

*East
Coast
Protein
Meeting*

Friday 26th - Sunday 28th July, 2019
Opal Cove Resort, Coffs Harbour,
NSW



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Welcome

The East Coast Protein Meeting (ECPM) is a joint initiative of the Sydney and Queensland Protein Groups of the Australian Society for Biochemistry and Molecular Biology (ASBMB). ECPM is an excellent opportunity to highlight the exciting work of Australia's young protein scientists, with a high number of oral presentations by postgraduate students and postdocs complementing presentations by senior scientists. The meeting represents one of the few opportunities for junior scientists to share the podium with more established researchers, and will have a relaxed and informal atmosphere that allows all those attending to exchange views and develop useful contacts within academia and industry.

We are very pleased to be joined by Associate Professor Denise Wootten (Monash Institute of Pharmaceutical Sciences) and Professor Colin Jackson (The Australian National University) as our plenary speakers this year.

The organising committee would like to thank all the sponsors whose generous support makes this meeting possible. In particular, we would like to thank ANSTO, ASBMB, ATA Scientific, ThermoFisher, and BMG Labtech for their continued and longstanding sponsorship of ECPM.

Finally we would like to thank all of the delegates for their participation in this meeting, and we hope you will have a great time in Coffs Harbour.

The organising committee.

The organising committee

The following people have generously donated their time and talent to make the 2019 East Coast Protein Meeting possible:

Brett Collins

Yanni Chin

Bostjan Kobe

Michael Landsberg

Zhenyao Luo

Jeff Nanson

Thomas Ve

Conan Wang

The members of the organising committee can be identified by blue name badges and can be contacted throughout the meeting for help with any problems you may encounter.

We would like to thank all of our session chairs and talk and poster judges for their time and assistance.

General information

Registration desk

Registration is located in the Ocean View Foyer and will open from 3 pm on Friday. If you arrive on Saturday morning please find an organising committee member before the session or during the morning tea break to register. Please direct any queries to the organising committee.

General information

Poster presentations

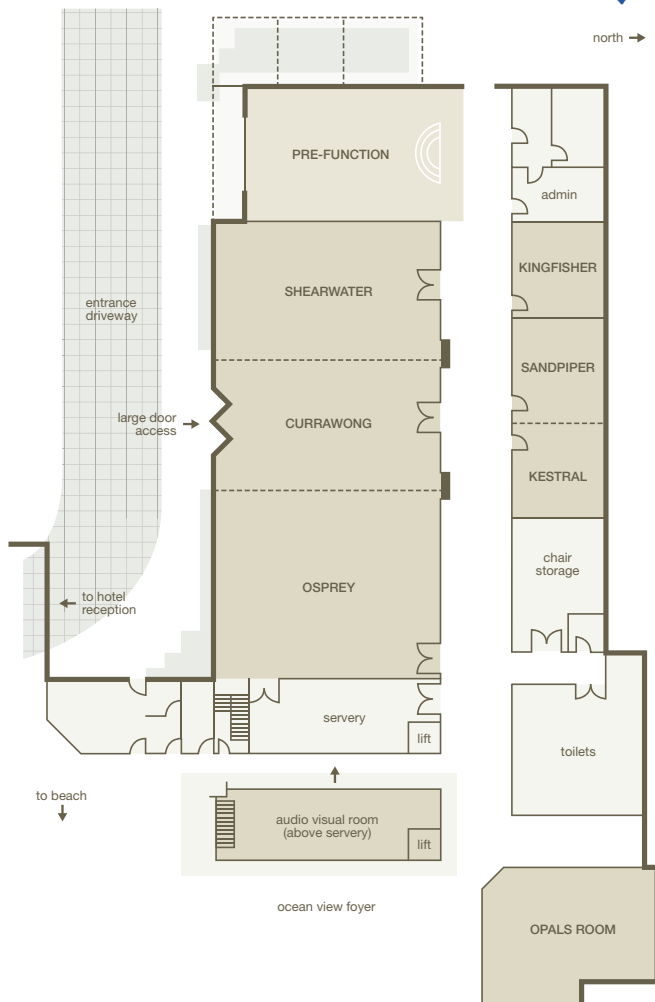
The poster session will be held on Saturday from 16:30 - 18:30 in the Pre-Function Foyer, next to the Shearwater Theatre. Please put up your poster (according to your poster number) during Saturday's lunch break or afternoon tea break and remove it by the end of the conference dinner. The registration desk will supply items for attaching your poster. Authors with odd-numbered posters should aim to be near their poster from 4:30 pm to 5:30 pm, while those with even-numbered posters should be near their posters from 5:30 pm to 6:30 pm. Poster presenters are encouraged to view other posters during the time when they are not required to be near their poster.

