# THE ANNUAL MEETING OF THE FOUR SOCIETIES

The Nuclear Engineering Panel of the Sydney Branch of Engineers Australia
The Australian Nuclear Association
The Royal Society of New South Wales
The Australian Institute of Energy

## "Counting atoms for a living – tales of Accelerator Mass Spectrometry"

## Dr Andrew M. Smith, Institute for Environmental Research

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| Venue: | **Hamilton-Parkes Room**<br>**Trade & Investment Centre, Industry & Investment NSW**<br>**Level 47, MLC Centre, 19 Martin Place, Sydney** |
| Date: | **Wednesday March 7, 2012** |
| Time: | **Refreshments served from 5:30 pm for a 6:00 pm start** |
| Cost: | **Free admittance** |
| Registration: | **Preferred by Noon, Monday 5 March** info@royalsoc.org.au |

The development of the technique of Accelerator Mass Spectrometry (AMS) during the 1970's has lead to a renaissance in many fields of research, notably in archaeology, biomedicine and the geosciences. AMS permits the detection of individual atoms in a sample and so is an inherently sensitive analytical technique. AMS determines the ratio of a rare isotope, normally radioactive and of intermediate half life, to a stable isotope. An example is radiocarbon dating, where the measurement of the $^{14}C/^{12}C$ ratio permits determination of the age of an artefact. Such measurements can be performed rapidly (20 – 60 minutes), at good precision (~ 0.3 ‰), with high sensitivity (<1 in $10^{15}$) and on very small samples (as little a few micrograms of carbon). Radiometric measurements, by contrast, require much larger sample masses and much longer measurement times in order to obtain good precision.

Dr Smith will give an overview of the technique of AMS and of the research programs underway at ANSTO. He will give examples of his own research of applications of AMS to climate change studies, utilising $^{14}C$, $^{7}Be$ and $^{10}Be$, derived from bubbles trapped in Polar ice sheets and from within the ice itself.

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