

2. Varma, A. and Palsson, B.O. (1994) Stoichiometric flux balance models quantitatively predict growth and metabolic by-product secretion in wild-type *Escherichia coli* W3110. *Appl. Environ. Microbiol.* 60, 3724–3731.
3. Marx, A. *et al.* (1996) Determination of the Fluxes in the Central Metabolism of *Corynebacterium glutamicum* by Nuclear Magnetic Resonance Spectroscopy Combined with Metabolite Balancing. *Biotechnol. Bioeng.* 49, 111–129.
4. Wiechert, W. (2001) <sup>13</sup>C metabolic flux analysis. *Metab. Eng.* 3, 195–206.
5. Iwatani, S. *et al.* (2008) Metabolic flux analysis in biotechnology processes. *Biotechnol. Lett.* 30, 791–799
6. Tang, Y.J. *et al.* (2009) Advances in analysis of microbial metabolic fluxes via (<sup>13</sup>C) isotopic labeling. *Mass Spectrom. Rev.* 28, 362–375.
7. Krömer, J.O. *et al.* (2008) Physiological response of *Corynebacterium glutamicum* to oxidative stress induced by deletion of the transcriptional repressor McbR. *Microbiology* 154, 3917–3930.
8. Wittmann, C. *et al.* (2007) Response of fluxome and metabolome to temperature-induced recombinant protein synthesis in *Escherichia coli*. *J. Biotech.* 132, 375–384.
9. Wittmann, C. *et al.* (2004) Metabolic network analysis of lysine producing *Corynebacterium glutamicum* at a miniaturized scale. *Biotechnol. Bioeng.* 87, 1–6.
10. Christensen, B. and Nielsen, J. (1999) Isotopomer analysis using GC-MS. *Metab. Eng.* 1, 282–290.
11. Sauer, U. *et al.* (1997) Metabolic fluxes in riboflavin-producing *Bacillus subtilis*. *Nat. Biotechnol.* 15, 448–452.
12. Zamboni, N. *et al.* (2005) FiatFlux – a software for metabolic flux analysis from <sup>13</sup>C-glucose experiments. *BMC Bioinformatics* 6, 209.
13. Wiechert, W. *et al.* (2001) A universal framework for <sup>13</sup>C metabolic flux analysis. *Metab. Eng.* 3, 265–283.
14. Antoniewicz, M.R. *et al.* (2007) Elementary metabolite units (EMU): a novel framework for modeling isotopic distributions. *Metab. Eng.* 9, 68–86.
15. Quek, L.E. *et al.* (2009) OpenFLUX: efficient modelling software for <sup>13</sup>C-based metabolic flux analysis. *Microb. Cell Fact* 8, 25.

## Biography

In 2006, **Jens O Krömer** received a PhD in the area of Systems Biotechnology from the Saarland University, Germany. His thesis on the L-methionine production in *Corynebacterium glutamicum* led to a number of publications but also significantly contributed to three international patents filed by the commercial project partner BASF. His thesis was recognized with the Dr-Eduard-Martin-Preis in 2007, an award for the best PhD thesis in the faculty.

Since his arrival at University of Queensland (UQ) in October 06, Jens focusses on the development of systems biological tools, especially metabolomics and fluxomics, as platform technologies and the adaptation to industrially relevant processes. Together with Prof Lars Nielsen, he established a critical mass in the area of metabolomics, fluxomics and *in-silico* analysis of industrial microbes at the UQ. As part of his role in establishing this research field at UQ he designed and until recently managed the NCRIS 5.1 funded Queensland Node of Metabolomics Australia. This state-of-the-art analytical facility provides non-targeted metabolite profiling, quantitative analysis of metabolites in various biological matrices and supports <sup>13</sup>C fluxomics in collaborative projects.

## Retirement of Associate Professor David Ellis from the Editorial Board



Associate Professor David Ellis is Head of the Mycology Unit at SA Pathology, Women's and Children's Hospital, Adelaide and an Associate Professor in the School of Molecular and Biomedical Science at the University of Adelaide. He graduated from La Trobe University Botany Department with BScHons, MSc and PhD in mycology and has been in charge of the Medical Mycology Unit for the past 33 years. David is an Honorary Fellow of the Royal College of Pathologists of Australasia, and a Fellow and past President of the Australian Society for Microbiology. He has also served as General Secretary and is the current President of the International Society for Human and Animal Mycology. His current research interests include the epidemiology and ecology of medically important fungi, especially *Cryptococcus*, fungal taxonomy and antifungal susceptibility testing. David is also actively involved in the teaching of medical mycology and is a recipient of the Australian Society for Microbiology David White Teaching Award and the Australasian College of Tropical Medicine Ashdown Medal. David has been a member of the Editorial Board of *Microbiology Australia* since 1998. He will retire on 11 November 2011. We wish him all the best for the future.