During your allotted hour, the judges will come to your poster and you will have 2 minutes to give them a summary of your poster. The judges will then have the opportunity to ask you questions. Be aware that this 2 minute limit will be strictly enforced, so it pays to have timed your summary beforehand.

Oral presentations

All sessions will be held in the Shearwater Theatre. Speakers will have access to Mac laptops. Unless prior arrangements have been made, speakers should bring their presentation on a USB stick to Zhenyao Luo at least 20 minutes before their session starts (or by 5 pm if your talk is on the first day). Speakers are allocated 15 or 20 minute slots according to the program. This will include 13 or 18 minutes for the presentation, with an additional 2 minutes for questions. The session chairs have been asked to enforce these timings.

north →



Plenary speakers

Associate Professor Denise Wootten:

Denise Wootten is an NHMRC Senior Research Fellow, a group leader in the Drug Discovery Biology Theme at the Monash Institute of Pharmaceutical Sciences and an adjunct Professor in the Faculty of Pharmacy at Fudan University. She is recognised internationally for her work on class B G protein-coupled receptors (GPCRs) that are important therapeutic targets for metabolic diseases.



The principle focus of her research is to develop a deeper understanding of the structure and function of these receptors in an effort to identify novel approaches to drug discovery. Her interests encompass biased agonism, allosteric modulation and interaction of receptors with regulatory accessory proteins. She has made major contributions to the current understanding of how these receptors are activated by peptide and non-peptide ligands and how this translates to cellular efficacy. More recently, her laboratory has been using cryo-electron microscopy to gain atomic level understanding of how ligands and accessory proteins modulate the function of these receptors, and how this influences receptor activation and signalling.



Professor Colin Jackson:

Colin Jackson received his BSc (Hons 1) from the University of Otago and PhD from the Australian National University. After working as a research scientist at CSIRO, he was awarded a Marie Curie Fellowship to study at the Institut de Biologie Structurale (Grenoble, France). He became a group

leader at the ANU in 2012 and was made Professor in 2018. His work is focused on proteins and encompasses structure, function, evolution and engineering.

Abstract:

"Rare" cofactors and pathogens: understanding the role of F420 in *Mycobacteria*.

In this talk I'll discuss our work on the cofactor F420. Although originally discovered in Archaea, it is present in some bacteria - including *Mycobacterium tuberculosis*. We have investigated its distribution, physiological roles, and biosynthesis, as well as its role in activating new classes of antibiotic pro-drugs, such as the new anti-TB drugs pretomanid and delamanid. In this context, we have used protein engineering to predict the possible evolutionary routes that *M. tuberculosis* could take to acquire resistance to these drugs, and using available sequence data have already identified resistant strains in regions where the drugs are yet to be used.

Careers forum

The careers forum will allow conference participants to discuss career opportunities with 4 invited speakers (A/Prof Denise Wootten, Prof Colin Jackson, Sylvia Johnson and Dr Alastair Stewart) from academia and industry.

Sylvia Johnson, BMG LABTECH:

Sylvia Johnson graduated from the University of South Australia with a Bachelor of Applied Science in Medical Technology and Bachelor of Science (Hons) Endocrinology from Flinders University. She ran a diagnostic endocrinology laboratory for eight years and then took an opportunity to move into reproductive research at Adelaide University. This was followed by a research position in the USA at NIH ERRL. On return to Australia, she moved to Sydney and joined the reproductive immunology/fetomaternal medicine laboratory at Royal North Shore Hospital. From there, she transitioned to the life sciences industry and managed the Australian / NZ subsidiary for an American kit reagent manufacturer.

