

Wednesday, 18th March, 2009

### Why Quantum Mechanics Will Change Your Life

Dr. Thomas Busch



Even though Quantum Mechanics is one of the most complete and successful theories ever developed in physics, it is also the least understood. Many of the effects it predicts are counter-intuitive to everyday life experiences. Over the last 100 years this has led to intensive discussions about fundamental questions such as what reality and locality really are. Recent progress in the area of quantum information has shone new light on these questions and I will give an insight into some of the most puzzling paradoxes and the current explanations.

Thomas Busch is a Science Foundation Ireland Principal Investigator in the Physics Department in UCC. A native of Germany, he obtained his PhD from the University of Innsbruck in the area of quantum statistics in 2000. His current research deals with designing computational devices using the laws of quantum mechanics to achieve superior computing powers.

Wednesday, 25th March, 2009

### Nitrogen Fixation - Food Wars and Politics

Professor Michael Morris



The reaction of atmospheric nitrogen with hydrogen to form ammonia is one of the most important industrial chemical reactions as ammonia is used in the synthesis of a great many chemicals but most importantly explosives and fertilizers. The development of nitrogen fixation has played a very significant role in recent political history and ammonia fertilizers have become a vital component of food production. The higher yields obtained with fertilizer use has allowed the world population to grow. This lecture will explore these issues and address the question of population growth sustainability given that gas and petroleum are the basic feedstock for ammonia production.

Michael A. Morris is professor of inorganic chemistry at UCC where his research centres on the development of nanoscale materials. Of particular interest is the growing role of nanoscience in ICT hardware and Prof. Morris is a principal investigator at the Tyndall National Institute and director of the nanoelectronics research at the Centre for Research in Adaptive Nanostructure and Nanodevices in Trinity College Dublin. Prof. Morris worked in industry for several years in areas including the development of catalysts for ammonia synthesis.

### Grand Final UCC Science for All Postgraduate Student Public Presentation Competition

Wednesday, 1st April, 2009, 7.00pm  
Boole Lecture Theatre 4, UCC



Come and hear a selection of our finest postgraduate students explain their researches in science, engineering and food science, in terms understandable to a general audience. These students are the finalists in our Annual Postgraduate Student Public Presentation Competition. The competition will be held in Boole 4 Lecture Theatre, Starting at 7.00p.m. The competition will be judged by a panel of lay-judges.

Brochure Design: Aisling Ní Mhurchú, Public Awareness of Science Office, UCC and Mary Heapes, Department of Biochemistry, UCC

## List of Lectures

Wednesday, 14th January, 2009

### Darwin's Legacy

Professor William Reville, UCC

Wednesday, 21st January, 2009

### Global Warming: Sink or Swim? – Global Warming and the Impacts of Sea-Level Rise on Society

Professor Robert Devoy, UCC

Wednesday, 28th January, 2009

### Embryonic Stem Cell Research – Opening a Pandora's Box or a Can of Worms?

Professor Gerry Whyte, TCD

Wednesday, 4th February, 2009

### Radio Astronomy Past, Present and Future: Pushing Technology Forward

Dr. Denise Gabuzda, UCC

Wednesday, 11th February, 2009

### Energy Infrastructure for the Future

Dr. Eamon McKeogh, UCC

Wednesday, 18th February, 2009

### Vitamin D and Health: The Sunshine Vitamin Stepping Out of the Shadows?

Professor Kevin Cashman, UCC

Wednesday, 25th February, 2009

### Sensing the Future

Dr. Cian Ó Mathúna, UCC

Wednesday, 4th March, 2009

### Toxicovigilance and Low Level Exposure to Potentially Dangerous Chemicals, Drugs and Pollutants

Professor Jim Heffron, UCC.

Wednesday, 11th March, 2009

### Food for Health – The Gluten-free Diet

Professor Elke Arendt, UCC

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### Why Quantum Mechanics Will Change Your Life

Dr. Thomas Busch, UCC

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Professor Michael Morris, UCC

Wednesday, 1st April, 2009,

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### Grand Final UCC Science for All Postgraduate Student Public Presentation Competition

The series is organised by

Professor William Reville,  
Public Awareness of Science Officer, UCC

For further information

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# UCC

Coláiste na hOllscoile Corcaigh, Éire  
University College Cork, Ireland

College of Science, Engineering and Food Science

# Annual Public Lecture Series

Science has made the most amazing discoveries over the past 400 years and today the entire developed world is dependent on science-based technology. In this Lecture Series, a distinguished list of speakers will discuss various aspects of science and technology, many of particular relevance to Ireland today.



