

## 講演会『Active Control of Sound in Vehicles and in the Ear』のお知らせ

日時:平成27年2月26日(木)15時～17時

場所:関西大学千里山キャンパス第四学舎3号館2階3202教室

講師:Stephen J. Elliott, Professor, ISVR University of Southampton

講師紹介:2ページ参照

演題: Active Control of Sound in Vehicles and in the Ear

概要:3ページ参照

主催:関西大学先端科学技術推進機構

共催:日本騒音制御工学会アクティブコントロール分科会

IEEE Signal Processing Society Kansai Chapter

IEEE Student Branch at Kansai University

日本音響学会関西支部

電子情報通信学会信号処理研究会

電子情報通信学会応用音響研究会

日本音響学会騒音振動研究会

Audio Engineering Society 日本支部

講演会終了後に懇親会(参加費3000円を予定)を開催します。

参加希望の方は2月16日までに下記世話人までご連絡ください。

世話人:関西大学システム理工学部 梶川嘉延 kaji@kansai-u.ac.jp

## Steve Elliott

Steve Elliott graduated with first class joint honours BSc in physics and electronics from the University of London, in 1976, and received the PhD degree from the University of Surrey in 1979 for a dissertation on musical acoustics.

After a short period as a Research Fellow at the ISVR and as a temporary Lecturer at the University of Surrey, he was appointed Lecturer at the Institute of Sound and Vibration Research (ISVR), University of Southampton, in 1982. He was made Senior Lecturer in 1988, Professor in 1994, and served as Director of the ISVR from 2005 to 2010. His research interests have been mostly concerned with the connections between the physical world, signal processing and control, mainly in relation the active control of sound using adaptive filters and the active feedback control of vibration. This work has resulted in the practical demonstration of active control in propeller aircraft, cars and helicopters. His current research interests include modular systems for active feedback control and modelling the active processes within the cochlear.

Professor Elliott has published over 250 papers in refereed journals and 500 conference papers and is co-author of *Active Control of Sound* (with P A Nelson 1992), *Active Control of Vibration* (with C R Fuller and P A Nelson 1996) and author of *Signal Processing for Active Control* (2001). He is a Fellow of the Acoustical Society of America, the IET and the IOA and a senior member of the IEEE. He was jointly awarded the Tyndall Medal from the Institute of Acoustics in 1992 and the Kenneth Harris James Prize from the Institution of Mechanical Engineers in 2000.

He was made a Fellow of the Royal Academy of Engineering in 2009



# ACTIVE CONTROL OF SOUND IN VEHICLES AND IN THE EAR

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The low frequency sound and vibration inside aircraft and cars is now attenuated using commercial active control systems. These typically operate using many shakers acting on the structure to modify its vibration and hence reduce excitation of the sound field.

As the structure becomes larger, the number of actuators and sensors required for effective control rises significantly. Conventional, fully coupled, control systems then become costly in terms of weight and sensitivity to individual failures. An alternative strategy is to distributing the control over multiple local controllers, which has been shown to be effective in a number of cases. Recent work will be presented on tuning these local control loops to maximise the power they absorb from the structure, which may allow the mass production of generic active control modules that include an actuator, sensor and self-tuning controller.

The workings of the inner ear also provide a remarkable natural example of distributed active control, whose objective is to enhance the motion within the cochlea. A simple model for this cochlear amplifier, in which each of the outer hair cells act as a local control loop, will be described and its use illustrated in predicting the otoacoustic emissions generated by the ear. These emissions are used clinically to screen the hearing of young children and so it is important to understand how they are generated within the cochlea.