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ComBio2017 International Speaker Profiles
We have another competition for the members of ASBMB.

All correct entries received by the Editors (email editor@asbmb.org.au) before 17 September 2017 will enter the draw to receive a gift voucher. With thanks to Shaun Gaskin.

Complete the word search. Once solved, the unused letters read from left to right, top to bottom, will make words which will provide clues as to who I am.

Fill out my name below once you have discovered my identity!

Clues

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--------- I am Professor --------
From the Editors

It is with immense pleasure that we present the August 2017 issue of the *Australian Biochemist* as the new Editors. First and foremost, we would like to thank the outgoing Editor, Chu Kong Liew, who served passionately for the ASBMB for the last five years. He had a clear vision and brought enthusiasm to the editorial role of the *Australian Biochemist*. He was also instrumental in the revamp of the ASBMB website. We would also like to thank the outgoing members of the Editorial Committee for their tremendous contributions, namely Rebecca Law (Competition and SIG reports), Brietta Pike (The Cutting Edge), Dominic Ng (News from the States), Margie Sunde (Travel Reports) and Justin Ridge (Off the Beaten Track).

As you know, the *Australian Biochemist* has already undergone some changes, including the transition to online only issues. Spearheaded by Chu, we have made a few changes to some sections of the magazine. We have introduced two new features in this issue – Publications with Impact and the ASBMB Education Feature. Most notably, we have retired the Showcase on Research that ran successfully for the last 19 years. We are keen to introduce more new sections to the *Australian Biochemist* and keep improving the existing features. In order to do so, we welcome suggestions from ASBMB members and the readers.

Thanks to all those who have contributed to this issue, especially our Editorial Officer, Liana Friedman, and our revamped Editorial Committee (see next page). We appreciate your support and hope you enjoy reading the magazine!

With warmest regards, Suresh Mathivanan and Tatiana Soares da Costa,
Co-Editors, Australian Biochemist

Would you like to help out with the *Australian Biochemist*? Then please join our Editorial Committee! If you have an interest in being part of this magazine, we warmly welcome your involvement. To volunteer or to find out more about what is involved, please contact the Editors at editor@asbmb.org.au

Cover Illustration
The embodiment of the 20 amino acids by Terry Mulhern, Department of Biochemistry and Molecular Biology, University of Melbourne. See page 9 for his article.

‘Chemical Cryptogram’ Result

The winner of the April competition is Emily Furlong, University of Queensland. Congratulations to Emily, who will receive a gift voucher.

WOMEN BIOCHEMISTS WHO WON NOBEL PRIZES
1. GERTY CORI (1947)
2. DOROTHY HODGKIN (1964)
3. GERTRUDE ELION (1988)
4. ELIZABETH BLACKBURN (2009)
5. ADA YONATH (2009)
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Using gene editing and proteomic approaches, Mike Ryan’s group at Monash University with colleagues investigated the importance of complex I subunits and how this enzyme is assembled in human mitochondria.

Complex I of the mitochondrial respiratory chain is the first enzyme involved in the electron transport chain required for the bulk of ATP production. Complex I is a monster – it contains 45 protein subunits, seven of which are encoded by mtDNA and the remainder encoded by nuclear genes. Bacterial complex I performs the same function as its mitochondrial counterpart, yet gets away with only having 14 subunits. These 14 subunits are also present as the core of the mitochondrial complex leading us to wonder what the function is of the additional ‘accessory’ subunits. Possible roles include assembly, stabilisation and the prevention of reactive oxygen species.

We decided to address this question by knocking out each of the accessory subunit genes in cultured human HEK293T cells. We commenced this work with TALENs, making the constructs from a library of more than 350 plasmids containing various TALE combinations. While the approach was highly successful, it was cumbersome and expensive. As CRISPR/Cas9 emerged and a single vector system became available, we moved to this technology to complete the study. These gene-editing approaches were used to target the gene of interest and clones were selected by sequencing alleles containing insertions–deletions that disrupted the reading frame, thereby making a knockout in cells.

In the end, we found that 25 of the 31 subunits were critical for keeping complex I assembled. Of the other five subunits, three could be removed without affecting the complex while the other two led to a more fragile complex. As we had these knockout cell lines, we also asked what changes in the mitochondrial and cellular proteomes occurred. This was performed using SILAC labelling and quantitative mass spectrometry with the large bulk of the work and analysis carried out by David Stroud in the lab. The most significant changes were, unsurprisingly, complex I subunits. However, different subunits were affected in different ways between the cell lines. We modelled these changes onto the recent cryoEM structure of complex I and found that loss of a subunit differentially affected neighbouring subunits of the complex. This led to the identification of different modules of complex I pointing to the way the complex is built. When we compared other changes in the proteomes, focusing on the differences between modules, we were able to identify and characterise two complex I new assembly factors. These assembly factors are new candidate mitochondrial disease genes.

Our work on these new assembly factors as well as other novel proteins identified from our proteomics approaches continues. We are also using mutagenesis approaches to uncover possible moonlighting functions in a set of accessory subunits of complex I.

Mike Ryan

Changes in complex I subunits in each of the knockouts form distinct clusters that correlate with modules on mitochondrial complex I.
Selling your research in less than 3 minutes

You have probably been told many times that you should have an elevator pitch ready… but what exactly is it? An elevator pitch is a short speech that helps you explain your research topic and findings in plain language to your uncle, a friend or someone you meet at a conference. Most people don’t want to listen to you rambling on about the intricate details about your findings, so the key is to keep it succinct and focus on the bigger picture. For PhD students, a good opportunity to practice their elevator pitch is by entering the Three Minute Thesis competition. Explaining complex ideas in simple terms is challenging but an essential skill for researchers to have. So how do you actually craft a good elevator pitch?

1. Explain why someone who is not a scientist should care about what you are working on

Can you remember the last time you were asked at a family gathering or a party what you do for a living? Did you have to pause? A good way to start is by introducing the relevance of your research in the context of benefits to society. Essentially, why it needs to be done/why it matters to other people/how it can improve our lives. Will it help cure cancer or solve global warming? Most people won’t care about how you synthesise a molecule that can disrupt the interaction between proteins X and Y, but they will care if that molecule can be used to treat cancer. Even if the practical application is a bit far-fetched, you need to make it relevant so they will bother spending the time listening to you in the first place.

2. Make your listeners feel involved

Getting people emotionally involved in your work makes them want to know more about what you do. You may want to include a personal story that others can relate to or how they may be affected by it. Using the word ‘imagine’ for example builds a bridge between the everyday experience of the audience and the academic work you are presenting. Using analogies is also a great way for listeners to conceptualise what you are explaining, as long as people can easily understand them; otherwise you will end up complicating things further.

3. Stun your audience with numbers and facts

Including statistics is a good way to highlight how important a particular issue is. But it is even more powerful if you can make real world comparisons. For example, instead of saying that the total uncoiled DNA encased in our cells is $2 \times 10^{14}$ meters long, why not say that the average person’s DNA can stretch from the sun to Pluto and back… 17 times! Also try to use any fun facts you may have uncovered during your research that others may not know. Did you know that there are ten times more bacterial cells in your gut than there are cells in your entire body?

4. Avoid jargon, acronyms and ‘academic’ words

This should be a no-brainer. There is nothing worse than using jargon or acronyms and making the listener feel stupid for not knowing what they are. This will instantly turn your listeners off. It is important not to make assumptions about the knowledge of your audience. The same goes for name dropping, unless you go on to explain who they are and why they are relevant. An elevator pitch is very different to a conference talk so avoid using terms that are specific to academia. They will not be understood by a non-specialist audience and will make them feel alienated.

5. Speak in an engaging manner

If you don’t sound like you care about the topic, why would anyone else care? Even if you are shy by nature, try to speak confidently by rehearsing your elevator pitch. Listen to other people describing their research and pay attention to what you like and dislike. Fake it until you make it!

6. Use humour… carefully!

Humour is a good way to break the ice but should be used carefully and delivered well. Some people are naturally great performers and can deliver jokes with spontaneity. But if that is not you, it is better to keep the jokes out so they don’t fall flat.

7. Practice, practice, practice

Practice in front of your work mates, friends and grandmother. If different audiences can understand your elevator pitch clearly, your job is done!

Having an elevator pitch ready will not only help your mum and dad finally understand what you have been doing at university/work for all these years, but it will also be beneficial to your career. Researchers often need to summarise their work while interviewing for a job, writing a grant application, visiting a lab or wooing a potential collaborator at a conference. Have your elevator pitch ready and well-rehearsed because you never know when you will need it next!
Welcome to the new ASBMB Education Feature of the Australian Biochemist!

We are delighted to be editing this exciting new feature, which will now appear in every issue of the Australian Biochemist. Our goal is to bring you interesting, thought-provoking, and fun articles and announcements from the ASBMB Education community.

Almost any contribution format is welcome. As you can see, this edition we have four great contributions from the education community: an interview by Heather Verkade with Allen Espinosa who is doing a PhD in biochemistry education at the University of Melbourne; a report of practice with some helpful resources about questioning from Angela Hu; an announcement about the ComBio Education Symposia from Maurizio Costabile and Amber Willems-Jones; and an inspiring description of performance art with a photo essay from Terry Mulhern. What an excellent start for our feature! Please write to us and make suggestions for your own article. We welcome your contributions!

Susan Rowland (s.rowland1@uq.edu.au) and Nirma Samarawickrema (nirma.samarawickrema@monash.edu), Editors, ASBMB Education Feature

A Discussion with a Biochemistry Education Student From a Research Intensive University

Heather Verkade, Department of Biochemistry and Molecular Biology, University of Melbourne, interviews Allen Espinosa

Allen Espinosa’s PhD is supervised by Heather Verkade and Terry Mulhern (Biochemistry and Molecular Biology), and Jason Lodge (Melbourne Centre for the Study of Higher Education).

What is your background?
I am a lecturer in Science Education from the Philippine Normal University, and now in my second year of a PhD in Biochemistry Education at the University of Melbourne. I hold a BSc (Philippine Normal University) and an MSc (University of the Philippines) in Chemistry Education.

Why did you decide to do a PhD in Biochemistry Education at the University of Melbourne?
As an educator, you don’t ever stop learning! A PhD in Biochemistry Education from a research-intensive institute with a high international reputation will enormously help advance my career. A PhD will also develop my research skills, and the outcomes of my training will enable students world over to achieve better outcomes.

What are you studying in your PhD?
My PhD focuses on identifying active learning methods to clarify misconceptions in large classes. In stage 1, I interviewed 11 academics from six universities with the objective of gaining an insight into how they design curricula and whether this is influenced by their pedagogical training. In stage 2, I interviewed second year Biochemistry students to explore the triggers for conceptual change. Mapping both sets of information has enabled me to design a new framework for active-learning tutorials for large classes, which can be applied to any topic. I am currently evaluating the effectiveness of the active-learning tutorial in enhancing students’ conceptual understanding in metabolism and carbohydrates. My goal is to design activities that encourage students to be independent learners.

Share one non-biochemistry facet about yourself.
I love dogs; they make me feel safe, relieve stress, keep me active. Dogs make me laugh!
Many Australian universities are rebuilding their recipe-style undergraduate laboratory classes into new, more discovery-based activities. It can be difficult to make major changes to the structure of the practical classes, especially when those who are teaching the classes are not well prepared for this transition. Some of the most influential teachers in the practical classes are the laboratory demonstrators. Although they play a pivotal educational role, they usually lack formal teaching training, and they often experience difficulty when first exposed to inquiry-based activities.