# The global effort to tackle the increasing incidence of chikungunya infection



*Lara Herrero & Suresh Mahalingam*

Institute for Glycomics, Griffith University, QLD 4222

**In 2011 a new global initiative was established to tackle the increasing global threat of chikungunya virus (CHIKV). This initiative is a consortium of specialists focused on various aspects of CHIKV disease, including virus transmission, virus evolution, disease pathology, vaccine biology, antiviral screening and viral immunobiology, all with the central aim of limiting the global impact of CHIKV.**

CHIKV is a mosquito-transmitted virus of the *Alphavirus* genus in the *Togaviridae* family. Typical symptoms of CHIKV infection are abrupt febrile illness, headache, arthralgia, myalgia and, in some cases, maculopapular rash. The acute signs and symptoms usually resolve in less than two weeks, but arthralgia and myalgia may linger for weeks, months or even years<sup>1,2</sup>.

Since 2005 there has been a massive increase in the incidence of CHIKV infection, with case reports as high as five million in India and South-East Asia<sup>3,5</sup>. Of increasing concern is the number of CHIKV cases being reported among travellers when returning to Europe and the USA<sup>6</sup>. In 2007, a traveller returning to Italy from India was identified as the index case for an outbreak of CHIKV in Italy which saw more than 250 people infected<sup>7</sup>. This was the first reported incident of local transmission following an imported case and highlighting the potential for this virus to invade Europe, North America and Australia.

*Aedes albopictus* has been implicated as the mosquito vector responsible for a number of the recent outbreaks and the resulting spread of CHIKV into new global regions. In the past few decades, *Aedes albopictus*, has spread from Asia and established itself in Europe, North and South America, the Middle East, North Australia and South Africa, making this species one of the most invasive species in the world. With the changing global environment, the increase in vector spread and the current ease of modern travel, the threat of global CHIKV is very real.

With such an impending global problem, the need for a world-class consortium to deliver a global effort was apparent. In this consortium (established in 2011), are some of the world's best including: Professor Philippe Gasque (Saint Denis, La Réunion; with expertise in clinical studies on CHIKV including archived clinical samples); Professor Marc Lecuit and his colleagues (the Pasteur Institute, France; who first described CHIKV infection in mice); Dr Pierre Roques and Professor Roger Le Grand (CEA, France; who developed the first macaque model and tested the TSI-GSD-218 US vaccine); Professor Sazaly AbuBakar (University of Malaya, Malaysia; who monitored and reported on CHIKV in Malaysia); Dr Lisa Ng, (The Singapore Immunology Network at A\*STAR; who has recently published studies on human immune responses to CHIKV infection) and Professor Christian Drosten, (University of Bonn Medical Centre, Germany; who led diagnosis of CHIKV in travellers returning to Europe and developed suitable diagnostic tests). In addition alpha-virologists: Professor John Fazakerley, Professor Peter Liljeström, Professor Andres Merits and Dr Tero Ahola join the consortium bringing not only expertise in molecular and cellular biology of alphaviruses and an ability to manipulate the CHIKV genome but also powerful molecular and cellular technologies to elucidate virus cell interactions as well as facilities and expertise for antiviral screening and extensive expertise in alphavirus vaccines and vaccine biology. This expertise will be extended by the inclusion of Professor Thomas Meyer, an expert on virus cell interactions who has established the technology for high-throughput RNAi screening to discover cellular genes affecting the virus life cycle.

These researchers will now work together in this consortium bringing their archived samples, cohorts of patients, ongoing clinical studies and established animal models (both mice and non-human primate), diagnostics and immunological assays. With funding from the Australian NHMRC, this consortium is joined by Professor Suresh Mahalingam and his team (ASM, Division 2 Chair-Virology), Griffith University, Australia, who will

carry out studies on the immune response to CHIKV in a mouse model. The project aims to maintain and build capacity on CHIKV within the European Union (EU), to coordinate research in the EU and beyond and to strongly enhance global preparedness for further virus spread or future re-emergence. The principal objectives are to:

1. To generate new molecular and cellular tools for research and applied studies.
2. To develop new, efficient diagnostic tests and ensure their quality and standard.
3. To determine key virus genetic changes across time, geographical regions and species.
4. To discover interactions between the virus and human cells.
5. To determine pathogenesis of both acute and chronic disease in humans, including whether virus persists in the joints, the cell types involved and the relationship to immune responses.
6. To characterise rodent and non-human primate models of acute and chronic infection.
7. To screen libraries of characterised pharmaceutical and bioactive compounds for antiviral activity.
8. To develop a vaccine which at the end of this project is ready to enter clinical trials.

