The **Australian Institute of Physics (SA branch)**
http://www.physics.adelaide.edu.au/aip-sa
in conjunction with the **Women in Physics Group**

presents the **"Claire Corani Memorial Lecture", a Free Public Lecture**
in the AIP 2000 Women in Physics Lecture Series
The Claire Corani awards will be presented at this meeting.

"NANOTECHNOLOGY:
Physics, chemistry and biology unite at the ultra-small scale"

by **Dr Michelle Simmons**
School of Physics, University of New South Wales

at **7:30pm, Tuesday 5th September 2000**
in the **Union Hall** at **Adelaide University**

Abstract:

Nanotechnology is the emerging field of building materials and devices atom by atom to harness the small-scale "quantum" properties of nature. This field unites physicists, chemists and biologists in order to understand how nature works at the atomic level and how we can control it. By going to this small scale (one nanometre is one millionth of a millimetre or about 5 atoms side by side) the properties of materials change from obeying classical physics to the more unfamiliar quantum physics. It is expected that the ability to manipulate individual atoms and molecules will revolutionise the 21st century in much the same way that the invention of the transistor led to the Information Age.

Today's manufacturing methods at the molecular level are very crude – it's like trying to make things out of lego blocks with boxing gloves on. In the future nanotechnology will allow us to take the boxing gloves off. This lecture will trace the history of how nanotechnology has developed and what tools we require to observe and manipulate atoms. In particular the lecture will highlight the new and exciting International research program in Quantum Computing that has recently been established in Australia. The ability to build a computer from the atomic level upwards will allow us to exploit quantum physics with the aim of building a new generation of computers. It is expected that these computers – quantum computers – can perform computations that all the computers on the planet linked together could not complete before the end of the universe.

Biography:

Michelle Simmons began an interdisciplinary career with a double degree in physics and chemistry at the University of Durham in England. This cross-disciplinary training proved invaluable for her subsequent PhD research at Durham where she developed and fabricated ultra-high efficiency solar cells. She then moved to the University of Cambridge to become the first female post-doctoral researcher in the Semiconductor Physics group (the largest research group in the U.K.), developing advanced quantum electronic devices. She is currently a Queen Elizabeth II Research Fellow at the University of New South Wales where she is investigating the fundamental nature of electrical conduction in quantum semiconductor devices. She is also manager of the atomic-scale fabrication and crystal growth program at the new Centre for Quantum Computer Technology at UNSW, collaborating with physicists at Queensland, Melbourne, Maryland, Caltech and Los Alamos.

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