I recently completed a Master of Teaching degree, and as part of this program I conducted a research project with biochemistry laboratory demonstrators. I hoped to provide pedagogical training for the demonstrators so I could help them meet the demands of inquiry-based teaching. I, of course, also wanted to know if my training had been useful! My project focused on questioning techniques, because dialogic interaction is an essential component of inquiry-based learning.

I drew on evidence from literature studies to build a workshop about questioning techniques, and then I delivered it to 23 demonstrators who worked with a second-year biochemistry class. During the workshop, I stressed the significance of elaborating on students’ responses to further stimulate their scientific reasoning skills, acknowledging and restating students’ contributions, and involving the less active students in the discussion. Key teaching techniques we addressed in the workshop are shown in the accompanying table.

I was very glad that the workshop was well received. My analysis of the demonstrators’ reflections showed they were concerned about the quality of the teaching and learning experiences they provided to the students. They also reported an increased appreciation for and understanding of the importance of targeted questioning strategies in facilitating inquiry-based learning.

This project empowered demonstrators with the pedagogy for effective questioning techniques in laboratory classes. I am proud to say that now, when students ask the demonstrators a question, the demonstrators often ask one right back!

### Effective Questioning Techniques for Inquiry Learning

<table>
<thead>
<tr>
<th>Technique</th>
<th>Definition</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pausing</td>
<td>The amount of ‘wait-time’ the demonstrator allows to elapse after they pose a question</td>
<td>Allow students time to think about a question before responding, thereby increasing the quantity and quality of unsolicited answers</td>
</tr>
<tr>
<td>Rephrasing</td>
<td>Paraphrase or reword the question differently, and/or break the question down into smaller components</td>
<td>Improve the clarity of the question so students understand what is being asked</td>
</tr>
<tr>
<td>Redirecting</td>
<td>In the case of an inadequate answer, redirect it to another student</td>
<td>To encourage more participation in class discussion from the quieter students; allows other students to suggest corrections to the first student’s answer</td>
</tr>
<tr>
<td>Reacting</td>
<td>Respond to students’ utterance with a question</td>
<td>Positive reinforcement to correct answer and respond constructively to an incorrect answer; maintain information flow</td>
</tr>
<tr>
<td>Probing</td>
<td>Request for students to expand, clarify, or justify their answers</td>
<td>Use diagnostic questions to probe students’ prior understanding and misconceptions; encourage them to reflect on their answers</td>
</tr>
<tr>
<td>Elaborating</td>
<td>Build on the students’ responses with another question</td>
<td>Encourage students to provide more information; guide students’ thinking process</td>
</tr>
<tr>
<td>Modelling</td>
<td>Using ‘verbal cloze’ to allow students to finish the sentence</td>
<td>Offer a more scientific or technically appropriate way to use key terminology and phrases</td>
</tr>
</tbody>
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**ASBMB Education Feature**

**It’s Not Just About the Answers: Laboratory Demonstrators, Questions, and the Pedagogy of Inquiry Learning**

Angela Wenjing Hu, Department of Biochemistry and Molecular Biology, University of Melbourne

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Angela Wenjing Hu.
This year, ComBio will be held at the Adelaide Convention Centre from 2–5 October. The Education Symposium will consist of two streams, scheduled for Wednesday 4 October. The first stream, commencing at midday, will feature current education research related to the theme of ‘Integrating skills into teaching to improve student job capability’. The second stream session, scheduled for 3pm is titled ‘E-learning approaches to teaching’. In between the two sessions, all Education Symposia attendees will be invited to enjoy a fully catered lunch, kindly sponsored by the ASBMB Education Special Interest Group.

Key speakers include Karen Burke da Silva, 2016 University Teacher of the Year at Flinders University, and Heather Verkade, 2017 ASBMB Shimadzu Education Award winner. The best abstract in each session will be awarded free conference registration, sponsored by the University of South Australia (School of Pharmacy and Medical Sciences) and the University of Melbourne (Department of Biochemistry and Molecular Biology).

The Education Symposia at ComBio2017 will yet again provide high quality presentations showcasing educational approaches that are fostering excellence in biochemistry and molecular biology education at the university level. We look forward to seeing you all there!

‘Physical’ Biochemistry, But Not as You’ve Ever Seen it Before...

Terry (Tyrosine) Mulhern, Department of Biochemistry and Molecular Biology, University of Melbourne

Last December, I completed Rinske Ginsberg’s ‘Acting Skills Workshop for Lecturers’ at the Victorian College of the Arts. This workshop released my inner thespian, not seen since age 12, when I played ‘Bug-Eyed Monster #2’ in the school production. Before the workshop was over, the idea of embodying all 20 amino acids had formed and I convinced Rinske to help me script and perform it.

Over the summer, I mused on how to convey geometry, charge, reactivity, resonance and flexibility. I spent many pre-dawn hours (while my family slumbered in blissful ignorance) practising the yoga-like poses. The most difficult task was finding red, blue and yellow gloves and beanies in Melbourne’s late February heat. The blue gloves came from a stall at the Queen Victoria Market; the red came from the costume and props department at the VCA; my Mum knitted the yellow ones. I am indebted to Andy from the snowboard section of Auski, who, upon hearing why I was after beanies, said, “Dude, I have a huge stash at home – what colours do you need?”

Across two days I performed to over 1,200 second year students – first as an interactive exercise with the Biomedicine class, who used smart phones to vote on what each pose represented and then as an encore to the Science class, as a double act with Paul Gooley. Paul gave his usual lecture, while I demonstrated features that 2D-images cannot easily convey. I think the high point was the ring pucker of Proline.

Rinske and I plan to publish a paper describing the poses and are currently raising funds to create a high production value interactive multimedia teaching resource. After a research career of spectacular mediocrity, I believe this may be my most significant and lasting contribution to the field of biochemistry.

I am available for wedding, parties, anything – at very reasonable rates. For the Acting Skills Workshop for Lecturers, contact Rinske Ginsberg at the VCA rinskeg@unimelb.edu.au
Anne Brunet, Stanford University, USA

Anne Brunet is the Michele and Timothy Barakett Professor of Genetics at Stanford University. Dr Brunet obtained her BSc from the Ecole Normale Supérieure in Paris, France, and her PhD from the University of Nice, France. She did her postdoctoral training in Dr Michael Greenberg’s lab at Harvard Medical School. Dr Brunet is interested in the mechanisms of aging and longevity, with a particular emphasis on the nervous system. Her lab studies the genetic and epigenetic regulation of aging. She is particularly interested in neural stem cells aging. Another goal of the Brunet lab is to discover new genes and processes that regulate longevity using short-lived systems, the nematode *C. elegans* and the naturally short-lived African killifish. Dr Brunet has received several grants from the National Institute on Aging. She has received a number of awards, including the Pfizer/AFAR Innovations in Aging Research Award, an Ellison Medical Foundation Senior Scholar Award, and the Vincent Cristofalo Rising Star Award in Aging Research. She was awarded a Pioneer Award from the NIH Director’s fund, which supports scientists of exceptional creativity.

Manel Esteller, IDIBELL, Barcelona, Spain

Manel Esteller graduated in Medicine (1992) and obtained his PhD (1996) from the Universidad de Barcelona. He was an Invited Researcher at the University of St Andrews, Scotland, where he focused on the molecular genetics of inherited breast cancer. From 1997 to 2001, Dr Esteller was a Postdoctoral Fellow and a Research Associate at the Johns Hopkins University, USA, where he studied DNA methylation and cancer. His work was decisive in establishing promoter hypermethylation of tumour suppressor genes as a common hallmark of human tumours. From 2001 to 2008, Dr Esteller was the Leader of the CNIO Cancer Epigenetics Laboratory in Madrid, where he researched alterations in DNA methylation, histone modifications and chromatin in human cancer. Since October 2008, Dr Esteller has been the Director of the Cancer Epigenetics and Biology Program of the Bellvitge Institute for Biomedical Research (IDIBELL) in Barcelona, Professor of Genetics in the School of Medicine of the University of Barcelona, and an ICREA Research Professor. His research is devoted to the establishment of the epigenome maps of normal and transformed cells, the study of the interactions between epigenetic modifications and non-coding RNAs, and the development of new epigenetic drugs for cancer therapy.

Adam Frost, University of California San Francisco, USA

Adam Frost is an Assistant Professor of Biochemistry and Biophysics at the University of California (UCSF). He obtained his MD and PhD at Yale University and then worked as a postdoctoral fellow at the UCSF, where he developed a unique synergy between systematic genetics, biochemistry and structural biology. In 2011, he started his independent lab at the University of Utah, before returning to the UCSF in 2014. The Frost lab is animated by the idea that structural biology should be discovery biology, that efforts to see the cell’s machinery directly will teach us how living matter works. His lab studies molecular machines that are too fragile to purify, too large or too flexible to crystallise, or that depend on lipids for their form and function. The Frost lab integrates atomic structure determination by cryo-EM with genetics, biochemistry and diverse imaging techniques in collaboration with labs around the world. Recent examples include their discovery of the ribosome-associated quality control complex and the unexpected process of CAT tail elongation that is fundamental to protein quality control. The Frost lab has discovered new structures and functions for ESCRT pathway components that maintain nuclear envelope integrity and endosomal recycling, respectively.
Michael Hall, University of Basel, Switzerland

Michael N. Hall received his PhD from Harvard University and was a postdoctoral fellow at the Pasteur Institute and the University of California, San Francisco. He joined the Biozentrum of the University of Basel in 1987, where he is currently Professor and former Chair of Biochemistry. Hall is a pioneer in the fields of TOR signalling and cell growth control. In 1991, Hall and colleagues discovered TOR (target of rapamycin) and subsequently elucidated its role as a central controller of cell growth and metabolism. TOR is a highly conserved, nutrient- and insulin-activated protein kinase. The discovery of TOR led to a fundamental change in how one thinks of cell growth. It is not a spontaneous process that just happens when nutrients are available, but rather a highly regulated, plastic process controlled by TOR-dependent signalling pathways. As a central controller of cell growth and metabolism, TOR plays a key role in development and aging, and is implicated in disorders such as cancer, cardiovascular disease, diabetes and obesity. Hall is a member of the US National Academy of Sciences, has received numerous awards, including the Louis-Jeantet Prize for Medicine (2009), the Marcel Benoist Prize for Sciences or Humanities (2012), the Breakthrough Prize in Life Sciences (2014) and the Canada Gairdner International Award (2015).

Cathie Martin, John Innes Centre, Norwich, UK

Cathie is a group leader at the John Innes Centre and Professor at the University of East Anglia. Her interests span from fundamental to applied plant science. She researches into the relationship between diet and health and how crops can be fortified to improve diets and address the global challenge of escalating chronic disease. This work has involved linking leading clinical and epidemiological researchers with plant breeders and metabolic engineers to develop scientific understanding of how diet can help to maintain health, promote healthy ageing and reduce the risk of chronic disease. Cathie is also involved in genetic screens to identify crops which lack toxins that cause nutritional diseases, and has recently initiated a collaborative project with China to conduct research on Chinese medicinal plants.