Following the sale of the overseas company, she returned to the laboratory as a senior scientific officer. Missing the diversity of the Life Sciences industry, she joined BMG LABTECH. With her extensive expertise in many laboratory techniques such as tissue culture, protein isolation, immunoassay development and biochemical assays, Sylvia focuses on the customer's needs and provides timely solutions utilising BMG LABTECH instruments.

Dr Alastair Stewart, Victor Chang Cardiac Research Institute:

Alastair read the Natural Sciences Tripos at the University of Cambridge before moving to Australia to undertake his postgraduate studies with Dr Daniela Stock, graduating from UNSW in 2012. After two short post docs, Alastair established his own research laboratory at The Victor Chang Cardiac Research Institute in 2016. His group investigates the inner workings of large macromolecular complexes involved in fundamental biological processes such as energy production, mRNA maturation and protein folding, using a combination of crystallography, cryo-Electron Microscopy, intact mass spectrometry and single molecule methods. The main focus of the lab has been the F1Fo ATP synthase, which is the marvellous molecular motor that generates the majority of chemical energy in cells. By solving multiple high-resolution cryo-EM structures of the complex in a series of intermediates, they have shown how this enzyme is activated and functions in bacteria.

Over the past decade, Alastair has won multiple awards and prizes for his and his groups work, including the Best Student Oral Presentation prize at East Coast Protein Meeting back in 2009. He has been successful in obtaining research funds from the NHMRC, ARC and Perpetual, and is currently an NHMRC R.D. Wright Biomedical Career Development Fellow.

Program

FRIDAY, 26th JULY 2019

Registration

15:00-17:05 Registration

Welcome address

17:05-17:15 **A/Prof Brett Collins (QPG President)**

Plenary 1

17:15-18:15 **A/Prof Denise Wootten (Monash/MIPS)**
Chair: Thomas Ve

Session 1 Protein signaling

Chair: Shelley Barfoot

18:15-18:35 **Jeffrey Nanson**
TIR-domain-assembly Formation in Toll-like Receptor Signaling Pathways.

18:35-18:55 **Lin Luo**
A Transmembrane Adaptor for Toll-like Receptors Promotes Selective Pro-Inflammatory Responses.

18:55-19:10 **Mohammad Kawsar Manik**
Structural and Biochemical Characterization of the Enzymatic Activity of SARM1 TIR

19:15-21:30 Dinner & Drinks

SATURDAY, 27th JULY 2019

Arrival tea and coffee

08:00-08:45 *Ocean View Foyer*

Session 2 Protein interactions I

Chair: Kevin Chen

08:45-09:05 **Samuel Tong**
Activation of Rab8A by Guanine
Nucleotide Exchange Factors Rabin8 and
GRAB for Macrophage Toll-like Receptor
Signaling.

09:05-09:25 **Derrick Lau**
In Vitro Reconstitution of Capsid Lattice
Lattices to Screen and Study Capsid
Binders.

09:25-09:40 **Yichen Zhong**
CHD4 Slides Nucleosomes by Decoupling
Entry- and Exit-side DNA Translocation.

09:40-09:55 **Madaline Vereker**
Re-sensitising Antibiotic Resistant
Bacteria: Using Genetics and Single-Cell
Fluorescence Microscopy to Characterise
the Effects of Disrupting DNA Repair
Pathways in *E. coli*.

09:55-10:10 **Kelsey Whinn**
Resolving Stalled Replication Forks in
Escherichia coli at Sites of Nucleoprotein
Complexes.

Morning tea

10:15-10:45 *Ocean View Foyer*

Session 3 **Drug discovery & development**

Chair: Emily Furlong

Kai-En Chen

10:45-11:05

Towards a Molecular Understanding of Retromer and SNX-BAR Interaction through Novel Macrocyclic Peptides.

Chun Yuen Chow

11:05-11:20

Development of Nav-Selective Agonists with Potential for Treatment of Dravet Syndrome Epilepsy.

