



The Vocal Tract Organ



Professor David M Howard

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Abstract:

The Vocal Tract Organ is an instrument that has been produced as part of work on natural voice synthesis that makes use of magnetic resonance images of the vocal tract. This has enabled the 3-D printing of vocal tracts for individual vowels, and the organ makes use of these as its 'pipes'. These 3-D printed tracts are placed on loudspeakers to enable static vowel sounds to be produced. The acoustic excitation from the loudspeakers is a synthesized version of the typical waveform produced by the vibrating human vocal folds during pitched sounds, the L/F model. The instrument can be played from a keyboard or controlled via human gesture interfaces such as joysticks and distance sensors. This talk will describe the basis of human singing production, how it relates to the elements of the vocal tract organ, and how it has been used musically to date.



A 3-D print of a vocal tract for an adult male "ah" vowel as used in the Vocal Tract Organ.

April 16, 2015 (Thursday)

17:00 – 18:30

Room 802, Meng Wah Complex, HKU

(Chair: Dr Estella Ma)

About the speaker:

Prof. David Howard is Head of the Department of Electronics at the University of York where he also leads research in the Audio Laboratory. His teaching is mainly to music technology students and his main research areas are the analysis and natural synthesis of singing, speech and music. Key research topics of interest at the moment are intonation in unaccompanied singing, computers and iPad Apps in voice training and natural voice synthesis. Prof. Howard sits on the IET (Institution of Engineering and Technology – our professional body) Policy Panel on Education and Skills and has a strong conviction about the place of creativity in engineering, as exemplified in the requirement for music playing skills for entry to York's fully accredited (CEng and IEng) Music Technology degree programmes. Previously, he has been a Trustee and Vice President of the IET.

Prof. Howard has spent time as an EPSRC Senior Media Fellow committed to popularising science and he presented for the BBC4-TV programs *Castrato* and *Voice*. He appears on *The Hidden Talent Show* on Channel 4 in Spring 2012 using science in the context of singing. He is occasionally asked to act as an expert witness in audio areas; his most notable being working on the coughs in the *Who wants to be a millionaire* case. Prof. Howard sings in choirs, plays the organ at St. Luke's in York, conducts his choir *Consonance* and recently published the book *Choral singing and healthy voice production* (<http://willowleafpublishing.com/>).

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For enquiries, please contact the Office of Research at 2857 8254.