Hanna Mikkola, University of California Los Angeles, USA

Hanna received MD and PhD degrees in 1997 from University of Helsinki where she defined genetic defects in a congenital bleeding disorder with Aarno Palotie and Leena Peltonen-Palotie. Hanna started her postdoctoral training in Stefan Karlsson’s laboratory in Lund University, where she developed lentiviral gene transfer tools for hematopoietic stem cells. In 2000, Hanna joined Stuart Orkin’s group at Harvard Medical School to study hematopoietic transcription factors and HSC development. Hanna became faculty at Department of Molecular, Cell and Developmental Biology at UCLA in 2005. Her lab aims to understand how stem cells in the hematopoietic and cardiovascular system are specified during embryogenesis, and how these processes could be recapitulated in culture. In addition to mentoring her team, Hanna teaches stem cell biology for undergraduate students.
Clotilde Théry, Institut Curie, Paris, France

Dr Clotilde Théry is an INSERM Director of Research (DR2) working at Institut Curie, where she heads the Exosomes and Tumor Growth team, created in 2007 within the Immunity and Cancer INSERM Unit U932. Since 1998, Théry’s scientific interests have focused on the study of exosomes (and more recently extracellular vesicles in general), secreted by immune and tumor cells, and their roles in communications between tumors and the immune system. Her goals are to understand the physiological functions of EV secretion during an in vivo immune response, and during tumor growth. Théry has published more than 90 articles in international peer-reviewed journals, especially in immunology, cell biology and cancer, she has organised symposia and sessions dedicated to exosomes in international meetings. She has been instrumental in the creation of the International Society for Extracellular Vesicles (ISEV), for which she has been elected Secretary General in 2012 and 2014, and, since 2012, she has been co-Editor-in-Chief of the Society’s journal, Journal of Extracellular Vesicles.

Jian-Kang Zhu, Chinese Academy of Sciences, Shanghai, China

Jian-Kang Zhu is Director of the Shanghai Center for Plant Stress Biology, Chinese Academy of Sciences, and Distinguished Professor of Plant Biology, Departments of Horticulture and Landscape Architecture and Biochemistry, Purdue University, USA. His group is interested in understanding the genetic and epigenetic basis of plant resistance to environmental stresses and in identifying key genes for modifying the responses of crops to environmental stresses. Plant agriculture must change fundamentally by mid-century, when 9 billion people are expected to inhabit the planet, consuming 70–100% more food than is currently available. The looming gap between water supply and demand creates a need for major advances in crop adaptation to drought and salt stresses through increased water-use efficiency and tolerance to saline soil. His research is aimed at improving our understanding of drought, cold and heat, and salt stress signaling pathways and resistance mechanisms. He is interested in epigenetic mechanisms of gene regulation and their roles in abiotic stress resistance. His group is interested in developing and applying gene editing technologies for functional genomics research and crop improvement, using a combination of genetic, biochemical, genomic and proteomic approaches to analyse various levels of gene regulation and to understand stress signaling and resistance.
Off the Beaten Track

Written by former researchers who have now established careers outside of research, Off the Beaten Track is intended to give the readers insights into the range of alternative careers available to them. Authors describe the paths they have taken to arrive at their present career and provide a detailed description of exactly what the job entails on a day-to-day basis.

Publishing Excellent Science

Brietta Pike, Journal Publisher, CSIRO Publishing

I am a Journal Publisher. In this role, I am responsible for overseeing a portfolio of peer-reviewed, scientific journals. The work of a Journal Publisher is never dull. In order to maintain an overview of the journals, I need to be in close contact with a number of teams within the publishing house, such as editorial assistants who help editors to move papers through peer-review to acceptance; production editors who prepare accepted manuscripts for publication; as well as marketing, e-publishing and finance/customer service teams. I also work closely with external clients, such as editorial boards composed of leading academics as well as society partners (we publish a number of society owned journals). My day may include anything from discussing and organising journal special issues with editors, analysing and interpreting journal metrics, putting together or executing strategic journal growth and development plans, managing performance of external editorial boards, preparing publishing agreements for society partners, tracking journal budgets, identifying new publishing opportunities such as journal acquisitions and start-ups, and travel to conferences for editorial board meetings, journal promotion or publishing workshops.

I did not plan for a career in publishing, so how did I get here? To go back to my time in the lab – my PhD was in biochemistry/molecular genetics at St Vincent’s Institute of Medical Research through the University of Melbourne, studying cell cycle signalling and the DNA damage response in yeast. I enjoyed working in a lab and loved the science but I was not convinced I had what it took for a career in research. Performing research became shadowed by the intense pressure of ‘publish or perish’ and your ability to sell your story, together with the competitiveness of grant funding. But I had no idea what I would like to do otherwise. I decided to do a...
postdoc and test myself further. I did this at the Friedrich Miescher Institute in Basel, Switzerland. This was a very exciting research environment and I still enjoyed the lab. It was also an exciting place to be culturally. In addition to being located right in the centre of Europe, I found myself as the only native English speaker in a large lab full of students and postdocs from all over the world – Switzerland, France, Germany, Italy, Netherlands, Spain, Japan, Iran... I spent an increasing amount of time helping my non-English speaking colleagues polishing their manuscripts and theses and less time on my own research in the lab. I realised I found it very rewarding to help others with promoting their science and I wanted to move my career in this direction.

As my postdoctoral grant came closer to an end, I began doing some freelance proofreading work, and eventually found a Production Editor position at a startup publishing house in Switzerland, which published peer-reviewed journals. My initial role was as a copy editor, but little did I know that I was the only one! After a few months I was given the task of forming a small copy editing ‘department’, including introducing billing for the service, and hiring internal and freelance staff. With no previous business or management experience (apart from students within the lab), this challenge gave me a first taste of the business world. I quite enjoyed following though this project and felt myself lucky to be thrown in the deep end this way. In the same way, I was able to gain experience in many aspects of the publishing process while with this company – from acting as a journal Managing Editor overseeing manuscripts from submission to publication; to publishing manuscripts online; to preparing basic marketing material; to launching new journals from scratch as the company grew.

With this experience under my belt, I secured a position at a well-established publishing house, also in Basel, Switzerland, Karger Publishers – a biomedical publisher with a 125-year history. My position was as a Product and Marketing Manager, responsible for journals and books within particular subjects. Here I got the chance to learn from some very experienced professionals. I also had the opportunity to work on some exciting projects in addition to my journal and book portfolio, such as leading the open access team to recommend how the company should grow in this model of publishing; repackaging of published content into topics rather than journals using semantic mining of the published content; and launching the company’s ‘mega-journal’ (following the model of PLoS One and other multidisciplinary open access journals).

For personal reasons, I decided to move back to Melbourne in mid-2015 and applied for an open position at CSIRO Publishing, which is where I am now. It is really impressive that CSIRO Publishing has a global reputation for quality products and state of the art publishing technologies, despite its small size. CSIRO Publishing currently has a portfolio of 28 journals, some owned and some published on behalf of societies (and also publishes books, magazines and runs writing workshops).

I did not plan to go into publishing but feel lucky to be here, because I still get to work with some great scientists and can focus on publishing excellent science and bringing it to the research community.

For young scientists contemplating a career in science publishing, there are many scientific editing companies around who look for freelance PhD-level editors to do copy editing and sometimes higher level scientific editing in their fields of expertise. A few hours a week may be all it takes to test whether you could see yourself moving away from the bench and your own research to a career in facilitating others to publish their best research.
I completed my undergraduate studies at the University of Otago, New Zealand, where I spent much more time on extracurricular activities than my coursework. I was nevertheless fortunate to have been taught by some excellent lecturers in biochemistry. Some of my favourite academic memories from that time include a course on the philosophy of science. I think it is a pity that we don’t teach students more about what it means to be a scientist, and how to do research properly, rather than filling courses with more and more content that they are required to memorise for exams. I can say with some conviction that those courses on the philosophy of science made a greater impression on me than the various metabolic pathways I had to memorise.

At the end of my third year, I was staring down the barrel of another summer throwing car tyres into 40-foot containers, which was dirty and exhausting work (for $10 an hour). I overheard some other students in my class talking about a summer scholarship program at the Australian National University; I think the deadline was that afternoon. I had no real idea what it was but I wrote an application letter very quickly and was lucky enough to be invited across the ditch to the ANU in 2002. I was pretty amazed by the resources available at the time and had an enjoyable summer, both scientifically and socially. It provided me with enough motivation that I went back and finished my Honours at Otago (with Dr Sigurd Wilbanks), with more effort that I had put into my undergrad courses. I was very lucky (again) that my Honours supervisor gave me a lot of freedom to pursue things I was interested in and helped design a project around protein chemistry with lots of limited proteolysis and N-terminal sequencing and the like. He was very patient with my incessant questions, gave me the space to learn things for myself and tolerated my frequent stuff-ups (including accidentally defrosting a freezer).

I started my PhD at ANU with Professor David Ollis in 2003, on a topic I was interested in but was still relatively new at the time – protein engineering. The protein engineering part of the PhD didn’t work very well but I was happy to discover that I was just as interested in protein structure and enzyme mechanism. It meant that I got seriously into old-school enzymology, which is basically physical organic chemistry, with Brønsted plots and pH-activity curves, etc. It’s not particularly fashionable, but I think it’s provided me with the training and background to do a lot of the higher-profile work that I’ve done since. I was also lucky to have people like Professor Michelle Coote around at the time as she very generously taught me a lot about computational chemistry (and being a successful early career researcher) during the project.

During my PhD I must have somehow made a good impression on Dr John Oakeshott at the CSIRO (who we were collaborating with) because he invited me to do some contract work for him during my PhD and then after I had finished he gave me the opportunity to work with him at what was then CSIRO Entomology. This was very fortunate timing, as my wife still had a year and a half to go to finish her PhD and I wanted to stay in Canberra. After a short 6-month postdoc position, I was made a team leader at CSIRO – working in an ostensibly insect-focused department was a bit of a departure but turned out to be extremely interesting in a scientific sense. It was a nice situation where my expertise (structure/mechanism) was complementary to John’s, who is an amazing geneticist/entomologist, with our interests overlapping at the point of protein evolution/engineering. Working on the molecular evolution of enzymes in response to insecticides has become something that I have continued to be interested in to this day. I think it’s really important to keep pushing yourself into new areas – this is how all the best work that I have done has come about. I also think it’s a good thing, when looking for a postdoc, to try to find a place where you will be bringing something new to a group, collaborating with people that do different things, rather than being a cog in a larger machine (even if it means fewer papers, etc.).

While I was at CSIRO I was lucky (again) when Professor Dan Tawfik visited and invited me to spend some time in his lab in Israel. This was a really amazing time; his lab was full of really talented students and postdocs and there was a lot of discussion about science. It confirmed to me that the most important thing in science isn’t equipment or resources – it’s ideas – talking/arguing about ideas and testing ideas and really being curious about things, asking questions and enjoying science. I still collaborate with Nobuhiko Tokuriki (who is now a group leader at the University of British Columbia), who I met in the lab at that time. After coming back to Canberra, I was lucky (again) to meet Dr Martin Weik at a meeting on protein dynamics in China – I asked him about whether he’d be interested in me joining his lab for a couple of years and he was very welcoming. I had developed a strong interest in protein dynamics and he was an expert in that area. My wife and I wanted to go to Europe at the time, so it seemed to fit quite well.