Md Habibur Rahaman

11:20-11:35

Targeting TIR Domain Assemblies in TLR Signaling Pathways to Design Anti-Inflammatory Compounds.

Huawu Yin

11:35-11:50

Inhibition of Protein-Protein Interactions using a New Guideline for Peptide Design.

Khushboo Patel

11:50-12:05

The Branched Chain Amino Acid Biosynthesis Pathway as a Route to the Discovery of New Antimicrobial Drugs.

12:15-14:00 **Lunch**

Session 4

Protein structure and function Sponsored by ANSTO

Chair: Anthony Duff



Australian Government

14:00-14:20

**Daniel Eriksson &
Kate Smith**

MX beamlines current
and future developments.



14:20-14:40

James Walshe

Structural Characterisation of an ANTAR
Domain Anti-Terminator Protein Bound to
RNA.

14:40-15:00

Zhenyao Luo

Structural Characterisation of Novel
Transcription Regulator ACAB for INCC
Conjugation.

15:00-15:15

Denis Thaqi

Biochemical and Structural
Characterisation of the Copper Chaperone
ACCA from *Neisseria*.

15:15-15:30

Michael Healy

Structural and Functional Characterisation
of the Commander Trafficking Complex
and Accessory Proteins.

15:30-15:45

Joseph Box

Solving the Structure of YenTc: A Story of
Hybrid Structural Biology Techniques.

Afternoon tea

16:00-16:30

Ocean View Foyer

Poster session

	<i>Pre-Conference Foyer</i>
16:30-17:30	Odd numbers
17:30-18:30	Even numbers

Plenary 2 Career advice forum

18:45-19:45 **Panel discussion Q&A**

Panel members:

A/Prof Denise Wootten (Monash/MIPS)
Prof Colin Jackson (ANU)
Sylvia Johnson (BMG LABTECH)
Dr Alastair Stewart (VCCRI)

Chair: Conan Wang

Dinner & drinks

20:00-21:30 *Opals Private Dining Room & Bar*

Conference social party

21:30-late *Opals Private Dining Room & Bar*

SUNDAY 28th JULY, 2019

Arrival tea and coffee

08:00-09:00 *Ocean View Foyer*

Plenary 3

09:00-10:00 **Prof Colin Jackson** (Australian National University)
Chair: Ana Silva

Morning tea

10:00-10:30 *Ocean View Foyer*

Session 5 **Hot topics**

Chair: James Walshe

10:30-10:50 **Andrew Walker**
Combinatorial Peptide Libraries from Caterpillar Venoms.

10:50-11:05 **Chris Munro**
Accelerating Research Through Parallel Protein Production Capabilities.

11:05-11:20 **Shelley Barfoot**
Understanding Protein-Mediated Membrane Fusion: The Case of Ebola Virus.

11:20-11:35 **Megan Cherry**
Evolution on the Microscope: Examining the Role of Translesion Synthesis in the Development of Ciprofloxacin Resistance.

Session 6

Protein interactions II

Chair: Lin Luo

11:40-12:00

Stefan Mueller

Stalling, Pausing, Decoupling: Single-Molecule Visualisation of a Replisome Encountering Roadblocks.

12:00-12:15

Karishma Patel

Rapid Selection of Structurally Diverse and High Affinity Cyclic Peptide BET Bromodomain Inhibitors.

12:15-12:30

Thomas Armstrong

Single-molecule Imaging of DNA Polymerase II in Live *Escherichia coli* cells: Housekeeping and DNA Damage-Induced Activities.

12:30-12:45

Gurleen Kaur

Enzyme Choreography During Lesion Skipping at the *E. coli* Replication Fork.

12:45-13:00

Weixi Gu

Structural Basis of SARM1 Regulation.

Closing address

13:00-13:15

Lunch & presentation of prizes

13:15-14:00

Horizons Restaurant

Posters

#01 Adam Damry - Brighter red fluorescent proteins display reduced structural dynamics

#02 Ferran Nadal-Bufi - Peptide-based drugs to inhibit LDHA, a potential target for cancer therapy

#03 Patrick Wang - Developing molecules that target an essential bacterial protein for broad-spectrum antibiotics

#04 K M Rifat Faysal - Visualising HIV capsid uncoating via fluorescence microscopy

#05 Benjamin Ford - Crystal structure of a putative sugar-binding protein from marine *Synechococcus*. Can substrate-binding proteins redefine nutrient acquisition in marine cyanobacteria?

