Australian Institute of Physics
NSW Branch (April Public Talk)

"The Acoustics of Musical Wind Instruments – and of Musicians"

Professor Joe Wolfe

University of New South Wales

Tuesday 28th April 2009 @ 7.00PM

At the

Slade Lecture Theatre, School of Physics, University of Sydney

Public talk arranged by: The Australian Institute of Physics (NSW Branch)

Entrance is FREE

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Summary of talk:

Wind instruments have a valve or control oscillator (reed, player's lips, air jet) coupled to two acoustic waveguides: the bore of the instrument (downstream) and the player's vocal tract (upstream). This talk introduces some of the interesting effects, including multiphonics or chords produced in woodwinds by superposition of standing waves, and the interactions between the resonances of the bore and the vocal tract. Our lab has developed techniques for measuring the acoustical properties of musical instruments, especially the acoustical impedance spectrum, (the ratio of acoustic pressure to acoustic flow, in nice analogy with electrical impedance). We have used this to provide databases for wind instruments that allow the development of physical models precise enough to make predictions and analyses useful to makers and players. We have also used it to measure the impedance spectrum of the vocal tract, while it is in use for speech, singing or playing [1]. In this talk we'll see how the player's vocal tract is involved in performance on wind instruments, including the didjeridu, where the tract has a spectacular influence on timbre, [2], and on some reed instruments, where it can have a strong influence on pitch [3].

1. Joliveau, E., Smith, J. and Wolfe, J. (2004) "Tuning of vocal tract resonances by sopranos", *Nature*, 427, 116.
2. Tarnopolsky, A, Fletcher, N. Hollenberg, L., Lange, B., Smith, J. and Wolfe, J. (2005) "The vocal tract and the sound of a didgeridoo", *Nature*, 436, 39.
3. Chen, J.M., Smith, J. and Wolfe, J. (2008) "Experienced saxophonists learn to tune their vocal tracts", *Science*, 319, 726.

Brief Biography of the Speaker:

Joe Wolfe is a Professor of Physics at the University of New South Wales in Sydney. He has won awards or medals from the acoustical societies of Australia, France and America. The work to be presented is the result of collaborations with UNSW colleague John Smith and a number of students and other collaborators. The group maintains a large web site, both for musicians and physicists, at www.phys.unsw.edu.au/music.

Joe is also a composer. His most notorious orchestral work is *The Stairway Suite*, a set of symphonic variations on *Stairway to Heaven*, each in the style of a different composer.

Detailed Schedule for Tuesday, 28th April 2009:

- ***5.30-6.30 pm*** **LECTURE by Dr Bruce Yabsley.**
- ***6:35-7.00 pm*** **REFRESHMENTS, Slade Lecture Theatre.**
- ***7.00-8.00 pm*** **LECTURE by Prof Joe Wolfe.**
- ***8.15 pm*** **DINNER with the Speakers at Buon Gusto (Italian), 368 Abercrombie Street, Chippendale.**
  E-mail Dr Fred Osman (fred_osman@exemail.com.au) if you will be able to join us for dinner.

Travel Directions:

- Train to Redfern station and walk to the **School of Physics**.
- Buses 422, 423, 426, 428, 448, and 450 from Circular Quay to City Road / King, or 412, 435, 438, 470, 483 etc. along Parramatta Road from Circular Quay.
- Drive and park in various parking lots. You will need to pay for parking **($6 flat-rate after 4 pm)** and display the ticket in your car. You may also find parking places on public roads outside the Uni.

Event sponsored by:

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