I was lucky to be awarded a Marie Curie Fellowship to spend time at the Institut de Biologie Structurale in Grenoble, France (next to the European Synchrotron Radiation Facility), to work with Martin. My wife, who is much smarter than I am, had an Alexander von Humboldt Fellowship to work in Munich, a few hours away. I also spent several months continuing to collaborate with Dan Tawfik. Grenoble was a beautiful location, although the language barrier was an issue at times. Some aspects of
Great Expectations

the project didn’t work very well (which is normal), but I spent a lot of time at the synchrotron there, solving structures and doing tricky things to probe structural dynamics, as well as doing some neutron scattering. We also spent a lot of our time travelling throughout Europe (fortunately, you get a lot of holidays when working in France). I wasn’t really hell-bent on being an academic, and I hadn’t spent a lot of time thinking about what I’d do next because CSIRO had held my position open for me, when I saw an advert for a senior lecturer position at the ANU. I thought it would be good experience to apply for the position, and my interests were becoming increasingly fundamental so the idea of having a research group where I could study a broad range of things was appealing, but didn’t realistically expect to get the job. After an interview/seminar, I was lucky (again) to be offered the job, the timing was just right as my fellowship was ending, so we left to return to Canberra in late 2012. We love Canberra, we are close to the outdoors and camping/hiking spots, and the university is great. I started the Chemical and Structural Biology lab at the Research School of Chemistry at the Australian National University in late 2012.

Starting a lab was an interesting experience and there is a lot I’d do differently. I felt under some pressure to establish myself. I was the youngest in my department by quite a bit, but my senior colleagues were very welcoming (although their records were intimidating to me, without many other early career researchers around). Looking back, I felt like I needed to be performing at a similar level to the senior people in my department and my friends who had labs overseas – which was lot of pressure, but meant that I couldn’t be complacent. One thing about starting out – it can be difficult to explain to collaborators that you need to establish an independent research program and in some cases can’t afford to keep working on established projects. Some people will be more understanding than others. But I would encourage new researchers to prioritise their own ideas at the start. There will always be papers to finish off, but it’s important to differentiate yourself so people know what your group is about – I’m not sure people necessarily know exactly what my group does even now! (Protein engineering and structural biology and catalysis if anybody’s wondering). I applied for a lot of grants, and received a lot of funding, mostly from international sources at the start. This was great, and now things are established and working I certainly need more funding, but it isn’t always a good thing when just starting out. It takes a lot of time to establish a single research project in a new lab, let alone four or five quite different ones. You also get a little bit constipated on the results which all drip through slowly from a range of different projects. It probably took four years before things were under control, and things are quite productive now, but it was a busy period.

My scientific journey so far has been characterised by a lot of luck and a lot of very kind and generous collaborators/mentors. I’ve had two very supportive Directors at my institute who believed in me, and in what I was trying to do at the start. Nobody has ever said I was biting off more than I could chew (although I expect a few people probably thought it – including me at times!). Working with nice and interesting people is one of the best parts about this job. I have also tried to follow things that I have been interested in, in a pretty naïve way to be honest (I don’t think that this is necessarily a bad thing). Generally, if people ask me whether I want to discuss or work on system ‘X’ or protein ‘Y’, I’ll say yes if I feel I can contribute something worthwhile, and often start the project myself if there are no students or postdocs available. This has led to a lot of fun and interesting (and unexpected) projects and collaborations. One example that springs to mind is a structure of a plant enzyme we looked at with Professor Barry Pogson that undergoes redox-mediated activation/inhibition via formation/loss of a disulfide bridge (Chan et al. (2016) PNAS 113, 4567) – this locks the protein into active/inactive conformations and fits into our work on protein dynamics. Another recent one is our work with Associate Professor Ian Cockburn on an antibody that binds to an important protein in malaria – we found quite surprisingly that many copies of the antibodies bind to it (Fisher et al. (2017) PLOS Pathogens, accepted), which raises lots of interesting questions about how antibodies can ‘evolve’ towards new antigens – this fits into our research program on molecular evolution of binding proteins. When you are really interested in problems you tend to find yourself working quite hard (although it doesn’t always feel like it). Since starting my own lab I have also been tremendously fortunate to have some excellent students, who have been very patient with me as I’ve learned to manage a group (still learning!), but have also worked very hard and produced lots of great results.
SOCIETY MEDALS, AWARDS AND FELLOWSHIPS NOW OPEN

Nomination or application forms for all 2018 Medals, Awards and Fellowships can be obtained directly from the ASBMB website: http://www.asbmb.org.au/awards.html

Nominations or applications must be submitted no later than 31 October 2017. Nominations or applications must be emailed to the Secretary of the Society, Briony Forbes: awards@asbmb.org.au Please note that hard copies are not required.

All applicants (excluding those for the Boomerang Award) must be current members of ASBMB. The requirement for the number of years of prior membership varies between awards. All recipients will receive complimentary registration for the 2018 ComBio meeting.

NOMINATIONS FOR MEDALS AND AWARDS

The **Lemberg Medal** is awarded to a distinguished ASBMB member who will present the Lemberg Lecture at the ComBio meeting. The Medal is presented in memory of Emeritus Professor M.R. Lemberg who was the Society’s first President and Honorary Member. The award will be made to an individual who has demonstrated excellence in biochemistry and molecular biology and who has made significant contributions to the scientific community. An honorarium is provided by ASBMB.

The **Merck Research Medal** is awarded to an outstanding ASBMB member with no more than 15 years since the award of the PhD degree (or equivalent taking any career disruption into account) at the nominated deadline. The successful candidate will present the Merck Medal Lecture at the ComBio meeting. An honorarium is provided through the courtesy of Merck.

The **Beckman Coulter Discovery Science Award** is awarded to an ASBMB member for distinguished contributions to the field of biochemistry and molecular biology. The nominee should demonstrate involvement in research innovation, technology transfer, and communication. The Award is intended as a Travelling Lectureship to enable the awardee to present his/her work at a number of centres within Australia and New Zealand. The awardee will also present a Symposium talk at the ComBio meeting. The award carries an honorarium to cover the travelling expenses, provided through the courtesy of Beckman Coulter.
APPLICATIONS FOR TRAVEL AWARDS AND FELLOWSHIPS

The **Shimadzu Education Award** rewards outstanding achievement in education in biochemistry or molecular biology, especially innovation and creativity in education, with a view to fostering leadership in this important area of the Society’s objectives. The Award will enable the recipient to participate in an international conference with a significant focus on education, or to spend a period of time at another institution for the purposes of undertaking developments in education in biochemistry and molecular biology. The recipient will present a lecture within the Education Symposium at the ComBio meeting. The contribution to travel expenses is provided through the courtesy of Shimadzu.

The **Boomerang Award** is awarded to an outstanding expatriate Australian biochemist or molecular biologist to allow them to return to Australia to present their work in a symposium at the ComBio meeting and to give seminars at universities or research institutes. This will provide the awardee with exposure in Australia and will facilitate interactions with local researchers. The Award makes a significant contribution to the cost of a return airfare and accommodation for ComBio, and towards domestic travel expenses to visit at least one other Australian city. Applicants must have been a member of a recognised Australian scientific society for at least 2 years, and awarded their PhD not more than 10 years prior to the closing date (or equivalent taking any career disruption into account). The contribution to travel expenses is provided by ASBMB.

The Awards Committee will also award several **ASBMB Fellowships** to postgraduate students who are no more than 2 years prior to the completion of their PhD degree or recently graduated postdoctoral researchers no more than 2 years subsequent to the award of their PhD degree. The contribution to travel expenses is provided by ASBMB. The most outstanding ASBMB Fellowship applicant may receive the **Fred Collins Award**. These travel grants are awarded to early career researchers, normally resident in Australia, in recognition of their outstanding work in an area of biochemistry and molecular biology. The Fellowships provide funds to assist the recipient to attend an overseas conference in a field associated with biochemistry or molecular biology, or to visit briefly a research laboratory in Australia or elsewhere to access specialised equipment or to learn new research techniques.

APPLICATIONS FOR OTHER AWARDS

The **Bioplatforms Australia Award** is awarded to a biochemist or molecular biologist with no more than 7 years postdoctoral experience working in the field of genomics, transcriptomics, proteomics, metabolomics or relevant bioinformatics. The award is based on recognition of outstanding research and the potential to carry out independent research. Preference is given to those setting up an independent laboratory for the first time. The Award provides $10,000 worth of access to the services provided by nodes of Bioplatforms Australia, provided through the courtesy of Bioplatforms Australia. The recipient will give a talk at the ComBio meeting.

**Eppendorf Edman Award** is awarded to an ASBMB member with no more than 7 years postdoctoral experience (or equivalent taking any career disruption into account), in recognition of their outstanding research work. The Award provides funds to assist the recipient to attend an overseas conference in a field associated with biochemistry or molecular biology or to visit briefly a research laboratory in Australia or elsewhere to access specialised equipment or to learn new research techniques. The contribution to travel expenses is provided through the courtesy of Eppendorf South Pacific.
The Yeast Special Interest Group (Yeast SIG) was established in 2005, prior to our hosting of the XXIIIrd International Conference on Yeast Genetics and Molecular Biology (ICYGMB) in Melbourne in 2007. Our aim is to promote research and education on yeast, including its applications in industry (e.g. wine making, beer brewing), as a pathogen (e.g. Candida, Cryptococcus), as a model organism for biomedical research (e.g. Saccharomyces cerevisiae and Schizosaccharomyces pombe), or simply as an experimental tool (e.g. Pichia pastoris for recombinant protein expression).

The membership of the Yeast SIG overlaps with that of the Australasian Yeast Group (AYG – incorporating the Yeast SIG of ASBMB), which was formerly known as the Australian Yeast Group, but has now been expanded to include New Zealand members. The current Yeast SIG President is Dr Alan Munn (Griffith University), the Treasurer is Associate Professor James Fraser (University of Queensland) and the Secretary is Dr Ben Schulz (University of Queensland). The AYG website and membership list are currently maintained by Dr Simon Schmidt (Australian Wine Research Institute). Simon took over in December 2016 from Dr Paul Chambers, who had served in this role since the inception of the Yeast SIG. The Yeast SIG and AYG are very grateful for the outstanding contribution of Paul to the Yeast SIG. Our website was redesigned in 2016 with funding contributions from ASBMB to the Yeast SIG.

The most recent Yeast: Products and Discovery (YPD) meeting was held at the University of Adelaide from 2–4 December 2015 (YPD2015). The YPD2015 local organising committee included Dr Paul Chambers, Dr Jenny Bellon and Dr Paul Henschke, all of the Australian Wine Research Institute (AWRI), Dr Miguel de Barros Lopes (University of South Australia) and Dr Paul Grbin (University of Adelaide). YPD2015 was well attended (72 registrants) and several of our members from New Zealand attended and served as session chairs and/or gave presentations, including Dr Evelyn Sattlegger of Massey University, Professor Brian Monk of the University of Otago and a number of PhD students. ASBMB funding contributions to the Yeast SIG, as well as proceeds from past YPD meetings, were used to provide travel awards ($200 each) to nine Australian PhD students from interstate to support their travel to attend and present their research at YPD2015.

The opening plenary address at YPD2015 was given by Professor Ian Dawes (University of New South Wales) and was a stimulating reflection on Ian’s experiences over many years in research on cellular responses to redox stress, and the current status of knowledge in this important field. Ian is a highly engaging speaker and he shared with us many of his personal experiences and insights punctuated with gems of humour.

