



# ARC Industrial Transformation Training Centre for Cryo-electron Microscopy of Membrane Proteins

*Quarterly newsletter*



*Image credit - Dr Sepideh Valimehr*

---

## INSIDE THIS ISSUE:

Grant successes

CCeMMP Retreat

First industry placement

---



Australian Government  
Australian Research Council



MONASH  
University



THE UNIVERSITY OF  
MELBOURNE



bio  
institute

MOLECULAR  
HORIZONS



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA



WEHI  
brighter together

CCeMMP acknowledges the peoples of the Kulin, Dharawal, Yuin and Wadi Wadi Nations on whose land the Centre and its Nodes operate. We pay our respects to their Elders, past, present and emerging.

---

# From the Director

Professor Patrick Sexton  
Centre Director



Welcome to the 11th instalment of the ARC CCeMMP quarterly newsletter. Much has happened over the last 3 months, including our most recent Centre retreat that was held in early December 2023. This was an exciting 2 days with insight into some of the recent research being undertaken by Centre members and affiliates and an opportunity to both reflect on the last year and to plan for the next phase of operation. The Centre ran workshops on single particle cryo-EM data analysis and use of graphical presentation tools, while Centre students continued their education in media training. We welcomed new members and we congratulate all those Centre members who were successful in recent major funding rounds. There were also numerous members who presented their research at National and International conferences and we were thrilled that many members received competitive prizes for their presented research. We were also proud of our members, new and old, who were recipients of major awards.

A handwritten signature in black ink that reads "Patrick Sexton".

Professor Patrick Sexton  
Centre Director

## Did you know?....

....that the average time between deposition and release of a structure in EMDB in 2023 was 216 days. Compare that to ten years prior where in 2013 it was 105 days and ten years before that, in 2003, it was 90 days. Don't you just hate waiting?

**On the cover:** From the UoM node, the multidrug ABC transporter, BmrA. *Journal of Biological Chemistry* 300(1): 105546, January 2024 doi: 10.1016/j.jbc.2023.105546 (PDB 8CHB).

# Centre updates

## ICHDR Update

### Industry placements



The first of our ICHDR's has commenced their industry placements. Isabella Russell, is currently in Cambridge (UK), with her project partner organisation AstraZeneca. We can't wait to hear all about her industry experience. Isabella is undertaking a fully embedded 3 months experience with her industry partner before returning in April to share her experiences with the other students. This year many students from our early HDR cohorts will be taking part in industry placements, both locally and overseas.

### Isabella Russell wins the student oral presentation prize

Isabella Russell won the student oral presentation prize at the 11th International Molecular Pharmacology of GPCRs (MPGPCR) meeting, (15th - 17th November, 2023, Melbourne).

### Media Workshop

Centre ICHDRs and PhD affiliates participated in two workshops designed to build their skills in communicating their research; "Meet the Media" and "Present your Science" with both workshops led by Tanya Ha (Catalyst). The Meet the Media session was delivered as a discussion and Q&A moderated by Tanya with panel members, Lana Murphy (Channel 9), James Lake (Triple M), and Bridget O'Connell (Herald Sun). The principal subject of the discussion was "what makes science newsworthy?" Topics included: "How do you ensure your research is reported accurately?" "What do journalists look for in a story?" "Where do they find their stories?" and "What makes some stories work and others go wrong?"



Student media workshop with Lana Murphy, Brigid O'Connell and James Lake, moderated by Tanya Ha



Student Oral Presentation Prize winner, Isabella Russell

The Present your Science workshop was a 90 minute session where the students explored how to present their research quickly and clearly to anyone. The prime exemplar used was "explaining your research to Auntie Betty over Christmas dinner". Following an introduction from Tanya, including key tips on how to breakdown complex research into meaningful concepts for a lay audience, students broke into groups to present to each other and get feedback and then a member from each of the smaller groups presented to the larger group.



Student media workshop: Present your Science

## Visiting Scientists

### Prof. Renae Ryan visits Monash Node



*Prof. Renae Ryan met with Centre PhD students prior to her MIPS seminar, Nov 2023*

During Prof. Ryan's visit to MIPS as a seminar speaker, our Melbourne-based ICHDRs were fortunate enough to meet with her. We had an impromptu mentoring session covering the path Renae took to get to her current position, as well as gender equity and diversity, inclusive and supportive environments and the post doc experience. Renae was very generous with her time, knowledge and experience and presented an amazing seminar.