This public lecture series will run weekly from January through March 2009 on Wednesday evenings in Boole 4 Lecture Theatre at UCC

Lectures start at 8.00pm  
.....but please come a little earlier

All are welcome

Wednesday, 14th January, 2009

**Darwin's Legacy**

Professor William Reville



The theory of evolution through natural selection is probably the most important and influential scientific theory ever formulated. It is not only the central unifying theory in biology but has important implications for many other fields, e.g. religion. Even today some people refuse to accept the theory and it can generate heated debate. In this lecture the theory will be explained in outline and some of its major implications will be discussed.

*William Reville is Associate Professor of Biochemistry, Public Awareness of Science Officer and College Radiation Protection Officer at UCC. He also writes the weekly science column Under the Microscope in The Irish Times. He has written about 100 scientific papers and is author of the book Science Today: Understanding the Natural World (Irish Times Books, 1999), and the wall-poster Famous Irish Scientists, published in 2008 by The Irish Times in association with Barry's Tea.*

Wednesday, 21st January, 2009

**Global Warming: Sink or Swim?  
Global Warming and the  
Impacts of Sea-Level Rise on Society**

Professor Robert Devoy



In the recent International Partnership for Change Conference in Cork, November 2008, on global warming, the topic of sea-level changes linked to that of regional climate variability attracted most attention. The impacts of future rises in sea level under global warming may have profound effects in the 21st century on about 40% of the world's population. The lecture will explore this and other questions of the impacts of global warming.

*Robert Devoy is a Professor in Physical Geography at UCC and a lead author of the Intergovernmental Panel on Climate Change's (IPCC) Nobel Prize (2007) winning Fourth Assessment Report. He has an international reputation in the field of coastal science, physical geography and palaeoenvironmental research. Recently his work has focused on the repercussions of climate change upon coastal processes and sea-level rise in particular. Work on tsunamis in New Zealand is another topic of current research. He was the founder and Director until 2002 of the Coastal and Marine Resources Centre (CMRC), UCC.*

Wednesday, 28th January, 2009

**Embryonic Stem Cell Research  
- Opening a Pandora's Box  
or a Can of Worms?**

Professor Gerry Whyte



The right to life is not absolute – Irish law permits taking life if that is necessary/ inevitable in order to avert a threat to the lives of others. Embryonic stem cell research raises the question of whether it should be legitimate to destroy life that is non-threatening where this might produce significant benefit to others. This proposition, if accepted, would undermine the principle that an individual should always be regarded as an end in herself and never as a means to an end. Accordingly, the only way in which embryonic stem cell research may be reconciled with a refusal to treat the individual as a means to an end is if it can be shown that the moral status of the embryo is qualitatively different to that of life at later stages of development. In this lecture, the various arguments advanced in support of such differentiation are examined and found wanting.

*Gerry Whyte is an Associate Professor in Trinity Law School and a Fellow of Trinity College. The author and co-author of books on public interest law, constitutional law and trade union law, he is a former member of the Commission on Assisted Human Reproduction and the author of the minority report on the status of the embryo.*

Wednesday, 4th February, 2009

**Radio Astronomy Past, Present and Future:  
Pushing Technology Forward**

Dr. Denise Gabuzda



Radio astronomy began with the discovery of cosmic radio signals by Karl Jansky in the early 1930's, and has greatly changed our view of the Universe. It was early realized that groups of radio telescopes could be used to reveal finer detail in radio images of astronomical objects. Very Long Baseline Interferometry can obtain resolutions 50-100 times better than the Hubble Space Telescope achieves. Today, radio astronomy is undergoing a technological revolution, with data sent from telescopes to processing centres along optic fibres at enormous rates of up to 30 Gbit/sec. Current developments are pushing toward the Square Kilometre Array - an international radio telescope with unprecedented high sensitivity planned to be finished in 2025.

*Denise Gabuzda is a Senior Lecturer in the Department of Physics, UCC. Before coming to UCC, she carried out astrophysics research at universities and institutes in California, Canada, Russia, Japan and the Netherlands. Her research focuses on the origin and physical nature of "jets" of radio-emitting material that are ejected from the centres of active galaxies, and she is especially interested in finding new and creative ways to link observation and theory.*

Wednesday, 11th February, 2009

**Energy Infrastructure for the Future**

Dr. Eamon McKeogh



Future energy infrastructure must accommodate not only large centralized power and energy sources but also input from the growing array of distributed resources. These widespread resources will include renewable energy from wind, ocean, solar and biomass and the use of bulk and small scale energy storage. The transition from a simple centralized energy system to a complex multi source system will require a host of new and improved functions. This lecture will describe the new architecture and identify changes required for optimized operation of future energy infrastructure.