YPD2015 featured sessions on Molecular Cell Biology, Yeasts: Understanding and Treating Disease, Systems and Synthetic Biology, Signalling, Yeast in Fermentation Industries, Student Presentations, Yeast/Environment Interactions, Evolution & Ecology and Gene Expression. The quality of the presentations was outstanding and covered diverse topics including:

- Metagenomic analysis of wild wine fermentations and ‘yeast bubbles’ (A Borneman, AWRI)
- Mechanisms of immune evasion by pathogenic Candida (A Traven, Monash)
- Quantification of the filamentous growth in a yeast colony (B Binder, Adelaide)
- The structure and function of the TOM complex in yeast mitochondria (T Lithgow, Monash)
- Defining the antifungal mechanisms of plant defensins (K Parisi, La Trobe)
- 3’ UTR dynamics and prediction of mRNA fate (T Beilharz, Monash)
- Altered virulence of the key laboratory version of Cryptococcus neoformans type strain H99 (S Arras, Queensland)
- Overproduction of ‘rose’ aroma compounds in wine (A Cordente, AWRI)
- Regulation of the yeast cell cycle checkpoint kinase Rad53 (J Heierhorst, St Vincent’s)
- Genetic interaction networks (G Perrone, Western Sydney)
Gastric acid secretion and its regulation (C. Eppie, Melbourne)

Yeast competitive fitness in fermentation environments (S Schmidt, AWRI)

Protein N-glycosylation and its effect on secretion and cell wall retention in recombinant *Saccharomyces cerevisiae* (H Kroukamp, Stellenbosch, South Africa)

Two students, Jessica Chitty of the University of Queensland and Seeseei Molimau-Samasoni of Victoria University of Wellington, New Zealand, won AB Mauri-sponsored student presentation awards of $200 each.

As well as the scientific presentations, registrants enjoyed winery tours and wine tasting; some attendees chose Hardys Tintara winery and others chose Chapel Hill winery. After the tours we reunited for more wine tasting and a memorable conference dinner at Wirra Wirra winery.

The AYG is currently organising its next biennial YPD meeting. The Chairperson of the Organising Committee for YPD2017 is Professor Rod Devenish (Monash University). YPD2017 will be held at Federation University, Mount Helen campus, Ballarat, Victoria, from 29 November–1 December 2017, and we are all looking forward to an exciting scientific program.

**Alan Munn, Griffith University, a.munn@griffith.edu.au**
Professor Peter Colman was awarded a Companion of the Order of Australia (AC) for ‘eminent service to medical research, particularly in the fields of structural biology and medicinal chemistry, as a leader in the commercial translation of scientific discoveries, to professional organisations, and as a mentor of young scientists.’

Peter Colman took his PhD in physics at the University of Adelaide before embarking on postdoctoral work with Brian Matthews (also ex Adelaide University) in Eugene, Oregon, on the crystal structure of the enzyme thermolysin, and then with Robert Huber, Max Planck Institute, Munich, on antibody structure. He returned to Australia with an ARC Queen Elizabeth II Fellowship, spent at the University of Sydney where, with Mitchell Guss and Hans Freeman, they solved the structure of the blue copper protein plastocyanin.

He joined CSIRO’s Division of Protein Chemistry in 1978, having just commenced collaborating with WG Laver at the Australian National University on the influenza virus neuraminidase. This work led to him co-founding Biota and initiating work on the discovery of neuraminidase inhibitors as a new class of antivirals. Relenza and Tamiflu are stockpiled by governments around the world against pandemic influenza.

In 2001, he moved to the Walter and Eliza Hall Institute and established a Structural Biology Division that included a strong medicinal chemistry component. By the end of 2006, their efforts, together with other WEHI colleagues, triggered a collaboration agreement with Genentech, later also including Abbott (now Abbvie). Venetoclax, a BCL-2 antagonist approved for treatment of certain forms of chronic lymphocytic leukemia, is a result of that collaboration.

Peter recently retired as Division Head at WEHI but continues to run an NHMRC-funded laboratory there.

Professor Peter Klinken was awarded a Companion of the Order of Australia (AC) for ‘eminent service to medical research and biochemistry through seminal contributions to understanding the genetics of major diseases, and to the people of Western Australia through promoting the importance of science and innovation.’

Professor Klinken is a leading Western Australian medical research scientist, highly regarded for his work in advancing the understanding of genes involved in leukaemia, cancer and anaemia.

Peter studied the biochemistry of steroid production during his PhD at the University of Western Australia (UWA), and taught Chemistry at Scotch College (Perth) while writing up his thesis. He then undertook a Fogarty Fellowship at the National Cancer Institute in Bethesda, Maryland, USA, where he was exposed to the exciting new world of cancer genetics. Retroviruses had been discovered carrying cancer-causing oncogenes, and mammalian counterparts for these viral genes were being identified. He worked primarily on two oncogenes, raf and myc, and the impact these genes had on the hematopoietic system.

He then returned to postdoctoral position at the Walter and Eliza Hall Institute in Melbourne, a period he describes as “scientific heaven”. Quite unexpectedly, he observed that B lymphoma cells transformed with the combination of raf and myc oncogenes developed a propensity to switch lineages and become macrophages. Using a raf/myc-containing retrovirus he also generated an immortalized erythroleukemic cell line, which served as an excellent model for erythropoietin-induced red blood cell differentiation. From there he accepted an academic position at UWA and continued working on red cell maturation, and attempting to identify novel oncogenes. His research team identified a number of novel genes with oncogenic properties, including Myeloid Leukemia Factor 1 (Mlf1) and Hemopoietic Lineage Switch 5 (Hls5). In recent years, he has been involved with the FANTOM5 consortium that has taken transcriptomic research to new levels.

His previous roles have included Professor in Clinical Biochemistry at the University of Western Australia; Director of Research at the Royal Perth Hospital; and the Director of the Harry Perkins Institute of Medical Research (previously the Western Australian Institute for Medical Research). Under his stewardship, the Perkins Institute attracted world-class national and international researchers to the State and made numerous acclaimed medical discoveries. He also spearheaded the development of two new state-of-the-art medical research facilities, Perkins North in Nedlands (QEII Medical Centre) and Perkins South in Murdoch (Fiona Stanley Hospital).

Professor Klinken brings a wealth of knowledge and expertise to the role of Chief Scientist. His input will support the Government in growing the State’s science industries to achieve future prosperity for Western Australians.
Professor Angel Lopez was awarded an Officer of the Order of Australia (AO) for ‘distinguished service to medical and scientific research in the areas of immunology and cell biology, and through innovative developments in cancer treatment, particularly acute myeloid leukaemia.’

Professor Lopez is Co-Director of the Centre for Cancer Biology, a medical research institute in Adelaide that focuses on cancer. He holds an MD from the University of Rosario, Argentina, a PhD from the University of London, UK, and is a Fellow of the Royal College of Pathologists of Australasia. He has worked for over 30 years on the structure and function of cytokine receptors and their mechanism of action in health and disease. He is the Head of the Cytokine Receptor Laboratory where he leads a team of hard working and enthusiastic investigators internationally recognised for their work into the βc cytokine family that revealed how βc receptors signal. Insights by many bright investigators that worked in the Cytokine Receptor Laboratory, such as Michael Elliot, Chris Bayley, Jo Woodcock, Mark Guthridge, Hayley Ramshaw, Daniel Thomas and Tim Hercus led over the years to a deep understanding of how βc cytokines and their receptors assemble on the cell surface, how they signal and what biological activity they regulate. The work of this laboratory has been highly collaborative involving several academic and clinical groups. In particular, the long-standing collaboration with Professor Michael Parker’s group (SVI and Bio21) has been and continues to be a source of continuous enjoyment and successes that revealed significant new paradigms in cytokine receptor activation that were published in major international journals. Similarly, the collaboration with CSL Limited over many years has been incredibly fruitful, enabling the practical application of the laboratory’s insights and the development of several anti-receptor antibodies into potential new treatments for acute myeloid leukaemia and for allergic inflammatory conditions.

Professor Lopez was elected a Fellow of the Australian Academy of Science in 2014 and in 2015 was elected a Fellow of the Australian Academy of Health and Medical Sciences. He was the inaugural convenor with Professor Mathew Vadas of the biennial Barossa Signalling Meetings, now coming up to its eighth edition and currently chaired by Professor Stuart Pitson. Professor Lopez received the 2010 South Australian Scientist of the Year Award and also the 2010 South Australian of the Year – Science Category Award from the SA Government.

Professor Richard Christopherson was awarded a Member of the Order of Australia (AM) for ‘significant service to medicine in the area of molecular bioscience through contributions to cancer research.’

Richard is Professor Emeritus of Biochemistry in the School of Life and Environmental Sciences at the University of Sydney. During his career in cancer research, he has been a Fellow at the University of Southern California, the University of North Carolina, the Australian National University and the University of Melbourne. At the University of Sydney, where he has worked for 31 years, he was the Foundation Chair of the School of Molecular and Microbial Biosciences (1998–2003). In 2003, he established a proteomics facility at the University of Sydney using a grant of $1.79M from the Major National Research Facilities (MNRF) program. In 2008 and 2010, he was Chair of the Sydney Cancer Conference that brings together researchers from all levels of involvement with cancer. In the past 31 years, he has been the primary supervisor of 24 PhD students, with three more currently enrolled.

The key discoveries in his career have been:

- Elucidation of the catalytic mechanism of the enzyme dihydroorotase (DHOase), with rational design and synthesis of potent inhibitors. DHOase has a catalytic mechanism similar to that of a protease where a zinc atom at the active site coordinates and stabilises the tetrahedral transition state intermediate for the reaction.
- Elucidation of the antipurine mechanism of the anticancer drug, methotrexate. Accumulated dihydrofolate polyglutamates are potent inhibitors of the first enzyme of the de novo purine pathway, amido phosphoribosyltransferase.
- Development of the DotScan CD antibody microarray that provides extensive surface profiles for diagnosis of leukemias that express the corresponding CD antigen (eg, profiles distinguish between stable and progressive chronic lymphocytic leukemia (CLL)).
- Design and development of engineered antibodies (demibodies) for highly selective killing of cancer cells by targeting an unusual pair of surface proteins (with Professor Jacqui Matthews). Two demibodies are selected that bind to an unusual pair of surface proteins found on the cancer. The demibodies combine as a hetero-dimer only at the cell surface and induce cell killing.
- Demonstration that the purine analogue fludarabine, kills CLL cells by the unfolded protein response (UPR). The levels of proteins involved in the UPR increase, indicating that endoplasmic reticulum stress is likely to be one mechanism for induction of apoptosis in B-lymphoid cancers.

His current research involves proteomic analysis of leukemias, in particular profiling cell surface proteins, elucidating mechanisms of action of fludarabine, ibrutinib and idelalisib at the protein level, and development of demibodies.
Patent Myth Busting

A series of regular articles on intellectual property.

Over the course of the next few issues of the Australian Biochemist, we will briefly examine some commonly held misconceptions about the patenting process. In this issue we will take a quick look at the following patenting myths:

1. I worked on a patented invention, so I should be named an inventor on the patent.
2. Patenting prevents me from publishing.
3. Presenting at a conference or seminar isn’t a ‘publication’.

Myth 1: I worked on a patented invention, so I should be named an inventor on the patent.