In this consortium all participants are international experts in their field and the contribution of each is based on their key strengths. There is little overlap and extensive synergy. The studies generally involve existing facilities, equipment and expertise and in many cases utilise previously collected samples and reagents building on previous studies. The project objectives are strongly output-orientated and will provide knowledge on CHIKV evolution to potentially predict future outbreaks, new knowledge on disease pathogenesis, well-characterised animal models to test antivirals and vaccines, standardised and improved new diagnostic tests, 'proof-of-concept' antiviral compounds and a vaccine ready for human clinical trials. To date, significant advancements by the consortium have already been made. Overall, the aims that this global initiative are striving for will have an impact on our preparedness to fight further spread of the current epidemic or the next re-emergence of CHIKV.

For further information, please contact Professor Suresh Mahalingam at Griffith University: [s.mahalingam@griffith.edu.au](mailto:s.mahalingam@griffith.edu.au)

## References

1. Jaffar-Bandjee, M.C. *et al.* (2009) Chikungunya virus takes centre stage in virally induced arthritis: possible cellular and molecular mechanisms to pathogenesis. *Microbes Infect.* 11, 1206–1218.
2. Couderc, T. and Lecuit, M. (2009) Focus on Chikungunya pathophysiology in human and animal models. *Microbes Infect.* 11, 1197–1205.
3. Josseran, L. *et al.* (2006) Chikungunya disease outbreak, Reunion Island. *Emerg. Infect. Dis.* 12, 1994–1995.
4. Kalantri, S.P. *et al.* (2006) Chikungunya epidemic: an Indian perspective. *Natl. Med. J. India* 19, 315–322.
5. Yergolkar, P.N. *et al.* (2006) Chikungunya outbreaks caused by African genotype, India. *Emerg. Infect. Dis.* 12, 1580–1583.
6. Enserink, M. (2007) Epidemiology: Tropical disease follows mosquitoes to Europe. *Science* 317, 1485.
7. Liunbruno, G.M. *et al.* (2008) The Chikungunya epidemic in Italy and its repercussion on the blood system. *Blood Transfus.* 6, 199–210.

## Biographies

**Lara Herrero**, graduated with a PhD in virology from UWA in 2008. Originally focused on enterovirus research, Lara changed her research focus when she contracted Ross River virus and became ill with arthralgia for over a year. Now her research is primarily focused on deciphering the mechanisms behind virus induced arthritis and arthralgia, with particular interest on alphaviruses. Lara is working with Professor Suresh Mahalingam at the Institute for Glycomics at Griffith University. Current research discoveries are providing a better understanding of the processes by which arthrogenic viruses cause disease. This information is essential for the development of superior treatments and reducing the impact of virus induced arthritis on the human population.

**Suresh Mahalingam** has an international reputation in the field of viral pathogenesis and has spent the last 15 years investigating the interactions between viruses and their hosts. He is currently ARC Future Fellow and Professor of Virology at the Institute for Glycomics, Griffith University. His major scientific contributions are: First to show that chemokines elicit antiviral effects *in vivo* and received international recognition for this discovery. First to demonstrate that the host cellular signalling protein, STAT-6, is a susceptibility locus for virus infection and that hosts can become resistant to infection when STAT6 is absent. He was first to show that a novel DNA vaccine that targeted a host protein (Interleukin-5), was able to ameliorate the major features of asthma. He was first to demonstrate the efficacy of a CTL epitope vaccine for HMPV. Dr Mahalingam also made significant observations about arbovirus infections. Antibody-dependent enhancement (ADE) occurs with many viral families and is a risk factor for the serious diseases dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS). His work with Ross River virus revealed for the first time that ADE infection resulted in the specific disruption of the cellular genes that are normally activated to make antiviral proteins that destroy the invading virus. Dr Mahalingam and his team are the first in the world to develop a mouse model of viral-induced arthritis and first to elucidate the mechanisms of this disease. He recently identified the first specific drug for the treatment of viral arthritis and this work received national (ABC, WIN) and international (Reuters) press coverage. Honours and Awards: NHMRC Peter Doherty Fellowship, Ann Woolcock Fellowship, Australian scientists selected as "ScienceNow" scientist for 2001, Wellcome Trust Travel Fellowship, Australian Academy of Science Collaborative Travel Fellowship, NHMRC R. Douglas Wright Biomedical Fellowship, ARC Future Fellowship, Australian Young Tall Poppy award for outstanding contribution to science and biomedicine, commendation for outstanding contribution to science teaching, selected as one of three national finalists for the Eureka Prize for Scientific Research.

# ASM Tri-State Meeting, Alice Springs

## 30-September- 1 October 2011

A small but enthusiastic crowd of just under 50 registrants participated in this year's Tri-State meeting, held at the Alice Springs Convention Centre. We were fortunate to have a varied but interlocking set of speakers, whose presentations covered a broad area of knowledge and information. We sincerely thank all of the speakers for their participation.

