

2011 Anglo-French Physical Acoustics Conference Report

By Paul Wilcox

The 10th Anglo-French Physical Acoustics Conference (AFPAC) was held at Fréjus near Nice, France on 19-21 January 2011. Over 55 delegates attended the meeting from over ten different institutions in three different countries. 41 papers were presented.

Four invited speakers gave extended talks. These included applications of acoustics on length scales ranging from kilometres, in Robert Laws' talk on modern marine seismic surveying, to micrometres in Martyn Hill's talk on ultrasonic particle manipulation. Other invited contributions included an analysis of deconvolution methods in ultrasonic signal processing by Jérôme Idier and a stimulating review of acoustics research in Europe over the last decade.

Medical applications of acoustics featured strongly in the conference with many papers on imaging and biological material characterisation. A growing research area with biomedical applications is the manipulation of microscopic particles and bubbles using ultrasonic waves and this was the subject of several contributions alongside Martyn Hill's invited paper. The exploitation of the interaction between acoustic and other wave types – so-called multi-wave phenomena – was the subject of nine of the papers given at AFPAC 2011. The multi-wave topics covered included nonlinear acoustic wave mixing for material characterisation as well as photo-acoustic and electro-acoustic phenomena. In addition to probing new physical properties, multi-wave techniques potentially enable acoustic measurements at frequencies in the tens of gigahertz on nanometre length scales. There were several papers on acoustic meta-materials with negative refractive indices. This physical phenomenon offers the potential for interesting devices such as “perfect” acoustic lenses made from a thin-layer of meta-material. Whether acoustic meta-materials will find practical applications remains to be seen; however their counter-intuitive properties clearly offer some fascinating avenues of research. The field of linear acoustics and elastodynamics remains strong with many new contributions on diffraction theory and numerical techniques for modelling scattering. The areas of Non-Destructive Evaluation (NDE) and Structural Health Monitoring (SHM) continue to be major drivers in this area especially due to the expected build of new nuclear power stations in the UK over the coming years.

The relatively small size of the AFPAC meeting, combined with the fact that meals and accommodation were all provided on-site, engendered a highly friendly and collegiate atmosphere. Technical discussions continued alongside table-football and pool matches most evenings. On behalf of all delegates, I would like to thank the organisers, and in particular Alain Lhémy, for providing such an enjoyable meeting and take the opportunity to encourage participation at the 11th AFPAC tentatively scheduled for 18-20 January 2012 in the famous English seaside town of Brighton.