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Video Gallery

The Division of Fluid Dynamics 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.

Every year, the APS Division of Fluid Dynamics hosts a physical Gallery of Fluid Motion at its annual meeting—a room where stunning graphics and videos from computational or experimental studies showing flow phenomena are displayed. The most outstanding entries are selected by a panel of referees for artistic content and honored for their originality and ability to convey information. Past winners are published in the journal *Physics of Fluids*.

Viewing the Videos

The Division of Fluid Dynamics videos are in mpg format on the Cornell University Open Access Library (arXiv) website.

When you click a video link below, you will go to an arXiv page. On the right side of the page, under **Ancillary files**, click your preferred resolution and enjoy the video.

This year, in conjunction with the 63rd APS Division of Fluid Dynamics Annual Meeting, held from November 22-24, 2009 at the Minneapolis Convention Center, a subset of these images and videos are available on this page for viewing prior to the judging process.

▸ View Image Gallery

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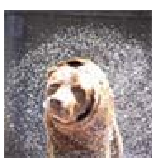
Reporters seeking permission to use these videos or to contact the authors should email Jason Bardi.

Wet-Dog Shake

Andrew Dickerson, Zachary Mills, Young-Hui Chang, David Hu - Georgia Tech



We determine conditions for drop ejection by considering the balance of surface tension and centripetal forces on drops adhering to the animal. Particular attention is paid to rationalizing the relationship between animal size and oscillation frequency required to self-dry.

▸ Wet-Dog Shake Video

The Tibetan Singing Bowl

Denis Terwagne - University of Liège, Belgium
John W.M. Bush - Massachusetts Institute of Technology

When the bowl is filled with water, this excitation can cause crispation of the water surface that can be followed by more complicated surface wave patterns and ultimately the creation of droplets. We here demonstrate the means by which the Tibetan singing bowl can levitate droplets.

▸ Tibetan Singing Bowl Video

Liquid Pearls

Bremond - Santanach-Carreras
Bibette - ESPCI ParisTech/LCMD

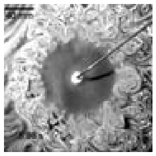
These fish-egg like structures are initially made of a millimetric liquid drop, aqueous or not, coated with an aqueous liquid film containing sodium alginate that gels once the double drop enters a calcium chloride bath. The creation of such pearls with micrometer thick membrane requires to suppress mixing until gelling takes place.

▸ Liquid Pearls Video

Surfactant-Assisted Spreading of an Oil-In-Water Emulsion on the Free Surface of a

Liquid Layer

Matthieu Roché, Zhenzhen Li and Ian M. Griffiths - Princeton University
Arnaud Saint-Jalmes - Institut de Physique de Rennes, France
Howard A. Stone - Princeton University

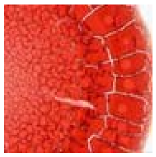


This fluid dynamics video shows how an oil-in-water emulsion stabilized by an ionic surfactant spreads on the free surface of a layer of pure water. The spreading shows two intriguing features: a transparent area surrounding the source of oil droplets, and a fast retraction of the layer of oil droplets on itself once the source has emptied.

▸ Oil-In-Water Emulsion Video

Patterns Formation in Drying Drops of Blood

D. Brutin, B. Sobac, B. Loquet - Université de Provence, France
J. Sampol - Université de la Méditerannée, France

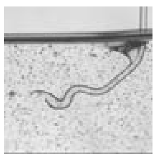


The drying of a drop of human blood exhibits coupled physical mechanisms, such as Marangoni flow, evaporation and wettability. The final stage of a whole blood drop evaporation reveals regular patterns with a good reproducibility for a healthy person.

▸ Drying Drops of Blood Video

To Be, or Not to Be… Instabilities on a Liquid Jet Penetrated into a Flowing Bath

Kaoru Hattori and Ichiro Ueno
Tokyo University of Science

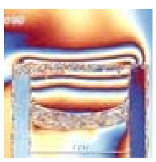


The impinged jet penetrates into the flowing bath accompanying with entrainment of the ambient immiscible gas, which results in the impinged jet wrapped by the entrained gas as a 'sheath.' This sheath formation enables the impinged jet to survive in the fluid in the channel without coalescing until the entrained-air sheath breaks down.

▸ Liquid Jet Video

Vapour Cloud Dynamics Induced by Evaporation

Sam Dehaeck and Pierre Colinet
Université Libre de Bruxelles



In this fluid dynamics video, the vapour cloud generated near evaporating free liquid surfaces is visualised by Mach-Zehnder interferometry (MZI). More precisely, for evaporating HFE-7100 (from 3M) and ambient conditions, the vapour concentration field and its dynamical behaviour are observed in three simple experiments.