### CCeMMP Retreat Dec 4 and 5, 2023

On December 4th and 5th, the Centre held their annual retreat. We heard various scientific presentations from ICHDRs, and more senior members and affiliates. ICHDR students Jack Tovey, Ania Beyger, Riya Joseph, Isabella Russell, Minakshi Barauh, Alok Pradhan, Marialena Georgopoulou, Xiaomin Wang, Qinghao Ou and Dongju Lee, who have been working on their PhD's for more than 12 months presented their research. These talks were delivered across two sessions, each chaired by Centre ICHDRs (Qinghao Ou and Xiaomin Wang; Jack Tovey and Isabella Russell). There were also two science presentation sessions from various CCeMMP members and affiliates. These included: Dr. Sarah Piper (Monash Node), Dr. Alisa Glukhova (WEHI Node), Susovan Das (WEHI Node), Dr. Aidan Grosas (UoW Node), Dr. Brian Cary (Monash Node), Dr. Jesse Mobbs (Monash Node), Dr. Joshua Hardy (WEHI Node), Yi (Jack) Zheng (Victor Chang Cardiac Research Institute), Assoc. Prof. Michael Landsberg (University of Queensland), Dr. Debnath Ghosal (UoM/Bio21 Node) and Dr. Winnie Tan (WEHI Node). These were followed by a series of strategic planning sessions.



*CCeMMP Retreat, Treacy Centre, Parkville*

Following an update on our current performance, Centre members worked in small breakout groups to discuss topics that ranged from new initiatives, funding, longevity, leadership and transition and brought their ideas back to the larger group. The Centre will move to implement as many of these ideas and initiatives in 2024 to improve Centre activities, collaboration, education and community outreach. Meanwhile our PhD students attended the media workshops highlighted above. The retreat took place at the Treacy Centre in Parkville.

---

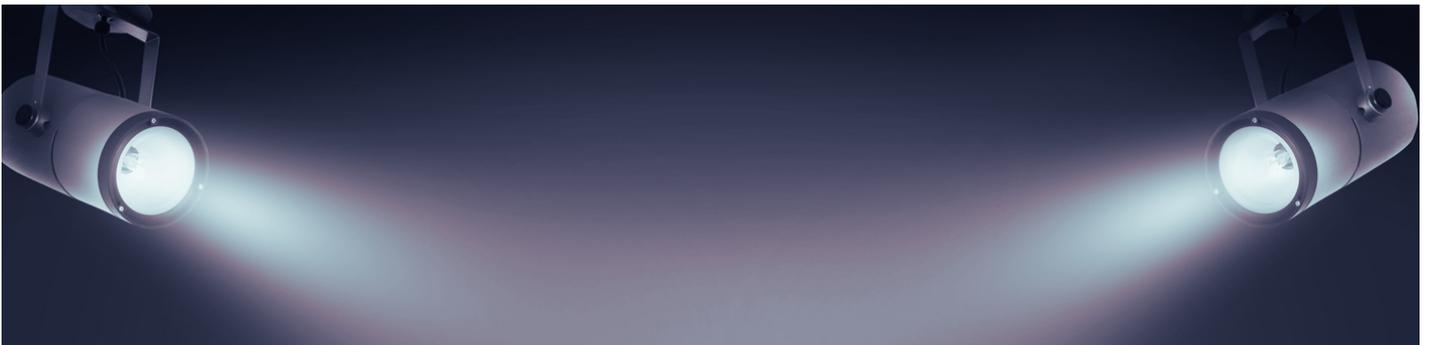
## Expanding CCEMMP Membership

As part of its strategic plan, the Centre has been reaching out to scientists, outside of the founding academic institutions, who are involved in cryo-EM and membrane protein research to provide opportunities for them to become members or affiliates of the Centre. Of course, we continue to actively seek inclusion of new staff and students from within our existing Nodes, as part of the Centre.

### **New affiliate members from around the country joining this quarter include:**

Dr. Rachel North (USyd), Assoc. Prof. Chris French (Royal Melbourne Hospital, UoM), Dr. Sarah Mueller (ANU), Solace Roche (UQ).

## In the Spotlight.....



To promote members of the CCEMMP, the Outreach and Public Engagement Committee will be running a publicity initiative called “In the Spotlight” that that will have a primary (but not exclusive) focus on newer members of the Centre. These will take the form of feature articles and will highlight recent members and affiliates in our newsletter and social media platforms, and include information about their scientific background, current research, and hobbies. This quarter we are showcasing two of our affiliates: Professor Lezanne Ooi, acting Node leader at UoW, and Doulin Shepherd, a student affiliate from the Bio21/UoM Node.

If you would like to be featured “In the Spotlight” please contact the chair of the Outreach and Public Engagement Committee, Dr. Sarah Piper ([sarah.piper@monash.edu](mailto:sarah.piper@monash.edu)). An expanded version of the highlight will be available on the CCEMMP website.