Why is inventorship important and what is the relationship between authorship and inventorship? The ownership of a patent ultimately derives from the rights of the inventors (I). This means that if inventorship is wrong on a patent, ownership can also be called into question; the net result being that the patent may be deemed invalid. This means that the deliberate incorrect inclusion of an individual as an inventor could destroy the property rights of the true inventor(s). Importantly, the inventorship determination must be done before a patent is allowed or granted and ideally it is done before filing.

How is inventorship determined? This is not a straightforward process due, in part, to the intangible nature of intellectual property. Generally, the first step in an inventorship determination is to prepare a patent specification that describes the invention or inventive concept. The process of setting out the invention in a patent specification is analogous to preparing a land survey to define the boundaries of a piece of land. Having the patent specification enables the parties seeking to be named as inventors to define the property in question.

The next step is a careful review of the patent specification to understand what the invention or inventive concept is. Not all contributions described in the patent specification will provide basis for a valid inventorship claim. It is the nature of the contribution, rather than the amount of contribution that is important, including whether a contribution is qualitative rather than quantitative in nature.

The following contributions may be considered to amount to inventorship:

• the contribution has a “material effect” on formation of the invention (i.e., without this contribution the invention “would have been less”);
• the contribution was to the “conception of the solution” to a problem that is solved by the invention;
• where one person had a general idea of what needs to be done to solve a problem but needs the ideas of another person to put this into effect (this may result in “joint inventorship”);
• where the final concept of the invention would not have come about without a particular person’s involvement.

The following are examples of contributions which would not normally be associated with inventorship (but might well give rise to authorship):

• a person’s contribution involved no more than carrying out instructions prepared by someone else (for example, the instructions of a postdoctoral researcher to a technician);
• where a contribution amounted to nothing more than a suggestion of something well known that has no material effect on the invention;
• where the contribution merely related to understanding or explaining how an invention works once that invention had already been made.

Conclusion: Inventorship is not the same as authorship. Just because you worked on a patented invention does not necessarily mean you are an inventor.

Myth 2: Patenting prevents me from publishing.

Publish or perish – right? There is little doubt that there is enormous pressure on researchers to publish so that their grant applications are competitive. Researchers place great pride and emphasis on their publication record and publishing their research is an important aspect of contributing to further research and developments in the scientific community.

Patent applications are another important way of sharing inventions and research findings with the scientific and broader community. A publication record and a patent filing record are not mutually exclusive.

Filing patent applications does not stop you from publishing your work. At most, it may delay you from publishing by a week or two – and if you’re ahead of the game, it won’t delay you at all.

Consider the following scenario (which I appreciate is simplified, and assumes you work in a research institute/university environment):

• You have just completed a body of research which has led to the discovery that a particular molecule is particularly useful at treating a disease in an animal model.
• You get ready to start drafting a manuscript reporting your findings and at the same time, inform your Technology Transfer Office of your research. The Business Development Manager at the Office may
spend some time discussing the invention with you, so that they can determine the likely commercial applications and the best way to protect your intellectual property.

- Within a week or so, the Business Development Manager advises you that your work may be worthy of patent protection and that a commercial partner would potentially take on the costs of future patenting if they are given the right to your intellectual property to develop a commercial product.
- At this point, patent attorneys are contacted and asked to start drafting a patent application.
- The patent attorneys ask you to provide the materials you have/are preparing for the draft manuscript and an hour or two to briefly discuss your invention with them.
- While the patent attorneys are drafting your application, they have one or two follow up questions for you: this takes an hour of your time. The patent attorneys also ask you to review the draft specification which takes two hours of your time.
- You finalise your manuscript for submission to a journal and around the same time, your patent application is ready for filing. Your patent application is filed two months before your manuscript is accepted for publication by your chosen journal.
- In total, you have invested fewer than ten hours of additional time. At the end of the process you have a provisional patent application and a journal article.

It is hard to see how the process I have described above could prevent you from publishing. However, if you decided to proceed with publishing your manuscript without engaging with your IP Manager or Technology Transfer Office and their patent attorneys, you would be impeded from obtaining patent protection.

Not all processes for obtaining a patent application will be as simplistic as that outlined above, but hopefully this scenario highlights the speed with which a patent application can be drafted, and the time investment required from you.

Typically, provided that your patent attorneys have some warning of the likely publication of your work, they will be in a position to ensure that your provisional patent application gets filed beforehand.

Ideally, by the time you file your patent application, you won’t have submitted the manuscript yet, but this can still be managed appropriately, provided there are confidentiality agreements in place with the journal.

To summarise, publishing first will impact on your ability to seek patent protection later. However, filing your patent application first does not impact on your ability to publish later. Patent first; publish later (but not much later).

Conclusion: It is possible to have a prolific publication record, and at the same time, protect your inventions by filing patent applications.

Myth 3: Presenting at a conference isn’t a publication

Many researchers mistakenly believe that the informality of a departmental seminar, poster presentation at a conference, or even a talk at a conference does not constitute a ‘publication’ which would impact on their ability to obtain patent protection in the future.

Unfortunately, this belief is incorrect.

When a patent application is examined (as outlined in my article in the last issue of the Australian Biochemist), the examiner will perform an extensive search of publically available documents to determine if your invention is novel and inventive. The search results may include conference abstracts (sometimes published in journals after the conference) and powerpoint presentations posted to the internet.

Moreover, just because a patent examiner accepts your patent application does not mean that all the potentially relevant prior art has been identified. In most jurisdictions, there are provisions for a third party to challenge the validity of a patent. During such challenges, materials made available to the public prior to your application filing date (but not identified by the examiner) may come to light.

Material posted to university or research institute websites is also relevant prior art for determining the validity of a patent. For example, departmental flyers announcing the successful results of a research group and even advertisements for student or postdoctoral research positions can potentially disclose information which may significantly impact on future patenting options.

Importantly, in some jurisdictions, it does not matter whether the public disclosure is a published document or an oral presentation. As outlined in my previous article, the patent laws in each country are different. For some countries, if it can be demonstrated that the information pertaining to your invention was made available to the public, and based on that, the invention could be reproduced by someone skilled in the relevant technological field, then there is a risk that your patent may be invalidated.

Conclusion: A presentation at a conference is just as significant a public disclosure of your invention as a journal article. Presenting your work at a conference could potentially jeopardise your opportunity to obtain a patent to your work.

Note

1. Basically, if the owners of the patent aren’t the inventors themselves, then the owner must have obtained the rights to the patent from the inventors.
In May 2017, twenty-one outstanding Australian scientists were elected to the Australian Academy of Science - two of the new Fellows are ASBMB members.

**Professor Jennifer Martin, Griffith Institute for Drug Discovery**

Jennifer Martin is an internationally renowned protein crystallographer. She has made seminal discoveries in bacterial redox biochemistry, including revealing how the DsbA enzyme assembles bacterial ‘weapons’, and validating DsbA as a target for novel antibacterials that are now being developed. Through her role as a founding member of the Science and Gender Equity (SAGE) Steering Committee, Martin helped implement the Athena SWAN pilot to address gender equity in science. Martin is a strong public advocate for science with an inspirational and highly effective science communication record.

**Professor Jozef Gécz, Department of Paediatrics, University of Adelaide**

Jozef Gécz is a human molecular geneticist internationally recognised for his contributions to the genetics of childhood onset neurological disorders, including intellectual disabilities, epilepsies, autisms and cerebral palsies. Gécz identified the first gene for non-syndromic intellectual disability, the FMR2 gene in 1994 and more than 100 other genes for various forms of neurodevelopmental disabilities. His research has transformed the understanding of the genetic architecture of neurodevelopmental disorders and those arising from genes on the human X chromosome specifically, and has led to better management and treatment of these conditions. His research delved into fundamental aspects of disease mechanisms and led, among others, to clinical trial of the neurosteroid allopregnanolone for treatment of PCDH19 girls-only epilepsy and autism.

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**ELECTION OF COUNCIL 2018**

Nominations are called for the following positions on the Council of the Australian Society for Biochemistry and Molecular Biology Inc for 2018: Secretary, Treasurer, Editor, Secretary for Sustaining Members and State Representatives for ACT, NSW, Qld, SA, Tas, Vic and WA.

- **President**: L. Tilley
- **President Elect**: nominations sought
- **Secretary**: B. Forbes#
- **Treasurer**: T. Piva*
- **Editor**: S. Mathivanan#
- **Education Representative**: S. Rowland#
- **Secretary for Sustaining Members**: S. Jay#
- **ACT**: Y.P. Mabbitt*
- **NSW**: K. Michie#
- **Vic**: E. Lee#
- **Qld**: D. Ng*
- **SA**: S. Polyak#
- **Tas**: K. Brettingham-Moore#
- **WA**: N. Taylor*

Nomination forms are available on the ASBMB website. Nominations for all vacant positions must be signed and seconded by members of the Society. The nominations must be signed by the nominee to indicate his/her willingness to stand. If more than one nomination is received for any position, a ballot will be held to determine the successful candidate. All members may vote for all positions except those of State Representatives where election is by members in the State concerned.

**NOMINATIONS MUST REACH THE SECRETARY BY 5PM 21 SEPTEMBER 2017**

(14 DAYS BEFORE THE ANNUAL GENERAL MEETING TO BE HELD AT 1:15PM 5 OCTOBER 2017)
It was an honour to receive the 2017 Eppendorf Edman Award, which allowed me to attend the EMBO/EMBL Molecular and Cell Biology of Membranes Symposium from 21–23 May, in Heidelberg, Germany. The meeting was held at the EMBL Advanced Training Centre, which is a short bus ride into the forest from the Altstadt (old town) area. After the bus drops you off in the morning you are trapped in the forest for hours of presentations and scientific discussion!

This was the first EMBO/EMBL Symposium on this topic, and the program covered a huge range of areas from protein-lipid interactions, organelle biogenesis and homeostasis, endocytosis to cellular signalling. The hot topics of the meeting were definitely lipid droplets and membrane contact sites. The Keynote lecture was given by Professor Howard Riezman (University of Geneva, Switzerland) who reminded us that there are more lipid species than there are genes! He emphasised that we are only beginning to understand the enormous complexity of lipid diversity/function so there is still plenty to study. At this meeting I presented a poster on a new project I am developing on endocytic pathways in the malaria parasite, and received some great suggestions that I’ll follow up on in the lab.

Following this meeting, I caught the train up to Hamburg to visit Dr Tobias Spielmann at the Bernhard Nocht Institute of Tropical Medicine. Tobi’s lab has been collaborating with Professor Leann Tilley’s laboratory (University of Melbourne) on molecular mechanisms of resistance to the frontline antimalarial, artemisinin. I gave a seminar to the department, and spoke with several PIs, postdocs and PhD students at the institute. Although we’ve had several Skype meetings, it was great to meet Tobi in person and discuss new data and experiment ideas.

During my entire time in Germany, I was spoiled with unexpectedly hot (up to 34°C!), sunny days. I made the most of my weekend of free time, and explored the Hamburg docks and Miniatur Wunderland (the world’s largest model railway display, with over 15 km of track!). I also had a day trip to Lübeck, and explored the historic city centre (a UNESCO World Heritage site) and ate lots of marzipan, which some believe was first invented there.