▸ Vapour Cloud Dynamics Video

UFO: "Unidentified" Floating Object Driven by Thermocapillarity

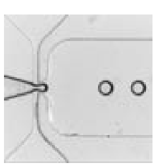
Yuejun Zhao and Chuan-Hua Chen - Duke University

In this fluid dynamics video, we show thermocapillary actuation of a binary drop of water and heptanol where the binary drop in motion takes on a UFO-like shape. On a parylene-coated silicon surface subjected to a linear temperature gradient, a pure heptanol droplet quickly moves to the cold side by the Marangoni stress, while a pure water droplet remains stuck due to a large contact angle hysteresis.

▸ "Unidentified" Floating Object Video

Acoustically-Bound Bubble Crystals

P. Marmottant, D. Rabaud and P. Thibault
CNRS and University of Grenoble



In these fluid dynamics videos, we show how bubbles flowing in a thin microchannel interact under an acoustic field. Because of acoustic interactions without direct contact, bubbles self-organize into periodic patterns, and spontaneously form acoustically bound crystals.

▸ Bubble Crystal Video

Feeding Currents Generated by Upside-Down Jellyfish

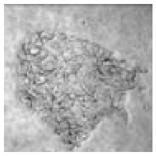
Megan Gyoerkoe, Terry Rodriguez and Laura Miller
University of North Carolina at Chapel Hill

The pulsing kinematics and fluid flow around these upside down jellyfish is investigated using a combination of videography, flow visualization, and numerical simulation. Significant mixing occurs around and directly above the oral arms and secondary mouths.

▸ Upside-Down Jellyfish Video

Locomotion of *C elegans* in Structured Environments: Experiments and Simulations

Trushant Majmudar, Eric Keaveny, Mike Shelley and Jun Zhang
Courant Institute, New York University

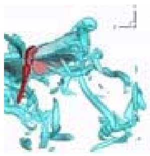


Undulatory locomotion of microorganisms like soil-dwelling worms and spermatozoa, in structured environments, is ubiquitous in nature. They navigate complex environments consisting of fluids and obstacles, negotiating hydrodynamic effects and geometrical constraints.

▸ Locomotion of *C elegans* Video

An Integrated Study of Vortex Formation of Freely Flying Insects

Hui Wan, Yan Ren, Zongxian Liang, Zach Gaston and Haibo Dong
Wright State University

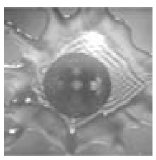


This is a short introduction illustrating vortex formation of freely flying insects.

▸ Freely Flying Insects Video

Wetting Splashing

Peichun Amy Tsai, Maurice H. W. Hendrix, Remko M. Dijkstra and Detlef Lohse
University of Twente

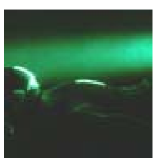


We show that microscopic boundary condition, imposed by the solid texture, profoundly influences the macroscopic flow dynamics upon super hydrophobic surfaces at high impinging velocity. In addition, the intervening air between the liquid and the solid plays a crucial role in directional splash, which can be eliminated by a reduced air pressure.

▸ Wetting Splashing Video

DPIV Measurements of Olympic Skeleton Athletes

Chia Min Leong, YaeEun Moon, Vicki Wu and Timothy Wei - Rensselaer Polytechnic Institute
Steve Peters - USA Bobsled & Skeleton Federation



In the fluid dynamics video shown, the athlete slowly raised his head while DPIV measurements were made behind the helmet in the separated flow region.

▸ Skeleton Athletes Video

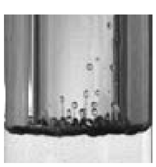
Freezing Splashes

Terwagne Denis, Caps Hervé, Vandewalle Nicolas, Dorbolo Stéphane and Delon Giles
University of Liège

We have studied the splashing dynamics of water drops impacting granular layers. Depending on the drop kinetic energy, various shapes are observed for the resulting craters.
▸ Freezing Splashes Video

Vertically Vibrated Gas-Liquid Interfaces: Surface Deformation and Breakup

T. J. O'Hern, E. F. Romero, C. F. Brooks, B. Shelden, J. R. Torczynski, A. M. Kraynik, L. A. Romero and G. L. Benavides
Sandia National Laboratories



Large-amplitude vibrations produce liquid jets into the gas, droplets pinching off from the jets, gas cavities in the liquid from droplet impact, and bubble transport below the interface, all of which can be seen in the videos.
▸ Gas-Liquid Interface Video

