



AUSTRALIAN ASSOCIATION OF von HUMBOLDT FELLOWS  
presents

## “Everything you always wanted to know about Physics, but were afraid to ask”

**Sunday, 30 January 2005**

**The Australian National University, Canberra**

The 16<sup>th</sup> Biennial Congress of the Australian Institute of Physics (AIP) will bring together an international group of scientists from different disciplines with a common interest in physics, many of whom are Humboldtians. The **Australian Association of von Humboldt Fellows** (<http://www.airborneresearch.com.au/Humboldt/AAvHF.htm>) would like to take the opportunity to invite all Humboldtians from the congress and the region, and those interested in physics and activities of the Humboldt foundation to participate in a one day workshop preceding the congress. Younger scientists are particularly encouraged to attend.

Invited speakers will demonstrate how physics is part of our everyday life, and how far we have come since Humboldt and Einstein. Discussion will continue over lunch, which will take place at a local winery. Attendance at the workshop and morning tea is free of charge. Lunch at the winery will be available at a very reasonable cost.

**Registration** is required as places may be limited.

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**Registration deadline: 11 January 2005**

I would like to participate in the Humboldt workshop in Canberra on 30 January 2005.

Title.....Name.....Surname.....

Address.....

Phone.....Fax.....Email.....

Connection to the Alexander von Humboldt Foundation:

- I am a Humboldt-Research-Award-Winner   
Humboldt-Fellow   
Feodor-Lynen-Fellow   
Junior Scientist   
None of the above

Transport requirements for lunch at local winery (ca. 30 min. drive from ANU):

- I will use my own car and can take ..... people along  
 I need transportation  
 I will not participate in lunch & wine tasting

**Mail or fax registration form to Judith Reinhard, RSBS, ANU, GPO Box 475, Canberra ACT 2601, fax: +61-(0)2-61253808, or Email the above information to [judith.reinhard@anu.edu.au](mailto:judith.reinhard@anu.edu.au)**

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# Program

**Sunday, 30 January 2005 (Manning Clark Centre, Lecture Theatre No. 6)**

## **10:00-10:40 Introduction**

Prof. Erich Weigold      *Opening address*  
Prof. Robert Robson      *Activities of the Humboldt Foundation*

## **10:40-11:00 Coffee break with gourmet cakes**

## **11:00-13:00 Presentations**

Prof. Andrew Blakers      *Black to the 19<sup>th</sup> century: energy and environment*

Green power, greenhouse, black gold, Iraq, geosequestration, solarization and all that. What are our energy options? Is all the physics done, and its just a matter of economics and politics?

Dr Patrick Kluth      *Smaller, faster, cheaper – the hype about Nanotechnology*

Silicon based microelectronic circuits can be found in nearly all modern electronic gadgets – from microwave ovens to the personal computer. The rapid downscaling of microelectronic devices imposes enormous challenges on fabrication and analysis methodologies. Additionally, as device dimensions approach the nanometer scale, the physics involved can change significantly and new device concepts and materials have to be developed to satisfy the demand for smaller, faster and cheaper microchips. We will address some of the challenges and explain the excitement about the current buzz-word nanotechnology – in this context.

Dr Alex Robson      *Physics and economics*

Brownian motion is the name given to the irregular movement of pollen, suspended in water, observed by the physicist Robert Brown in 1828. It was also studied by Albert Einstein in his 1905 study of the molecular-kinetic theory of heat. The range of application of Brownian motion now goes far beyond the study of microscopic particles in suspension, and includes the modelling of financial asset prices, most notably by Fischer Black and Myron Scholes in 1973. Some examples of economic applications of Brownian motion will be discussed.

Dr Megan O'Mara      *Physics in medicine*

What do epilepsy, cystic fibrosis, diabetes, supercomputers, nicotine addiction and Newton's equation of motion have in common? The answer is physics. Most people know that physics plays a vital role in modern medicine: without physics we would not have laser surgery, x-ray machines, CT scans or radiotherapy, to name just a few things. As we have learnt more about what can go wrong, we have discovered that every process in the body is based on physics: like the beating of your heart, the sensation of thirst, or learning something new. For each one of these processes, your nervous system uses tiny electrical signals to send information from one cell to another. These electrical signals are turned on or off by switches called *ion channels* in the cell. Many conditions, like cystic fibrosis, diabetes, epilepsy and nicotine addiction, are the result of these ion channels malfunctioning. Using physics to further our understanding how these conditions work, we can develop ways to fix them, improving the quality of life of many people.

Prof. Neville Fletcher      *Music and physics*

Music and physics have been closely related since the time of the classical Greek philosophers; many of the equations of modern quantum theory were developed to describe acoustical phenomena; an overwhelming majority of really competent amateur musicians today have a background in the physical sciences or mathematics; and even Einstein played the violin! What are the links, and how can we best exploit them?

Dr Lindsay Tassie      *Physics of painting*

My work as a theoretical physicist frequently provides me with ideas to use in my paintings. Some examples will be shown.

## **13:00-17:00 Lunch & wine tasting at a local winery**