MST Best Paper Award for 2004

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2005 Meas. Sci. Technol. 16

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MST Best Paper Award for 2004

Patrick Gill
Chairman of the Working Party
October 2005

For the last 13 years, *Measurement Science and Technology* has awarded a Best Paper prize. The Editorial Board of the journal believes that such a prize is an opportunity to thank authors for submitting their work, and serves as an integral part of the on-going quality review of the journal.

An Editorial Board working party, comprising Patrick Gill (Chairman), David Birch and Ralph Tatam undertook the task of selecting as Best Paper 2004 a single contributed paper describing new and significant work, well aligned with the measurement scope of the journal, and presented in clear and rigorous form. They received a number of recommendations from the Editorial and International Advisory Board Members, and they would like to record their thanks to the Members for these recommendations, as they form an all-important first stage in the assessment process. There were responses from some five Board Members. In total, there were 16 papers nominated, plus another six from the working party. All these papers had quality ratings of 2 or higher from the referees, and note was also taken of the total electronic accesses for those papers subsequently short-listed. Review Articles, and papers that included a Board Member as an author, were automatically excluded. From the submitted nominations and working party deliberations, a short list of two papers was drawn up. The winning paper was then selected on the totality of criteria.

Thus the paper recommended by the working party for the MST Best Paper Award for 2004 is:


This paper describes a novel pressure sensor based on a luminescent coating applied to a porous anodized aluminium layer, with application to the measurement of fluctuating pressures on short timescales with high spatial resolution. The research has particular application to pressure and flow measurements on aircraft structures in wind tunnels. The luminescence from the molecular sensor can be quenched by oxygen, giving a luminescence intensity inversely proportional to quencher concentration and hence air pressure. Quenching occurs on the 10 $\mu$s timescale, allowing use in unsteady pressure measurement situations.

The paper is well organized and clearly written, with a good introduction to the principle of the sensor technique and its application, together with a clear description of the techniques needed to produce good sensitivity by means of luminophore adsorption to enhanced surface area offered by porous anodized aluminium. The paper considers theoretical aspects of the sensor time response, both in respect of luminescence lifetime and also gas permeation in a micropore. The experimental responses for two types of pressure fluctuation are presented. These include a pressure-jump apparatus by means of a fast opening valve on the millisecond timescale, and a shock tube system capable of microsecond resolution using a CCD array. In addition, coating intensity versus pressure and temperature relations, together with photodegradation, have been studied. Thus the paper reports a good combination of multidisciplinary activities necessary to develop and test a simple sensor capable of widespread application. The paper cites up-to-date references to prior art, has a good quality rating from the referees and
significant downloads. We therefore recommend this paper for the MST 2004 Best Paper Award.

The paper that came a close second was

- ‘Micromachined strain gauges for the determination of liquid flow friction coefficients in microchannels’