

**OBJECTIVE:** This seminar will provide participants with an opportunity to hear from eminent scientists who will further elaborate on their areas of research under the theme "Science to Inspire and to help us". Participants will be able to reach to a common consultative platform to discuss and provide valuable input to open up the world of science. Besides that, participants could also establish strategic alliances or professional networks for future joint undertakings or partnership.

This seminar series has been initiated with the support of the Open University Malaysia (OUM) and the Academy of Sciences Malaysia (ASM) to highlight research undertaken by the members of ICSU Regional Committee for Asia and the Pacific (ROAP). The ICSU mission is to strengthen science for the benefit of society.

This seminar will be webcast **LIVE**.

Date

**29 April 2010**

Time

**10:30 am – 12:30 pm**

Venue

**Auditorium, Block C,  
OUM Main Campus  
Kuala Lumpur**



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ICSU ROAP Seminar Series

## "Science to Inspire and to Help Us"

Speakers

**Professor Bruce H. J. McKellar**

*"Matter, anti-matter and our existence as stardust"*

**Biodata:** Bruce is Chair, ICSU Regional Committee for Asia and the Pacific, and Honorary Professorial Fellow, University of Melbourne, Australia. He is a theoretical physicist who primarily works on elementary particle physics and has a particular interest in neutrino physics and in the violation of matter-antimatter symmetries. His curiosity has led him to work in many other fields, including nuclear physics, remote sensing of atmospheric aerosols, cosmology, and particle production by high intensity lasers. He recently retired from the Professorship of Theoretical Physics at Melbourne University, a position he held for 36 years. He has been a Vice President of the Australian Academy of Sciences and of the International Union of Pure and Applied Physics, and was a Foreign Secretary of the Australian Academy of Science. He served on the Board of Trustees of the Asia Pacific Center for Theoretical Physics and on the Council of the Association of Asia Pacific Physical Societies for many years. His research has been recognised by the award of several medals, including the 2007 Massey Medal of the Institute of Physics (UK) and the Australian Institute of Physics, and the 2009 Flinders Medal of the Australian Academy of Science.

**Abstract:** One of the most remarkable achievements of twentieth century science was the prediction and subsequent discovery of anti-matter. Anti-matter particles have exactly the same mass as their matter particle partners, but they have the opposite charge. Examples are the anti-proton which is negatively charged, and the anti-electron (also called the positron) which is positively charged. When particle and antiparticle meet they annihilate each other, creating energy as Einstein predicted. Inversely, with enough energy we can create matter and antimatter in equal amounts. The Big Bang provided enough energy to create large, equal, numbers of particles and antiparticles. That was a long time ago, and we would expect that they would have found each other and annihilated. Why is there enough matter left over to make galaxies, stars and us? That question is central to our understanding of the Universe and our place in it. For the last forty years it has been understood that elementary particle physics should allow us to calculate the mean density of matter in the universe (about one hydrogen atom per four cubic metres) and thus answer this question. However, at this stage our calculations give about one hydrogen atom in a billion billion cubic metres. I will explain why we think this calculation is possible and what new information we are trying to find so we can get the right answer.

**Professor Jaime Montoya**

*"A Molecular Epidemiologic Analysis of Tuberculosis in Different Populations at Risk in the Philippines"*

**Biodata:** Jaime is Professor in Infectious Disease at the University of the Philippines College of Medicine and currently the Executive Director of the Philippine Council for Health Research and Development. He is also currently the President of the National Research Council of the Philippines, Secretary of the Philippine College of Physicians and Vice-President of the Science Council of Asia. He is recognized by both the Royal College of Physicians, London, U.K. and the Philippine Board of Internal Medicine and Infectious Disease. He is the recipient of over 20 prestigious professional awards in the fields of medical research, education, medical writing, medical society leadership and community service including Outstanding Young Scientist of the Philippines, 1998 awarded by the National Academy of Science and Technology, Distinguished Physician Researcher awarded by the Philippine College of Physicians in 2001, Ten Outstanding Young Men of the Philippines, 2001 and conferment of the rank of National Academician in 2008 by the National Academy of Science and Technology. He is the Founding President of the Philippine Alliance for the Prevention and Control of Infectious Diseases and Past President of the Philippine Society for Microbiology and Infectious Disease, Philippine Hospital Infection Control Society, Alliance for the Prudent Use of Antibiotics, and the Philippine Coalition Against Tuberculosis.