Our opening plenary speaker, **Bart Currie** spoke to the title, *Meloidosis on the Rise – What's Going On?* and drew our attention to a number of recent factors influencing morbidity and mortality in Northern Territory (NT), citing figures recorded through the Darwin Prospective Meloidosis Study (that's been running since 1989). Some of the major factors involved with 91 cases over 2009–2010 included record rainfalls for that period (even in the absence of cyclones), possibly more people with risk factors in Darwin (for example, hazardous alcohol use, diabetes, cancer and cancer treatment) and environmental disturbances through expanding development (for example, soil samples were positive at RDH for *B. pseudomallei* to a depth of 1.4 metre!).

The second session on Friday began with **Rob Baird's** view of *Tropical Diseases in the Top End*, and he outlined for us the difficult logistics of providing the NT Group Pathology Services: five laboratories servicing an area of 1.3 million km<sup>2</sup>, and their use of modern technologies in order to help build a more integrated service. Good news with rates of MRSA declining from 18% of *S. aureus* infections in 2006 to 8% in 2011. Top End service provision is influenced by geography, language difficulties (English is not a first language or even spoken in all communities) and access – the 'big wet' closing many roads to many communities for six months; thus their dependence on air access during those times.

**Vicki Krause** walked us through *Organisms/Diseases of Interest from the CDC Perspective* and included for us the 'Top 10' notifiable diseases in the NT in 2010, with *Chlamydia*,

*Trichomonas* and *N. gonorrhoeae* taking out the trifecta. Of 62 cases of HIV in 2010, 30% were female, 58% heterosexual and 92% in the non-Aboriginal population. An insight into micro-epidemics of *Streptococcus pneumoniae* st1 (also in Western Australia with overlapping time frame), and interesting case studies of *M. leprae* and non-TB mycobacteria were shown.

**Lloyd Einsiedel** presented on *HTLV-1: Clinical Aspects of a Neglected Infection Among Indigenous People* and showed the basis of a number of studies (for example, [http://www.mja.com.au/public/issues/192\\_10\\_170510/ein10732\\_fm.html](http://www.mja.com.au/public/issues/192_10_170510/ein10732_fm.html)) where there is growing evidence that the presence of HTLV-1 is more likely to be conducive to other infectious-disease-related morbidity, which is contradictory to earlier dogma arising from studies in the mid-1990s.

The day ended with the Welcome Mixer, held in the courtyard of the Convention Centre, a glowing sunset in the background through the evening haze, looking out onto the MacDonnell Ranges, delegates catching up with old friends and colleagues over some delightful wines and beverages.

Day 2 Session 3 opened with **Stella Heley** providing an *HPV Vaccine Program Update* and set the scene with background information from the cytology screening program on HPV rates, then how the Australian approach differed by providing the HPV quadrivalent vaccine to a younger starting group than many countries, and also with a catch-up program for females up to 26. The results have been significant: a 73% decrease in HPV incidence in eligible women from 2006 to 2010. At the same time, the use of the quadrivalent vaccine (covering types 6, 11, as well as 16, 18) has seen a decrease in incidence of HPV in males of 35% over the same time (with a decrease in younger males of 44%). The protection given to male partners of females vaccinated was underlined by there being no significant change in HPV incidence in gay males.





**Ian Denham's** presentation, *Sexual Health in the Post-Antibiotic Era* reminded us of where we've come from historically, and recently, in treatment of STIs; but worryingly, where we might be headed – increasing treatment failures of azithromycin against *C. trachomatis*, *M. genitalium* and even syphilis; ceftriaxone treatment failures against *N. gonorrhoeae*; anti-parasitic treatment failures against scabies; and up to 12% of yeast infections now diagnosed as resistant non-*C. albicans* (*C. tropicalis*, *C. krusei*, *C. glabrata*), and visual and graphic examples of the sequelae.

**Jennifer Delima's** presentation asked the question *Chlamydia – Eye or STI – Does it Matter?* From a strictly clinical treatment perspective, perhaps not – but from a medico-legal perspective, especially when involving minors, then the question becomes significant; and the difficulties of how to respond, how quickly to respond, and how foolproof the diagnosis has to be becomes critical.

*Nasopharyngeal Microbiology as a Tool in Monitoring Impact of Strategies to Reduce Risk of Infection in Indigenous Populations* as presented by **Amanda Leach** showed us the work conducted by Menzies School including the treatment of otitis media using long-term amoxicillin and its successful impact on reducing the incidence of ear perforations and pneumococcal carriage, without an increase in resistant pneumococci. Use of single-dose azithromycin did not reduce treatment failure rates, but reduced carriage rates, although this was offset by increased rates of azithromycin-resistant pneumococci.

We were then treated by **Phil Giffard** to his presentation, *Bacterial Skin Infections in Tropical Indigenous Populations*. The link between skin infections and acute rheumatic fever is microbiologically compelling, given the rarity of streptococcal throat infections in Top End Aboriginal infections, yet the rates of ARF and rheumatic heart disease are high. Similarly, *S. aureus* infections and the relevance of PVL in NT clones was discussed in detail.

