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**Air Flows in Mechanical Device Reveal Secrets of Speech Pathology**

*Discovery by George Washington University Researchers May Improve Treatments*
*Presentation at Fluid Dynamics Meeting Today in Long Beach, CA*

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EMBARGOED for release until 11:00 a.m. Eastern time (U.S.) on Sunday, Nov. 21, 2010

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WASHINGTON, D.C., November 22, 2010 -- From a baby's first blurted "bowl!'" for the word "ball" to the whispered goodbye of a beloved elder, the capacity for complex vocalizations is one of humankind's most remarkable attributes -- and perhaps one we take for granted most of our lives.

Not so for people who are afflicted with paralysis to their vocal folds and who suffer the social stigma of affected speech. Nor so for engineering professor Michael Plesniak and post-doctoral researcher Byron Erath at the George Washington University (GWU) Biofluid Dynamics Laboratory In Washington, D.C., and their colleague professor Sean Peterson at the University of Waterloo. To them, the ability to vocalize is such a prized ability that they have built a mechanical model of human vocal folds.

Today at the American Physical Society Division of Fluid Dynamics (DFD) meeting in Long Beach, CA, the researchers are reporting their discovery of how asymmetrical airflow impacts normal and diseased vocal fold motion -- observations that may lead to new devices to help those who cannot take for granted their ability to vocalize.

“Potential application of this finding includes assisting otolaryngologists to optimize surgical procedures to correct vocal fold paralysis with an implant that changes the position of the damaged vocal fold," Plesniak says.

Vocal folds, commonly known as vocal cords, are the vibrating structures of the phonatory process that stretch across the larynx, and are driven by air expelled from the lungs. Variability in the physics of sound production from the vocal folds can mark the difference between communication that connects people and enriches their lives and speech so impaired it isolates and estranges.

In the GWU team's most recent investigation, they found that asymmetric flow develops when there is an adverse pressure gradient. Under these conditions, the glottal jet separates from one vocal fold and attaches to the opposing one, disrupting the pressure forces that drive vocal fold motion. This change can have devastating impacts on speech.

"In the past, many investigators have assumed air flow is symmetrical over the vocal folds," explains Erath. "We've discovered that this is not always the case."

While most people's vocal folds tolerate the asymmetry very well, the degree of asymmetry becomes especially important in speech pathologies where tissue stiffness is affected by diseases such as unilateral vocal fold paralysis. In these cases, the asymmetric flow interacts with the damaged vocal fold, causing chaotic irregular vibrations.

Data from the GWU team suggests that devising an implant material with tissue properties that mimic those of the voice apparatus is key to restoring the good vibrations that are the foundation of intelligible speech.

The presentation "The impact of asymmetric flows on pathological speech is at 8:13 a.m. on Sunday, November 21, 2010 in the Long Beach Convention Center Room: 202A.
ABSTRACT: http://meetings.aps.org/Meeting/DFD10/Event/132273

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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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