<< INVITATION >>

The Department of Mechanical and Aeronautical Engineering at the University of Pretoria cordially invites you to attend a presentation by

PROF. GEOFFREY SPEDDING

University of Pretoria,
formerly from the
University of Southern California

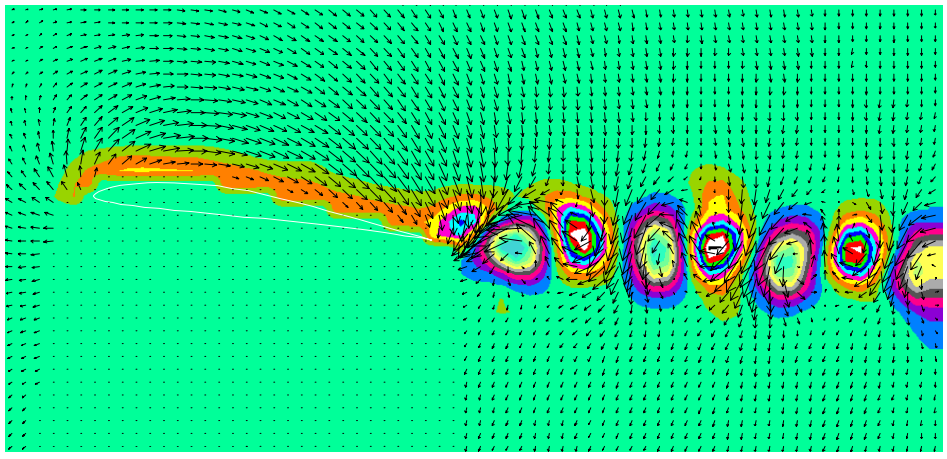
The flight of birds, bats and other small-scale flying machines

"What can the one tell us about the other?"

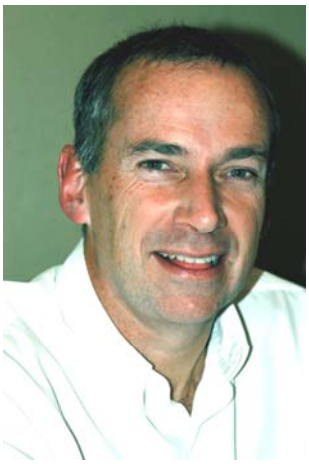
Date: Wednesday 6 August 2008

Time: 16:30 – 17:30

Venue: Lecture theatre 3-40, Engineering 2 building, University of Pretoria, corner of University Road and Lynnwood Road, Hatfield



Prof. Geoffrey Spedding



Geoffrey Spedding is a Professor of Mechanical Engineering at the UP's Department of Mechanical and Aeronautical Engineering, where he currently teaches Aeronautics. Prior to his appointment at the University of Pretoria, he was a Professor in the Department of Aerospace and Mechanical Engineering at the University of Southern California, and a Faculty Fellow at the Center for Excellence in Teaching at that same university. Professor Spedding is also a Visiting Research Fellow in the Department of Animal Ecology at Lund University, Sweden. Professor Spedding obtained his undergraduate and graduate qualifications (PhD) from the University of Bristol, England.

Professor Spedding's PhD work became the first-ever quantitative study of the vortex wakes of flying birds. He did this by training birds to fly through a cloud of neutrally-buoyant, helium-filled soap bubbles. As part of his experimental set-up, he designed and built a stereoscopic, multiple-flash camera system. He also wrote software that converted the sampled experimental data to three-dimensional velocity maps. His consequential findings are considered a major landmark in the study of bird flight. At the time, the goal of the work was simply to understand the unsteady lift developed by birds, as an end in itself.

At the University of Southern California, Professor Spedding developed a variant of the digital particle image velocimetry (DPIV) system for studying unsteady wakes, including those of birds in flapping flight. The substance of the new method is the accurate identification of the cross-correlation peak between velocity images pairs. Professor Spedding's contributions are for devising a highly accurate cross-correlation scheme, and for automating the procedure in which thousands of image- pairs are processed. This technique was employed in the low-turbulence wind tunnel at Lund University. The resulting stream of technical papers by Professor Spedding and his Swedish colleagues has completely transformed our understanding of flapping bird flight, and opened up an entirely new field of research. One of his tentative findings, was that boundary layers seem to remain attached to feathered wings and bodies, far more tenaciously than one might expect from the low Reynolds numbers at which birds fly. There may be some hitherto unsuspected principles in the flow over these feathered surfaces, which could be fed back to aeronautical applications.

Professor Spedding has applied the DPIV technique to gain considerable insight into the behaviour of the wake of a bluff-body moving through a stratified fluid. The application is to subsurface vehicles (such as submarines) moving through the upper ocean. He has been able to show quantitative details of the internal wave field produced by the body, and to demonstrate the unique persistence of a characteristic eddy-structure in the late wake.

Professor Spedding is a researcher of the highest international repute, whose works have appeared in (among others) the following scholarly journals: *Science*, *The Journal of Fluid Mechanics*, *Physics of Fluids* and *The Journal of Experimental Biology*.