynamics plays a prominent role in any sport where a ball spends time in flight or a person moves through a fluid, and the field of fluid dynamics may shed new light on any such sport. In a special session on Sunday, November 22, five invited speakers will discuss everything from potential new golf ball designs to strategies professional swimmers adopt to improve their stroke.

These include:

- Numerical modeling and experimental measurements of golf ball aerodynamics
- The fluid dynamics of competitive swimming
- Baseball aerodynamics
- Cricket and tennis ball aerodynamics

All physics of sports session abstracts can be viewed at:

<http://meetings.aps.org/Meeting/DFD09/SessionIndex3/?SessionEventID=113267>

2) HARVESTING ENERGY FROM TURBULENCE

The availability of significant kinetic energy in fluid flows distributed over a number of temporal and spatial scales creates a unique opportunity to convert this energy into electrical output by using piezoelectric generators.

<http://meetings.aps.org/Meeting/DFD09/Event/111223>

3) WHY DO ELEPHANTS FLAP THEIR EARS?

"Noting that the elephant ears have high surface area to volume ratio and an extensive vascular network, ear flapping is thought to be the principal thermoregulatory mechanism"

<http://meetings.aps.org/Meeting/DFD09/Event/110596>

4) THE GROWTH AND MELTING OF ICICLES

Researchers at the University of Cambridge are looking at the competing forces at work in icicle formation -- heat transfer, air currents, and gravity.

<http://meetings.aps.org/Meeting/DFD09/Event/110706>

5) THE PHYSICS OF WILDFIRES

"Wildfires have been a long-standing problem in today's society. In this paper, we derive and solve a fluid dynamics model to study a specific type of wildfire, namely, a two dimensional flow around a concentrated line of fire, resulting in a narrow plume of hot gas rising and entraining the surrounding air"

<http://meetings.aps.org/Meeting/DFD09/Event/110726>

6) AERODYNAMICS OF REED INSTRUMENTS

"We present an investigation of the mechanism by which air flow induces oscillation in free reeds, which produce sound in several musical instruments."

<http://meetings.aps.org/Meeting/DFD09/Event/111572>

7) MAGNETIC DRUGS

"Magnetic drug targeting is a promising cancer treatment technique in which magnetic drug particles are steered through the blood stream or held near a tumor site using external magnetic fields."

<http://meetings.aps.org/Meeting/DFD09/Event/112198>

8) A NEW, GROOVED, GOLF BALL

A team in Korea uses a wind tunnel to measure the lift and drag on a new golf ball with grooves instead of dimples on the surface.

<http://meetings.aps.org/Meeting/DFD09/Event/111481>

9) DWARF SEAHORSE ATTACK

Why do some dwarf seahorse feeding attacks succeed and others fail?

<http://meetings.aps.org/Meeting/DFD09/Event/110810>

10) TUNABLE ADHESIVES

"We demonstrate experimentally that field-responsive magnetorheological fluids can adhere to non-magnetic substrates. The tunable adhesive performance is measured experimentally"

<http://meetings.aps.org/Meeting/DFD09/Event/111580>

11) A COMPUTATIONAL ESTUARY

Researchers in California and Switzerland simulate the complicated flows, sedimentary processes, and fresh-saltwater mixing where a river flows into the ocean.

<http://meetings.aps.org/Meeting/DFD09/Event/111169>

12) RED BLOOD CELLS SLIP AND SLIDE

"Understanding why red blood cells (RBCs) move with an asymmetric shape (slipper-like shape) in small blood vessels is a longstanding puzzle of blood circulatory research. An increase of membrane rigidity is found to lead to a dramatic change of the slipper morphology, offering thus a potential diagnostic for cell pathologies."

<http://meetings.aps.org/Meeting/DFD09/Event/112213>

13) SORTING WITH BUBBLES

Researchers at the University of Illinois at Urbana-Champaign sort particles by size using oscillating microbubbles.

<http://meetings.aps.org/Meeting/DFD09/Event/110600>

14) CRATER FORMATION

"This project characterizes crater formation in a granular material by a jet of gas impinging on a granular material, such as a retro-rocket landing on the moon."

<http://meetings.aps.org/Meeting/DFD09/Event/112251>

MORE MEETING INFORMATION

The 62nd Annual DFD Meeting will be held at the Minneapolis Convention Center in downtown Minneapolis. All meeting information, including directions to the Convention Center is at:

<http://www.dfd2009.umn.edu/>

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@ajp.org, 301-209-3091).

USEFUL LINKS

Main meeting Web site: <http://meetings.aps.org/Meeting/DFD09/Content/1629>

Searchable form: <http://meetings.aps.org/Meeting/DFD09/SearchAbstract>

Local Conference Meeting Website: <http://www.dfd2009.umn.edu/>

PDF of Meeting Abstracts: http://flux.aps.org/meetings/YR09/DFD09/all_DFD09.pdf

Division of Fluid Dynamics page: <http://www.aps.org/units/dfd/>

Virtual Press Room: SEE BELOW

VIRTUAL PRESS ROOM

The APS Division of Fluid Dynamics Virtual Press Room will contain tips on dozens of stories as well as stunning graphics and lay-language papers detailing some of the most interesting results at the meeting. Lay-language papers are roughly 500 word summaries written for a general audience by the authors of individual presentations with accompanying graphics and multimedia files. 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>

Currently, the Division of Fluid Dynamics Virtual Press Room contains information related to the 2008 meeting. In mid-November, the Virtual Press Room will be updated for this year's meeting, and another news release will be sent out at that time.

ONSITE WORKSPACE FOR REPORTERS

A reserved workspace with wireless internet connections will be available for use by reporters. It will be located in the meeting exhibition hall (Ballroom AB) at the Minneapolis Convention Center on Sunday and Monday from 8:00 a.m. to 5:00 p.m. and on Tuesday from 8:00 a.m. to noon. Press announcements and other news will be available in the Virtual Press Room.

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 2010, and will appear in the annual Gallery of Fluid Motion article in the September 2010 issue of the journal *Physics of Fluids*.

This year, selected entries from the 27th 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.

ABOUT THE APS DIVISION OF FLUID DYNAMICS

The Division of Fluid Dynamics of the American Physical Society 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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