*Eamon McKeogh is a Senior Lecturer, Department of Civil & Environmental Engineering, UCC. His research is focussed on the control and prediction of sustainable energy from sources such as on and off-shore wind, hydropower, and biomass. He recently investigated the use of pc-clusters for large scale wind energy forecasting and storage scheduling. Dr. McKeogh is currently involved in the development of a National Energy Competence Centre. His current research project is Assessment of the European Terrestrial Carbon Balance, EU 6th framework programme.*

Wednesday, 18th February, 2009

**Vitamin D and Health:  
The Sunshine Vitamin  
Stepping Out of the Shadows?**

Professor Kevin Cashman



Prolonged and severe clinical vitamin D deficiency leads to bone disorders. There is also a growing body of evidence to suggest that low vitamin D status may be associated with increased risk of a wide range of other chronic diseases, including tuberculosis, rheumatoid arthritis, multiple sclerosis, inflammatory bowel diseases, cardiovascular disease, hypertension and certain cancers, which will be reviewed in this lecture. With this in mind, it is of concern that a high prevalence of low vitamin D status has been reported in children, adults and elderly from many countries, including Ireland. The reasons for low vitamin D status as well as strategies for improving the vitamin D status will be reviewed in this lecture

*Kevin Cashman is Professor of Food and Health and Head of the Department of Food and Nutritional Sciences at UCC. He has a BSc and PhD in Nutrition from UCC as well as having spent time in the USDA Human Nutrition Centre on Aging at Tufts University in Boston. He has presented and published widely in the area of diet and bone health.*

Wednesday, 25th February, 2009

**Sensing the Future**

Dr. Cian Ó Mathúna



Wireless sensor networks are set to play a major role in addressing some of the key challenges faced by society in healthcare, the environment and energy in buildings. In the future we will be surrounded by millions of sensors embedded in both the natural and built environment, in buildings and homes, on our clothing and even in our bodies. These sensors will be able to power themselves and communicate with each other via the web. This lecture will outline the potential for sensors to enhance the security, health and comfort of people throughout their daily lives.

*Cian Ó Mathúna is Head of the Microsystems Centre at the Tyndall National Institute in Cork. He received B.E., M.Eng. Sc., and Ph.D. degrees from University College Cork, in 1981, 1984, and 1994, respectively. His research is focussed on the convergence of microelectronics and microsystems. The main driver for the research is the concept of miniaturised wireless sensor modules and their application in sensor networks that will drive future Information and Communication Technology opportunities in Energy, Personal Health and the Environment.*

Wednesday, 4th March, 2009

**Toxicovigilance and Low Level Exposure  
to Potentially Dangerous Chemicals,  
Drugs and Pollutants**

Professor James Heffron



The human population is exposed to chemicals in the home, the workplace and during recreation. Great concern is expressed when the population is exposed to dangerous chemicals such as the recent episodes of exposure to melamine, benzene, lead from toys, Sudan dyes and dioxins in foodstuffs. While we know a great deal about the toxic actions of high levels of chemicals our knowledge of long-term effects of low dose exposures is generally poor. Current research in this area will be analysed.

*James Heffron obtained BSc and PhD degrees in Biochemistry from UCD and the DSc from NUI. He has carried out research and lecturing in the Mayo Clinic / Graduate School of Medicine, USA, University College London and the University of the Witwatersrand, South Africa. A professor in the Department of Biochemistry, UCC, he specialises in Biochemical Toxicology. He is a Member of the Royal Irish Academy.*

Wednesday, 11th March, 2009

**Food for Health - The Gluten-free Diet**

Professor Elke Arendt



In genetically susceptible individuals, ingestion of gluten and related proteins triggers an immune-mediated enteropathy known as coeliac disease. One in 100 people worldwide suffer from coeliac disease. Coeliac disease is more common in Ireland than elsewhere, affecting up to 1 in 20 people. Currently, the only treatment is lifelong avoidance of gluten ingestion. Therefore, coeliac sufferers have to follow a strict diet and avoid products which contain wheat, rye or barley (some authors also include oats). Avoidance of these cereals leads to recovery from the disease. This presentation will give an overview of coeliac disease, recent advances in the area of gluten free foods and beverages.

*Professor Elke Arendt is a native of Stuttgart, Germany. She graduated as an Engineer of Food Technology at Hohenheim University in 1988 (MSc.) and received her PhD from the same institute in 1991. She received her DSc on published work in the area of fermented foods in June 2007. She lectures and carries out research in the general area of food and health related to cereals and beverages. She has published extensively in this area; amongst these publications are 2 books in the area of gluten free foods and beverages.*