After lunch, **Narelle George** presented *An Overview of EUCAST Antimicrobial Susceptibility Testing-the Way Forward*. Narelle outlined the pros and cons of changing AST methodology to

EUCAST and also touched on the issues of differing breakpoints (versus CLSI and CDS) ... meaning we will probably see higher reported rates of resistance once the new parameters are in place. Laboratories will need to pay attention to the differing disc strengths, different media and different QC orgs for this methodology. See [www.eucast.org](http://www.eucast.org) for more info.

**Claire Heney** took us into the maelstrom that was Queensland in January this year through her presentation *Floods and Bugs – Queensland 2011*. Claire began by outlining the preparatory work undertaken by using old data to help try and predict what might be the most likely pathogens arising from the flood disaster. Leptospirosis emerged as the most significant pathogen arising, followed by *Aeromonas hydrophila*; vibrio infections were not significant in Brisbane but incidences were well up across Queensland overall. Some other organisms highlighted through preparatory work, such as *B. pseudomallei*, *Salmonella* and *Shewanella*, failed to register as an issue during or from the floods.

**Craig Williams**, whose presentation title was *Mosquito-Borne Diseases – Impact of the 2010–2011 Floods on Infection Rates through Rural and Regional Australia*, began by first reminding us that rainfalls had been at record levels for much longer than the above date limits, citing meteorological rainfall maps as evidence. Factors of significance leading to the combinations driving mosquito-borne disease increases were worthy of the 'four horsemen of the apocalypse' analogy eloquently brought together by Craig.

The meeting closed with a presentation by local Alice Springs physician **Ciara O'Sullivan**, whose *Overview of Chronic Disease and Management in the Remote Setting* gave us a panoramic and breathtakingly beautiful photographic view of the central Australian landscape and the communities surrounding Alice Springs (views that Steve Parrish would be proud to claim as his own) – contrasting these vistas with images of the hardships of life in the outback, the difficulties of providing a remote health service, and reminding us that achieving positive outcomes remains as difficult as it was when she first joined the program 10 years ago.



The evening was consummated with dinner at Madigan's restaurant, with desserts and accompanied by wine and beverages, bringing the meeting to a close.

Thanks are in order to the organising committee, ICMS (and Rebecca Charlton in particular), to Alice Springs Convention Centre, to our sponsors, to the many delegates – and especially to our speakers.

Some of the delegates were able to use the remainder of the weekend to see the sights of Central Australia. It was a wonderful opportunity to do so and the half-dozen who travelled by bus together to Uluru on the Sunday had an amazing time together.

The above presentation summaries barely scratch the surface of what was actually covered in the two days of presentations. Of course, to do justice to the program is best done simply by being there. For the delegates present, all enjoyed the quality, diversity and standard of the presentations themselves. We encourage you to do the same, in three years' time, at the next Tri-State meeting.

Peter Traynor MASM  
 Scientific Program Convenor,  
 Tri-State 2011

## AUSTRALASIAN VIROLOGY SOCIETY CONFERENCE ANNOUNCEMENT



4<sup>th</sup> to 8<sup>th</sup> December 2011  
 Mantra on Salt Beach, Kingscliff, NSW

### 6<sup>th</sup> Australasian Virology Society Meeting (formally the Australian Virology Group)

**AVS6** is an opportunity for all those with interests in human, animal, plant or prokaryotic virology to come together in a relaxed environment and discuss issues from basic molecular virology to diagnosis and control. Topical general interest oral presentations from leading virologists will be combined with oral presentations selected from proffered abstracts where young postdoctoral researchers and students typically shine. Once again, we will offer generous student prizes for the best oral and poster presentations.

**Special International Speaker – Prof. Marilyn Roossinck**  
 Virus Evolution and Ecology, Penn State University, USA.

#### Symposia themes

- New and emerging viruses
- Virus structure, receptors and assembly
- Virus-host interactions
- Gene expression and replication
- Evolution and Ecology
- Viral epidemiology and diagnostics
- Viral disease
- Immunity and immune evasion
- Viral control strategies – Vaccines and Therapeutics

#### Call for abstract submissions and registrations

Abstracts for oral consideration – Friday 30<sup>th</sup> September (note EXTENDED deadline!)  
 Abstracts for posters – Friday 21<sup>st</sup> October  
 Early Bird registration rate expires – Friday 30<sup>th</sup> September (note EXTENDED deadline!)