#06 Xin Xiong - Crystal structure of meso-2,3-butanediol dehydrogenase (BDDH) from *Serratia macescens* H30 in a complex with NAD⁺ and acetoin at 2.0 Å resolution

#07 Yan Li - Structural characterization of higher-order assembly in Toll-like receptor pathways

#08 Mengqi Pan - Structural characterization of Zn-binding proteins in *Streptococcus pneumoniae*

#09 Shun Jie Wun - Branched amino acid biosynthesis – an important antituberculosis drug target

#10 Xin Lin - Compound library screening to identify novel inhibitors of mycobacterium tuberculosis ketol-acid reductoisomerase

#11 Shan Zheng - Structural studies of a dodecameric ketol-acid reductoisomerase

#12 Liping Liu - The characterisation of SCIMP and Toll-like receptor complex

#13 Sheena Chua - Bifunctional GAR synthetase/AIR synthetase as an antifungal target

#14 Teegan Lawson - The structural details of the interaction of single stranded DNA binding protein HSS2 (NABP1/OBFC2A) with UV-damaged DNA

#15 Ya Gai - Intrinsically disordered sequences of CAVIN1 drive the formation of plasma membrane caveolae

#16 Matthew Jackman - Elucidation of NuRD and NuDE protein structure with cryo-EM, and purification of NuRD from CHO cells

#17 Xavier Reid - Parologue-derived, mutually exclusive NuRD complexes with unique functions

#18 Qian Guo - Macrocyclic peptides as the novel chemical probes to modulate retromer complex in endosomal trafficking

#19 Olivia Tan - Structural basis and inhibition of human parainfluenza virus Type 1 haemagglutinin-neuraminidase host-cell attachment and release

#20 Anthony Duff - MX beamlines current and future developments

#21 Xing Gui - Structural and biochemical characterisation of the TIR domains of TLRs 7, 8 and 9 and their interactions with adapter proteins

#22 Maxwell Rank - Interaction and structural study between TNLs and EDS1 immune regulatory complex

#23 Kit Carruthers - Purification and removal of metals of Chlamydial YtgA, an iron binding protein in *Chlamydia trachomatis*

#24 James Woodmansey - Structural insights into BRD3 drug discovery

#25 Bryan Lim - Structural studies on molybdenum uptake in *Pseudomonas aeruginosa*

#26 Dalton Ngu - Structural characterisation of two bacterial virulence factors involved in zinc acquisition in *Pseudomonas aeruginosa*

#27 Shaodong Guo - Using dipteran insect assays to screen arachnid venoms for discovery of orally active bioinsecticide leads

#28 Serena Ekman - In silico models for extracellular glycophorin A (GYPA) and B (GYPB) structure

#29 Jason Low - Glutaraldehyde crosslinking can be combined with SEC-MALLS to estimate the molecular mass of unstable protein complexes

#30 Ryan Hall - Structural insights into the conformational change of COMMD proteins using X-ray crystallography

- #31 Clancy Lott - Structural and functional characterisation of a pyrimidine synthesis complex from yeast
-
- #32 Natasha Jones - Assembly of the nucleosome remodelling and deacetylase (NuRD) complex in GATAD2B associated neurological disorder (GAND)
-
- #33 Andrew Hedger - Structural basis of TIR domain assembly formation in the Toll-like receptor TRIF-dependent pathway
-
- #34 Surekha Nimma - IL-1R8 (SIGIRR) regulates TLR4 signaling
-
- #35 Ana Silva - The nucleosome remodelling and deacetylase (NuRD) complex has an asymmetric, dynamic and modular architecture
-
- #36 Yi Zeng - Cryo-EM analysis of filamentous chaperonins
-
- #37 Emily Furlong - Structural insights into the bacterial flagellum
-
- #38 Joel Mackay

Notes