**Abstract:** Tuberculosis, long known to be a major cause of morbidity and mortality throughout the world, has for the past several decades been a neglected disease in both industrialized and developing countries. It causes death of around 3 million people in the world per year, with 95% of cases taking place in developing countries where *M. tuberculosis* transmission has been associated with factors like crowding and poor or weak public health infrastructure. Recent advances in molecular microbiology have allowed the development of molecular tools for the genetic analysis of *Mtb* strains, which subsequently is providing better insights on the epidemiology of tuberculosis. This molecular epidemiology approach permits the formulation of more precise and targeted control strategies. The Philippines has very limited data regarding the molecular epidemiology of *M. tuberculosis* isolates in the country. In the initial study done by Douglas, Qian and Montoya et al, the isolates of *M. tuberculosis* from Filipino patients without HIV were found to belong to a distinct family of tuberculosis strains, which may be called the Manila Family of *M. tuberculosis*, different from the other identified strains in the region based on RFLP and spoligotyping analysis. This valuable information can now be used in describing the distribution of *M. tuberculosis* isolates as well as patterns of transmission in the general population. No similar study, however, has yet been done on specific high-risk groups like HIV in the Philippines. Isolates of *M. tuberculosis* are being collected from these high-risk groups to identify possible patterns of transmission and predominance of specific tuberculosis molecular types and strains.

**Professor Motonori Hoshi**

*"Making Asexuals Sexual in the Planarians"*

**Biodata:** Hoshi-san works in the field of developmental and reproductive biology, and in glycobiology. He was a Professor at the Tokyo Institute of Technology (1985-2000), Visiting Professor, University of the Philippines, Diliman (1991), Miller Visiting Professor, University of California, Berkeley (1992), Professor at Keio University (2000-2006), and Senior Visiting Researcher at Riken Genomic Sciences Center (2001-2007). At Tokyo Institute of Technology, he served also as Department Chairman, Dean and Chief Presidential Aide, and has been Professor Emeritus, since 2000. He is currently Professor at The Open University of Japan (2006-), and Fellow of International Institute for Advanced Studies (2006-). Professor Hoshi is active in several learned societies and was the President, International Society of Invertebrate Reproduction (1990-1992), and President, Zoological Society of Japan (1999-2002), and served as President, International Union of Biological Sciences (IUBS) (2004-2007). He served also as the Editor-in-Chief, *Development Growth and Differentiation* (1994-1996), and Asian-Pacific Editor for *Zygote* (1996-2000). He was a member of the Science Council of Japan (1997-2005) and is Senior Academic Advisor, Japan Society for the Promotion of Science (2001-). In ICSU, he served as a member of the Committee for Scientific Planning and Review (2006-2009).

**Abstract:** Reproduction is one of the most prominent characteristics of living organisms, and it constitutes, together with speciation, the mechanism for the continuity of life. It is performed through alternative reproductive modes; the asexual reproduction and the sexual one. Asexual reproduction is the way to form a new individual(s) without changing the genetic information, whereas sexual reproduction is coupled with shuffling the genes of two individuals in the same species and thus increases the genetic diversity in the offspring. Sexual reproduction evolved much later and costs much more than asexual reproduction, nevertheless the metazoans that reproduce exclusively through the asexual reproduction are absolutely exceptional. Those that reproduce exclusively through the sexual reproduction, like mammals, are rather limited. In fact, the majority use both modes of reproduction and switch from one mode to the other depending upon the stage of life cycle and/or environmental conditions, most probably as a way to balance the advantages and disadvantages of each reproductive mode. Mechanisms underlying the switch of reproductive modes remain unexplored in the metazoans. We have developed an experimental system to sexualize all the exclusively asexual (fissiparous) worms in the planarian *Dugesia ryukyensis* (OH strain) by feeding them with sexually matured worms of the same or even different species. Once they are completely sexualized, they do not undergo spontaneous fission any more, suggesting that two reproductive modes are mutually exclusive also in the experimental sexualization. In this short lecture, I will summarize our findings on the sexualization and discuss their biological significance.