After these few days of sightseeing, I returned to Heidelberg for another conference, the BioMalPar XIII: Biology and Pathology of the Malaria Parasite Conference. This was also held in the EMBL Advanced Training Centre, from 29–31 May. Once again I was trapped in the forest, but this time the presentations were around vector biology, immunobiology, host–parasite interactions and various aspects of malaria parasite cellular/molecular biology. The highlight of the meeting was the presentation of the Lifetime Achievement Award to Professor Kevin Marsh, UK, who gave a brilliant talk on malaria control in Africa. Professor Marsh celebrated achievements across the last few decades and also gave us cautious warnings for how we should proceed in malaria control in the future. I was fortunate to present a talk on the mechanisms of artemisinin action on the last day of the conference, in a session with two female chairs and six female speakers. I had great feedback after my presentation and now I’ve got lots more experiments to start.

This trip was an excellent chance for me to develop new networks in the field of membrane biology and strengthen my networks within the malaria field. The feedback I received on multiple projects was constructive and has inspired me to try some new ideas in the lab! I would like to sincerely thank the ASBMB and Eppendorf South Pacific for the funding to support this journey.

Natalie Spillman is an NHMRC CJ Martin Fellow in the Department of Biochemistry and Molecular Biology at Bio21, University of Melbourne.
Science meets Parliament is an annual event organised by Science & Technology Australia (STA) that was created to connect those working in the science, technology, engineering and mathematics (STEM) sector with our country’s decision makers. For two days each year, the hallways of Parliament House are abuzz with enthusiastic discussions between scientists and parliamentarians. On 21–22 March 2017, Associate Professor Marc Kvansakul (La Trobe University) and Dr Erinna Lee (La Trobe University/Olivia Newton-John Cancer Research Institute) attended SmP 2017 on behalf of the ASBMB.

Day 1

It is not often that one gets to attend a professional development workshop in beautiful historical surroundings. The first day of SmP 2017 was held in the Members’ Dining Room of Old Parliament House with a sweeping view across to Parliament House. The day started with a Welcome Address from Professor Jim Piper AM (President, STA) and Kylie Walker (CEO, STA). This was followed by the inspiring Opening Address by Australia’s Chief Scientist, Dr Alan Finkel, who emphasised the importance of science engagement and for us to recognise that scientists and parliamentarians do in fact share a common goal of wanting to make a difference.

Following the official opening proceedings, the day comprised a series of panel discussions covering subject areas such as ‘Meet the media – turning science into news’, ‘Getting into policy: how science is used to shape public policy’, and ‘How to convince parliamentarians: hear from the experts’. Much discussion was had on the importance of scientists communicating with the public at a time when ‘fake news’ and suspicion of experts abound, and the importance of discussing our science in a non-partisan way. The final session of the day conducted by Dr Merryn McKinnon and Dr Will Grant, from the Centre for the Public Awareness of Science at ANU, required us to get into groups and undertake communication exercises which included sharing our science stories, under a series of challenging and fun constraints (including a fire alarm!). This served the purpose of preparing us for the next day to come and for improving our communication skills in general.

The day concluded with a formal dinner at Parliament House. Each table was a mix of scientists and politicians, enabling more personal conversations to occur over dinner. To emphasise the genuine opportunities for influencing our politicians available at this event, at one of our dinner tables, an exchange between a mathematician and a Member of Parliament led to an immediate text sent from the MP’s phone to a Minister requesting a meeting to discuss what had just been exchanged and the possibilities of making it happen. The MC for the dinner was Bernie Hobbs (ABC science broadcaster) who provided much laughter and entertainment throughout the night. She chaired the enthralling debate between the Hon Arthur Sinodinos (Minister for Industry, Innovation and Science) and the Hon Bill Shorten (MP, Leader of the Opposition) about their vision for STEM.

Day 2

Whilst Day 1 was all about professional development classes, Day 2 was the ‘make it happen’ day. Each delegate was assigned into groups to meet with parliamentarians at scheduled times. Here, we got to put into practice...
what we had learnt the previous day. When our meeting
times came around, we were escorted past the security
doors through the inner corridors of either the Senate or
the House of Representatives chambers to meet with our
assigned politician. Any fly on the wall on this day would
likely have witnessed enthusiastic and fervent exchanges
between both parties. Whilst these meetings were ongoing,
those waiting for their meeting times were able to listen to
the current Australian of the Year Professor Alan Mackay-
Sim and the Shadow Minister Senator the Hon Kim Carr
share their vision for Australian science. At midday,
those not in meetings had the opportunity to attend the
National Press Club address presented by the Hon Arthur
Sinodinos, who discussed why Australians should care
about science and innovation, discussed our economic
challenges and presented the National Science Statement.
We got to witness the grilling from journalists that ensues
after the address that makes an NHMRC interview look
like a walk in the park.
Towards the end of the day, all delegates were able to
witness Question Time. To put it diplomatically, the lively
proceedings were a real eye-opener, and allowed us to
experience first-hand what partisan politics looks like in
real life. The penultimate session was a panel discussion
on how science and politics mix. The meeting concluded
with a relaxing cocktail finale.
Politics may not always be at the forefront of one’s
mind as we sit at the laboratory bench or in front of
our computers looking for the next cure for cancer or
heart disease. However, the professional development
opportunities offered over the two days opened our
eyes to the importance of effective communication of our
science in exerting a positive influence on the legislative
and policy-making process – which in turn can have a
significant impact on our funding climate, on investment
in the STEM sector and on the future of Australian science
and technology. The parliamentarians displayed a
genuine interest in learning about our work and what
was needed. Whilst ‘funding’ was a taboo word, the main
purpose was to excite our country’s leaders with our
science, demonstrate how what we do in our laboratories
every day is relevant, and in so doing spark their
enthusiasm to make the changes we need.
If you ever have the opportunity to attend Science meets
Parliament – put your hand up. It really was a fantastic
learning experience and we would like to thank the
ASBMB for this brilliant opportunity that made us realise
that politics should indeed be for all scientists.

Day 2 presented us the opportunities to discuss our
science and excite our country’s decision makers to
help make a difference to the future of science in Australia.
Photo credit: Science meets Parliament, Mark Graham.

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Promoting and Sharing Knowledge

Bringing together molecular bioscientists is a key driver for the Biochemical Society and inter-society collaboration is central to our success in achieving this. This year we hosted our first Tweetchat, #AntibioticFuture, in partnership with the Royal Society of Biology (RSB) and the Society for Applied Microbiology (SiAM). Follow us on Twitter at @BiochemSoc to get involved in our next Tweetchat.

In line with our strategic goal of promoting and sharing knowledge, we organize a programme of public engagement activities including The Hungry Games and Scientific Scissors. This year in collaboration with the British Pharmacological Society, we have produced the Medicine Makers kit. A free outreach activity about drug-target interactions to use in schools, at science festivals or other events, you can download our kit here: bit.ly/2m7leec.

The Biochemical Society has launched a brand new blog, packed with news, views and opinions on issues of relevance to the molecular bioscience community. Check out The Biochemist Blog: www.thebiochemsitblog.com

Portland Press, the publishing arm of the Society, launched two new journals this year. Neuronal Signaling (www.neuronalistics.com), co-owned with the RSB, provides an overview of a new, or growing, field of life science research in each issue. Make sure you read the first issues of each journal, both of which are now live.

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Tecan’s popular Infinite® 200 PRO series of multimode microplate readers has been updated to even better serve the life sciences market, with a number of new options and configurations designed to provide flexible and user-friendly solutions for entry level research applications. The proven and trusted Infinite® 200 PRO microplate reader has been engineered for excellence, and has so far featured in more than 1,800 peer reviewed articles around the world. Based on further customer feedback, it is now available in six application-focused configurations, allowing researchers to choose the perfect solution for their specific needs and budget today, with the option to upgrade as requirements change.

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New Models from Nanolive Expand the Appeal of Live Cell Imaging

Nanolive, creators of the groundbreaking holographic tomographic 3D Cell Explorer (3DCX), have expanded their family of microscopes to include two new systems. The original 3DCX allows you to see inside cells, using variations in refractive index within the sample, without the need for stains, dyes or markers—a completely label-free system for high resolution 3D and 4D cell imaging.

3DCX technology allows you to visualise subcellular structures in real-time. It offers 200nm resolution and generates 3D reconstructions from 96 slices through a 30µm thick sample.

The recently released 3DCX-fluo offers the same powerful holographic tomographic microscopy but adds a fluorescence channel. This enables you to measure up to 10 channels, including overlaying refractive index data with up to 3 fluorescence channels and with the option of adding a stage top incubator for time lapse experiments. This can reveal much more information than conventional fluorescence microscopy by combining physical structural imaging (refractive index) with functional information about organelles, proteins and drugs interacting within the cell (fluorescence).

The latest addition to the Nanolive family is the 3DCX-discovery, a low cost system designed for teaching environments. Based on the award-winning original 3DCX, the 3DCX-discovery is a plug-and-play system capable of providing stunning images with nanometric resolution in just seconds, with minimal sample preparation. Without the need for markers, stains or dyes, the 3DCX-discovery is a powerful teaching tool with an extremely attractive price tag and a great introduction to imaging live cells in real time.

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Collagen is abundant in all connective tissue which makes it one of the most studied biomaterials of the extracellular matrix. Innovation with collagen biomaterials is witnessing significant growth particularly in the fields of regenerative medicine, medical devices, cell culture and stem cell research.

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Due to the ancient chemical lineage, jellyfish collagen represents a more universal type of collagen, better suited to support the growth of a wide range of human cells. It is also human biocompatible which enables research to be translated from lab to in vivo clinical applications.

Jellyfish collagen is a non-mammalian derived source which are physiologically much less complex than mammals, bony fish, and birds (other common sources of collagen), and so there is much less to change between individuals of the species. This provides batch to batch consistency offering advantages to research and medical applications.

Jellagen Pty Ltd is a Med-Tech business pioneering the manufacturing of next generation collagen products sourced from jellyfish for application in 2D and 3D cell culture.

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Cleaver Scientific is a manufacturing company situated in Rugby, UK, that offers a range of instruments, chemicals and consumables for both electrophoresis and life science laboratory. Founded in 2004, the company has always strived towards excellence both in manufacturing and customer support. Each product represents the culmination of the combined creativity, technical and engineering expertise acquired over many years by our in-house manufacturing and scientific product development team. Customised equipment can be manufactured to tailor the needs of our customers, in some cases culminating in improvement of existing techniques such as our High-throughput Comet Assay Tank COMPAC-50, which was developed by Cleaver Scientific in collaboration with the University of Leicester. Our ethos is to design and manufacture high quality products to help scientists to further knowledge and develop application useful for the benefits of humankind.

Starting from our teaching range, we want to help shape the future scientists and follow them throughout their scientific path and our technical support is always ready to advise and assist our clientele.

Cleaver Scientific Ltd
www.cleaverscientific.com
Biotix xTip for Rainin LTS Pipettes

Rainin LTS users have even greater choice when it comes to selecting tips for their pipettes. The new Biotix xTip has been manufactured for maximum compatibility with LTS pipettes with all the great features that tip users expect and rely on.

The FlexFit feature allows for a secure seal of the tip onto the pipette without needing to force the fit, improving ergonomics and reducing strain.

The naturally low retentive X-Resin provides a non stick tip surface, promoting accuracy and precision when pipetting with no sample loss.

Eliminating the need for tip touch off, the Blade feature delivers increased reproducibility and reliability.

Available in filtered and unfiltered versions, in sizes of 20µl, 200µl and 1000µl, the Biotix xTip for Rainin LTS pipettes also comes with complete certification of RNase, DNase, Pyrogen, Endotoxin, Nucleic Acid and Trace Metal free status.