#### Organizing Committee

**Nigel McMillan Chair**, University of Queensland  
**Damian Purcell** University of Melbourne  
**Vernon Ward** University of Otago, NZ  
**Barry Slobedman** Westmead Millennium Institute  
**Joanne Meers** University of Queensland

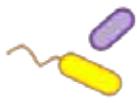
**Paul Young** University of Queensland  
**Patrick Reading** University of Melbourne  
**Tim Mahony** University of Queensland  
**Roy Hall** University of Queensland  
**Ralf Dietzgen** University of Queensland

AVS6 2011



[www.avs.org.au](http://www.avs.org.au)





## Message from the Committee

In July, the Student Special Interest Group organised a special careers event for our members at the annual ASM conference in Hobart. Planning started months ago and we managed to secure four excellent speakers for this event, including **Liz Hartland**, **Steve Djordjevic**, **Mark van Asten** and **Helen Smith**. They each brought a unique perspective to the workshop. They talked about life in academia, industry and public health and the ‘highs’ and ‘lows’ associated with working in each of these sectors. Responses from the students were overwhelmingly positive, which shows how much the students appreciated the speakers for coming and giving us a glimpse of what it is like working in a variety of industries. You can find out a bit more about this event and the reactions from students in this newsletter. I thank the speakers once again for their willingness to share their experiences with budding microbiologists. I am also grateful to **Hazel Mitchell** (University of New South Wales) for hosting the event on my behalf. I must thank my co-organiser **Jose Burgos** (University of New South Wales), and members of the workshop advisory committee – **Mitchell Groves** (University of Queensland), **Jennifer Mak** (Abbott Molecular) and **Sylvia Baltzer** (Flinders University) for their fantastic input and for bringing this event together! I’d like to thank **Tom Ross** (University of Tasmania) for organising the venue. Thank you to all of you who came to the workshop.

To go with the theme of the workshop, we will look at post-PhD career options for those who want to stay in research and those who want to try something different. I interviewed **Nadeem Kaakoush** to ask him how having your own postdoctoral fellowship could help kick-start your research career. I also spoke with **Anna Brockhurst** to learn about a career in consultancy. Many PhD graduates with a science background have gone into management or strategic consulting firms and are very successful at it because they have the problem-solving capabilities required for the job.

**Si Ming Man | Student SIG Convenor | Department of Veterinary Medicine, University of Cambridge, UK**



### ASM student careers workshop report

On the closing day of the 2011 Australian Society for Microbiology conference, the ASM Student Special Interest Group held a **Careers in Microbiology** workshop for postgraduate students. Chaired by **Professor Hazel Mitchell**, the workshop saw a panel of specially invited speakers discussing their respective fields of expertise and participating in a Q&A session with the student audience. The panel included **Professor Liz Hartland** (University of Melbourne), **Associate Professor Steve Djordjevic** (University of Technology Sydney), **Mark van Asten** (Diagnostic Technology) and **Helen Smith** (Queensland Health Forensic and Scientific Services).

The invited speakers offered first-hand advice of the career options and pathways relevant to today’s microbiology students. The presenters touched on pathways to academia, government research, diagnostics and the commercial sector. Through personal accounts, students were also given a glimpse into the worlds of human clinical, veterinary and public health microbiology. During the Q&A session, the panel imparted a wealth of knowledge and advice on the back of interaction with the keen audience. Discussion topics arising from student queries included the value of networking, the pros and cons of multi-institutional research projects and the importance of early-career affiliations and publications when applying for

postdoctoral positions, fellowships and research grants. Advice from Liz Hartland and Steve Djordjevic also emphasised the importance of scientific mentors when looking to expedite the transition from a doctoral student to an early career scientist. The success of the workshop was reflected by the number of students that stayed on to network with one another at the completion of formal proceedings. The panel members happily continued to field questions and talk science with these enthusiastic students.

Mitchell Groves | School of Agriculture and Food Sciences, University of Queensland | The photo above of Mitchell was taken by Larry Pitt Photography during the ASM 2011 public forum

#### Your feedback:

*"Thank you to the speakers – it was very helpful"*

*"The workshop ran perfectly. The presentations were excellent and they stimulated plenty of questions. I personally enjoyed the advice that was imparted. I hope the feedback suggest that the other students were equally as pleased. I'm certainly looking forward to ASM 2012"*

*"Continue to secure presenters with a diverse background such as those today"*

*"This session was an excellent session, very pleased to have attended"*

*"It was really good"*

*"It would be great to see more pre-conference promotion of this session in Brisbane 2012"*

#### Feedback from one of our speakers:

*"It was an excellent workshop and congratulations to yourself and the other organisers. There was a good range of scientists showing a range of possible careers. The students were participative and there were quite a few questions in session and afterwards from the shyer ones. It was good to see some early career students. It was a surprise and a bit of a concern to me that a number of students hadn't realised the value of networking for their future careers. All in all an excellent workshop and I was very happy to be a part of it"*

**Helen Smith** | Reference Microbiology and Molecular Epidemiology Laboratories Public Health Microbiology Forensic and Scientific Services



## Careers' corner

### Profile: Nadeem Kaakoush – NHMRC postdoctoral fellow

**Nadeem did his doctoral studies in the School of Medical Sciences at the University of New South Wales (UNSW), Sydney, Australia, where he investigated pathogenic *Helicobacter* and *Campylobacter* species. In 2008, he took up a research associate position in the School of Biotechnology and Biomolecular Sciences at UNSW, examining the role of mucosa-associated bacteria in IBD. Dr Kaakoush has recently been awarded an NHMRC postdoctoral fellowship to further his research in this field.**

*"... a fellowship provides you with more research independence, more respect within your local academic community and has greater impact when applying for academic positions"*

#### Tell us a little bit about your research

My research focus can be divided into two areas of study. My first area of research is the study of the involvement of microbes in inflammatory bowel diseases (IBD) using high-throughput sequencing and metabolomics. IBD are chronic inflammatory conditions of the gastrointestinal tract, with an unknown aetiology and a rising global incidence. IBD result in significant morbidity, with up to 80% of patients requiring surgery and often rigorous antibiotic and immunosuppressant regimens after each episode. The general hypothesis regarding the aetiology of IBD is that gastrointestinal microbes or their by-products, in association with a disrupted gastrointestinal epithelium and/or environmental trigger, propagate a dysregulated immune response leading to chronic inflammation in genetically predisposed individuals. My second area of research is the study of the pathogenic mechanisms of *Campylobacter concisus*, an emerging intestinal pathogen. *C. concisus* has garnered increasing attention from the scientific community due to its association with periodontal disease, enteritis and, more importantly, Crohn's disease, one of the two major types of IBD.

**What inspired you to go down the academia career path?**

Initially, as a premedical student during my undergraduate studies I found that I was always more interested in the novel questions posed by scientific research and the possible methods one could use to answer such questions rather than what was already known about the topic. This led me to pursue a career in research rather than a medical degree. Following from that, the opportunity to co-supervise and mentor undergraduate and postgraduate research students and see them succeed in their degrees inspired me to continue down this path.

**What is the difference between applying for a postdoctoral position and applying for a postdoctoral fellowship? When is it most appropriate to apply for a fellowship?**

The simplest explanation for a student would be that having a postdoctoral position (research associate) versus having a postdoctoral fellowship (fellow) is like having a scholarship from your supervisor's grant versus having an Australian Postgraduate Award, or a scholarship directly from another funding body. To apply for a postdoctoral position would generally require you to work on a predefined project that has already been funded by a grant. In contrast, applying for a fellowship requires you to have much more input in the project you will work on as the assessment of your fellowship application will be on both your academic standing and the project you want to work on. Of course the project you develop will have to fit within the scope of the laboratory you work in.

Even though fellowship applications are very competitive, there is no harm in applying for a fellowship straight out of a PhD. There is no limit on the number of times you apply for something if unsuccessful. In fact, the feedback provided would likely be beneficial for resubmission. The only limit I can think of, and graduates must be very aware of, is that many fellowships have a limit on the number of years you can be out of your PhD. For example, the limit for NHMRC postdoctoral fellowships was two years during my round of applications.

**What are the advantages of having a postdoctoral fellowship?**

The main advantage of having a fellowship as opposed to being a research associate would be the greater access to further funding. Funding bodies are more likely to award a postdoctoral fellow with research funding than a research associate because fellows would be more secure in their position and have already been successful in similar funding applications. Moreover, a fellowship provides you with more research independence, more respect within your local academic community and has greater impact when applying for academic positions.

**What was the biggest obstacle you faced in your scientific**

**career and how did you overcome this obstacle?**

I have been lucky throughout my career to not have faced big obstacles besides the usual problems arising from lack of funding, failed experiments and papers being rejected, all of which can be overcome with patience. However, having been in the field for nine years now, I would say the biggest obstacle is having a bad relationship with your supervisor. In contrast, a good relationship with your supervisor can be the difference between securing a great job in the future or not. Therefore, my advice would be to choose your supervisor and laboratory very wisely before you commit to doing a PhD somewhere.

**Do you think it is important to have overseas research experience?**

Definitely. Overseas research experience is one factor that assessors look at in a fellowship application. Travelling overseas also helps students understand how different laboratories function and helps you build collaborations with fellow researchers, collaborations which may lead to employment opportunities once you have completed your degree.

**If you would give anyone advice on how to be successful in your career path, what would you tell them?**

While this would be evident to most and may appear crude, so early in your career funding bodies will mostly base their assessment on the number and quality of publications you have. When applying for a research associate position, the techniques you master during your PhD may prove to be the key factor in employment. This is mainly because funding bodies expect fellows to learn and master a specific area of research, whereas positions offered by a supervisor have a specific job to be done in a limited amount of time.