For further information contact Pathtech Pty Ltd
1800 069 161
info@pathtech.com.au

Reduce Laboratory Wastes

Scientific laboratories can produce a significant amount of waste, so designing an eco-friendly laboratory can be challenging when it comes to waste output. A lot of universities have eco-friendly policies now, so this can pose a large issue. While recycling is often the first thing that comes to mind, reducing the amount of resources used from the beginning may be effective as well. Get started towards becoming more sustainable with the following tips:

- Discuss the need to reduce waste and brainstorm ideas in your regular lab meeting.
- Hang signage in appropriate areas.
- Donate unneeded items to nearby laboratories.
- Place a paper recycling bin in the laboratory, and one in the break room for the recycling of aluminum cans and plastic water bottles.
- Do not throw away broken equipment. Ask your supplier about trade in or recycling options.
- Run lab dishwashers for glassware only when full. Running half loads of beakers results in excess water usage.
- Consider buying items that are packaged in bulk, such as reload tips.
- If you can’t limit it, ensure chemical waste is disposed of correctly.

For further information contact Pathtech Pty Ltd
1800 069 161
info@pathtech.com.au

Interpath Services
(03) 9457 6277
sales@interpath.com.au

For the past two years, we have also been helping researchers by running multiplex protein assays, which are now the focus of Crux.

For more information please contact Catherine Osborne.

Crux Biolabs
www.cruxbiolabs.com.au
catherine.osborne@cruxbiolabs.com.au
0437 051 177

Crux Biolabs

Routine Cytokine Services Now Available

You routinely outsource your DNA sequencing, so why not your cytokine and protein biomarker analysis too? We can offer ‘per sample’ pricing with no minimum sample numbers on our regular fortnightly runs. If you’re interested in a range of cytokines, but don’t have the resources to invest in full multiplex kits, our new Routine Cytokine Service might be just for you!

For human samples we are offering a 9-plex and a 25-plex, and for mouse samples we are offering a 5-plex and a 16-plex. If you have more than 20 samples, or work on a different species, speak to us about our Custom Multiplex Service. We have years of experience tailoring custom multiplex experiments for many satisfied researchers.

Crux Biolabs is the new name of elisakit.com, which has been making ELISA kits here in Australia for six years.

For human samples we are offering a 9-plex and a 25-plex, and for mouse samples we are offering a 5-plex and a 16-plex. If you have more than 20 samples, or work on a different species, speak to us about our Custom Multiplex Service. We have years of experience tailoring custom multiplex experiments for many satisfied researchers.

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For further information contact
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ReZolve Scientific Sells Fluorescent Imaging Dyes

We have four fluorescent dyes, plus a click reactive fluorescent tag for you to develop your own labels. They are suitable for staining live and fixed cell and tissue. All of our fluorophores are highly photostable meaning less photobleaching and more time for your imaging acquisition. All of our products are delivered and stored at room temperature – you can keep them on the shelf, not in the freezer.

Our products are available from http://www.rezolvestrict.com/contact/

We offer fantastic support to help you use our products. We work hard to make sure our protocols are easy to use and give great results.

Our four products are:
- ReZolve-L1™, which lets you monitor cellular lipid content with our cell-permeant stain which has an affinity for polar lipids.
- ReZolve-ER™, which is a fluorescent dye ideally suited for real time live cell imaging of the endoplasmic reticulum.
- IraZolve-Mito™ will allow you to unlock information in your frozen tissue banks. It is a mitochondrial marker compatible with fixed and live tissues.
- IraZolve-L1™ is a cellular lipid dye with localisation to lipid droplets and the endoplasmic reticulum.

We can also work with you to develop bespoke fluorophores for unique applications.
Merck Advances Lab Water Purification Technology with Milli-Q® IQ 7000 System

- 50th anniversary of first lab water system launch
- First to use environmentally friendly, mercury-free UV lamps
- Smaller, ergonomic design reduces waste, increases productivity, accelerates research

Merck announces the launch of the Milli-Q® IQ 7000 system, the seventh generation Milli-Q® water purification innovation.

For half a century, Merck has been the partner of choice for water purification systems and services for lab scientists who need to ensure their water is free of contaminants.

To ensure that Merck’s new water purification systems meet customers’ evolving needs, the company combined customer feedback with its engineering and technical expertise to develop an even smaller, easier-to-use device designed with:

- echno mercury-free UV lamps
- 33% smaller purification cartridges
- Digital touchscreen
- Easy connection to lab networks
- Hibernation mode maintaining system water quality with reduced energy consumption
- Ergonomic, precise dispensing wheel – from drop-by-drop to 2L/min
- Smaller footprint, for smaller, clutter-free workspace

Merck’s leading brand, Milli-Q® water, has become synonymous with ultrapure water, and is the most cited brand in peer-reviewed publications.

The new Milli-Q® IQ 7000 system is available in Australia and New Zealand. For further information contact Merck on 03 8727 6300 or orders.aus@merckgroup.com

NEBNext Ultra II Directional RNA Library Prep Kit

NEB’s new NEBNext Ultra II RNA kits are available for directional (strand-specific, using the ‘dUTP method’) and non-directional library prep and are compatible with poly(A) mRNA enrichment or rRNA depletion.

- Get more of what you need, with the highest library yields
- Generate high-quality libraries even with limited amounts of RNA:
  - 5ng–1µg Total RNA (poly(A) mRNA workflow)
  - 10ng–1µg Total RNA (rRNA depletion workflow)
- Minimize bias, with fewer PCR cycles required
- Increase the complexity and transcript coverage of your libraries
- Maximize flexibility by ordering reagents for your specific workflow needs, including directional and non-directional kits, rRNA depletion and poly(A) mRNA isolation reagents, and adaptors and primers (12- and 96-index) sold separately
- Enjoy the reliability of the gold standard SPRIselect size selection and clean-up beads, supplied in just the amounts you need
- Rely on robust performance, even with low quality RNA, including FFPE

Request a free sample today: https://goo.gl/1eyTgX or email info@genesearch.com.au for more information.

ICT International Pty Ltd

Enabling better global research outcomes in soil, plant and environmental monitoring

ICT International is a world-class science and technology company that designs, manufactures and deploys bespoke, integrated, wireless monitoring solutions for commercial agriculture and for scientific research into the natural and built environments. ICT International currently exports to over 51 countries annually.

ICT International’s unique family of digital sensors and dataloggers has been developed to measure key plant and soil parameters for the advancement of plant and soils research, for example: to address physiological and yield limitations of plants to water stress; to address ecosystem response to climate change; to evaluate plant genetics; and in commercial agriculture and horticulture to significantly increase yields and quality whilst reducing irrigation water use especially in tree crop and vine production. Commercial clients are building significant IP in regard to the crops response to the environment, located in the ‘cloud’.

This has all been achieved from the regional location of Armidale, which has provided a platform of Australian best personal and business infrastructure assets. These include direct fibre to the premises, a multiserviced airport, world class export freight services, corporate banking, accounting and legal services, both private and public schools, a liveable clean green city landscape and a rich arts culture.

ICT International
Email sales@ictinternational.com.au
Phone (02) 6772 6770
www.ictinternational.com.au
Forthcoming Meetings

ComBio2017
2–5 October 2017
Combined ASBMB, ASPS and ANZSCDB Annual Meetings
Adelaide Convention Centre, Adelaide

Later poster submission deadline: Friday 18 August 2017
On site poster abstract submission deadline: Wednesday 27 September 2017

ComBio2017 will be held at the new state of the art Adelaide Convention Centre located in the heart of the city on the Torrens River, and overlooking the magnificent Adelaide Oval Precinct. The Convention Centre and hotels are located a stone’s throw from the many restaurants and cultural activities that make Adelaide such an engaging and enchanting destination.

The program will feature a number of other overseas plenary presentations from some of the best international scientists together with a number of society specialty lectures. Several poster sessions are also planned. The scientific program of the conference will include the themes:

- Plant Biology
- Biotechnology and Sustainable Futures
- Developmental, Stem Cell and Regenerative Biology
- Proteins and Proteomics
- Genomes, Epigenetics and Bioinformatics
- Cell Biology
- Cell Signalling and Metabolism

Further information:
www.combio.org.au/combio2017

Conference Chair:
Michael Michael
michael.michael@flinders.edu.au

Registration/Exhibition
Sally Jay
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24th IUBMB–15th FAOBMB Congress
4–9 June 2018
Seoul, Korea
This is a triennial Congress of IUBMB, combined with the FAOBMB Congress when held in our region. A Young Scientist Program will be held in conjunction with the Congress, 2–4 June 2018.

Further information:
Email: info@iubmb2018.org
Website: www.iubmb2018.org

26th FAOBMB Conference
6–9 December 2017
Kobe, Japan
The 26th FAOBMB Conference will be held as a combined meeting with the Japanese Consortium of Biological Sciences (ComBio 2017). FAOBMB Travel Fellowships will be available for young scientists to attend this conference.

Further information:
Email: conbio2017@aeplan.co.jp
Website: www.aeplan.co.jp/conbio2017

Annual General Meeting of the Australian Society for Biochemistry and Molecular Biology Inc.

The 61st Annual General Meeting of the Australian Society for Biochemistry and Molecular Biology Inc. will be held in conjunction with the Annual Conference of the Society, in this instance at ComBio2017. The venue will be the Adelaide Convention Centre, Adelaide, on Thursday, 5 October at 1320 hours.

AGENDA

1. Apologies
2. Confirmation of the Minutes of Annual General Meeting No. 60
3. Results of Council Elections
4. President’s Report
5. Treasurer’s Report
6. Fees for 2018
7. Changes to the By-Laws of the Constitution
8. Changes to the Constitution
9. Any Other Business

Briony Forbes
Secretary, ASBMB
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SPECIAL INTEREST GROUPS

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COPY DEADLINE FOR NEXT ISSUE: Monday, 9 October 2017
Adelaide Convention Centre
2 - 5 October 2017

Plenary Speakers
- Anne Brunet Stanford University, USA
- Tim Colmer University of Western Australia, Australia
- Peter Currie ARM, Monash University, Australia
- Manel Esteller IDIBELL, Barcelona, Spain
- Adam Frost University of California San Francisco, USA
- Michael Hall University of Basel, Switzerland
- Lars Ittner University of New South Wales, Australia
- Cathie Martin John Innes Centre, Norwich, UK
- John Mattick Garvan Institute for Medical Research, Australia
- Hanna Mikkola University of California Los Angeles, USA
- Jonathan Plett Western Sydney University, Australia
- Clotilde Théry Institut Curie, Paris, France
- Jian-Kang Zhu Chinese Academy of Sciences, Shanghai, China

Conference Streams
- Plant Biology
- Biotechnology and Sustainable Futures
- Developmental, Stem Cell and Regenerative Biology
- Proteins and Proteomics
- Genomes, Epigenetics and Bioinformatics
- Cell Biology
- Cell Signalling and Metabolism
- Education and Career Development

Further information:
Conference Chair:
Michael Michael
michael.michael@flinders.edu.au

Registration/Exhibition:
Sally Jay
combio@asbmb.org.au

Combined ASBMB, ASPS and ANZSCDB Annual Meetings
- Australian Society for Biochemistry and Molecular Biology
- Australian Society of Plant Scientists
- Australia and New Zealand Society for Cell and Developmental Biology

Late poster submission deadline:
Friday, 18 August 2017

On site poster abstract submission deadline:
Wednesday, 27 September 2017

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