I would also say that if you want a career path in academia then it is never too early to start looking at the types of postdoctoral fellowships available to you and their requirements. The easiest way to do this would be to get onto the mailing list of the Grant Management Office within your university or institute. Students should not limit their searches to the ARC and NHMRC, as many other specialised funding bodies, scientific companies and philanthropy organisations provide fellowships. Moreover, getting involved in a grant application with your supervisor during your PhD, while it requires an immense amount of extra work, can prove vital in both your experience with applications and your future success.

*“it is never too early to start looking at the types of postdoctoral fellowships available to you”*



### **Profile: Anna Brockhurst – Management Consultant**

**Anna is from Melbourne and is a professional and experienced project and change management consultant. Her consulting experience spans 12 years, across global clients and a range of industries. She has a business degree and a postgraduate certificate in entrepreneurship and innovation. She has worked in a range of industries, including retail, property, mobile telecommunication network development, water, financial, oil and gas, aggregates, and environmental carbon reduction. She has developed and implemented behavioural change programs across a range of locations, such as London, Pembroke, Wales, Kazakhstan and Los Angeles. More recently she has focused on cultural change programs, developing energy and carbon reduction programs for numerous large companies in the aggregates sector and working with Carbon Trust UK. This year she is spending her time on a Sales Transformation program to improve the effectiveness of a global sales force and align their use of the systems tools and processes available to them.**

*“I would expect scientific research would give you a very clear methodical mindset, this can be important in consulting”*

#### **What is consultancy?**

Consultants provide expert or professional advice to others. A medical doctor can often be referred to as a consultant, so it's the same principle and a consultant has varying degrees of technical knowledge required, depending on what it is you are a consultant in. Business consultancy is about coming into companies and helping them achieve a range of needs. For example, helping companies develop and implement energy and carbon reduction programs. In my experience much of consulting is about being energetic and have the drive to help businesses move from where they are today to where they need to be.

#### **Tell us a little bit about your company and your role within the company.**

I am a freelance Change Management Consultant, I have two main clients I work for: a boutique consulting company called the Sysdoc Group in the UK and Changeworks in Australia. In both I wait for them to win a contract and if the consulting role within this project suits my skill set I am contracted in to do the job. The main difference between being freelance and a paid staff

member of a consulting company is that I am responsible for my own professional development.

#### **What is the most exciting part of your job?**

New clients – for me it is exciting meeting new people and building new relationships. My work was once likened to starting a new job with every client; some years I may work with three or four different clients, so it is like starting three or four new jobs a year.

#### **What is the worst aspect of your job?**

Consulting can be very tiring. Going to new places, using new computer systems, meeting new expectation requires constant adjustment, which means often not staying long enough to build that sense of belonging.

#### **What do you look for in a good consultant?**

Strong relationship building skills, good listening and strong problem-solving capabilities. You need to be flexible and handle stressful project environments within short deliverable time frames. You also need to be logical, organised and have good written and oral communication skills.

#### **Do you think PhD students with a microbiology background are suitable for consultancy positions?**

I think everyone with the skills outlined above can be a consultant regardless of their technical skill set. I would expect scientific research would give you a very clear methodical mindset; this can be important in consulting but you need to be flexible around that methodology at times. I think you need to think about what sort of consultant you want to be, maybe one that focuses within the medical or research industry. A working knowledge of an industry is valuable but not key.

#### **What advice would you give PhD students who are considering a career in consulting?**

When looking to who it is you would like to work for be aware of the churn that the big consulting companies have on junior consultants. You will learn a lot but you will also work very hard. But these graduate programs are a good first step into a sector which sells its people as its product, so it is important to build on your CV in whatever manner is possible.

Just keep in mind that if you do not have the above skills, then consulting can be difficult. No matter how technically brilliant you are, if you do not form good client relationship and are unable to gain the trust of the client you will find consulting a difficult place to be.

Good luck!



# Annual Scientific Meeting and Exhibition

1 – 4 July 2012  
Brisbane Convention  
and Exhibition Centre

[www.asm2012.org](http://www.asm2012.org)

The **Australian Society for Microbiology** is pleased to invite you to its Annual Scientific Meeting, to be held at the Brisbane Convention and Exhibition Centre from 1 – 4 July 2012. The meeting is Australia's largest and most prestigious microbiological conference, attracting researchers, clinicians, professionals and supporters from all microbiological disciplines.

The conference program will include plenary lectures delivered by world leaders in Medical and Veterinary Microbiology, Applied and Environmental Microbiology, Virology and Molecular Microbiology. Symposia, other oral and poster presentations, and workshops round out a stimulating scientific program.

The format of the meeting for 2012 has been redesigned. In today's busy world it is increasingly difficult to attend a five day conference. ASM has responded by removing one day from the program, and changing the program scheduling. Our goal is to provide delegates with a richer, more concentrated experience, which also provides the time and opportunity for networking.

We look forward to seeing you in Brisbane in July 2012