# In the spotlight



## Lezanne Ooi

Professor and Group Leader,  
CCeMMP  
Acting Node Leader at UoW

Twitter/X: @neuralooi

### Background

University of York, UK  
(BSc (Hons), Biochemistry) and  
University of Leeds (PhD, Neuroscience).

### Current research

My lab uses a range of molecular and cellular techniques to understand neurodevelopment and neurological disease mechanisms. Ask us about imaging, electrophysiology and stem cell models.

### Looking forward

Multidisciplinary research has always been a passion; I enjoy working collaboratively and thinking of new ways to solve technological problems. As part of the newly established Centre of Excellence on Quantum Biotechnology, over the next 7 years we will harness quantum technologies for single molecule, cellular and brain research.

### About me

I love running, particularly trail running, and have recently taken up axe throwing and golf.

If you're a CCeMMP member and would like to be featured, please reach out to the CCeMMP Outreach and Public Engagement Committee

# In the spotlight



## Doulin Shepherd

CCeMMP affiliate,  
PhD student at UoM

Twitter/X: @DoulinShepherd

### Background

I completed my Masters at The University of Auckland in 2019 studying *E. coli* pore forming toxins.

### Current research

I study bacterial and archaeal host-pathogen interactions using cryo-electron tomography. I am also interested in Cryo-EM method development.

### Looking forward

I am excited to learn more about denoising tomograms using statistical techniques and different types of neural network architectures.

### About me

When I am not in the lab I practice kirigami. In kirigami, paper is cut and folded to make three-dimensional designs.

If you're a CCeMMP member and would like to be featured, please reach out to the CCeMMP Outreach and Public Engagement Committee

# Node Updates

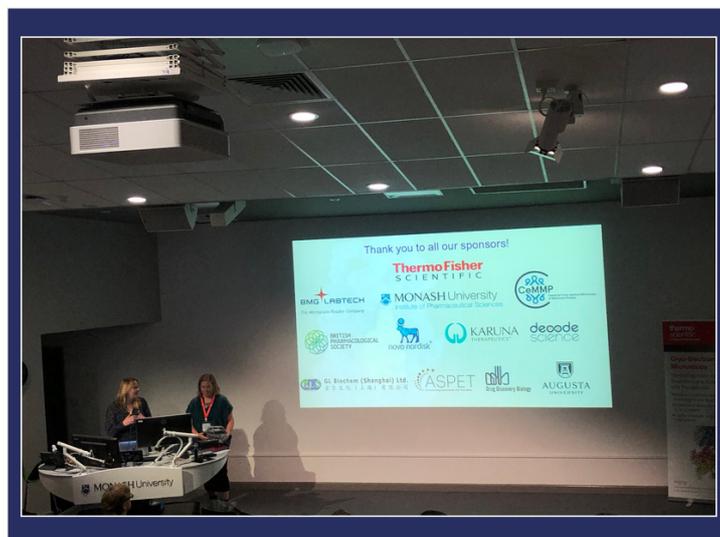
## Monash Node

Professor Denise Wootten

Node Leader, Monash University

### MPGPCR at MIPS, Nov 15-17, 2023

The 11th International Molecular Pharmacology of G Protein Coupled Receptors (MPGPCR) meeting took place at MIPS, November 15-17, 2023. CCEMMP was a major sponsor for this meeting, which was co-chaired by the Monash Node leader, Prof. Denise Wootten (together with Dr. Lauren May) and many CCEMMP members were part of the local organising committee (Assoc. Prof. Karen Gregory, Dr. David Thal, Dr. Elva Zhao, Dr. Tracy Josephs and Dr. Cindy Zhang). In addition to the Centre, the meeting was co-sponsored by some of our industry partner organisations, including Thermo Fisher Scientific (principal sponsor) and NovoNordisk.



*CCEMMP, along with some of our industry partners, sponsored the recent MPGPCR meeting, Nov 2023.*



*CCEMMP members were part of the organising committee*

It was also exciting to see many CCEMMP members present at the meeting, and in particular to see the recognition of the quality of their research. Highlights included ICHDR Isabella Russell winning the Thermo Fisher Scientific Oral Presentation Prize for her talk titled "Lipid-dependent activation of the orphan G protein-coupled receptor, GPR3"; four students were shortlisted from abstracts and included local and international students (University of Otago, Helmholtz Centre Munich, MIPS and The Florey).

The meeting included presentations from leading international researchers and provided a relaxed atmosphere for interaction between students, postdocs, academic and industrial scientists. The meeting focuses on novel concepts in GPCR pharmacology and drug discovery encompassing structural biology and biophysical studies, receptor pharmacology (ligand bias and allostery), chemical biology, cell signalling and systems biology. The opening keynote lecture was delivered by our Centre Director, Prof. Patrick Sexton.



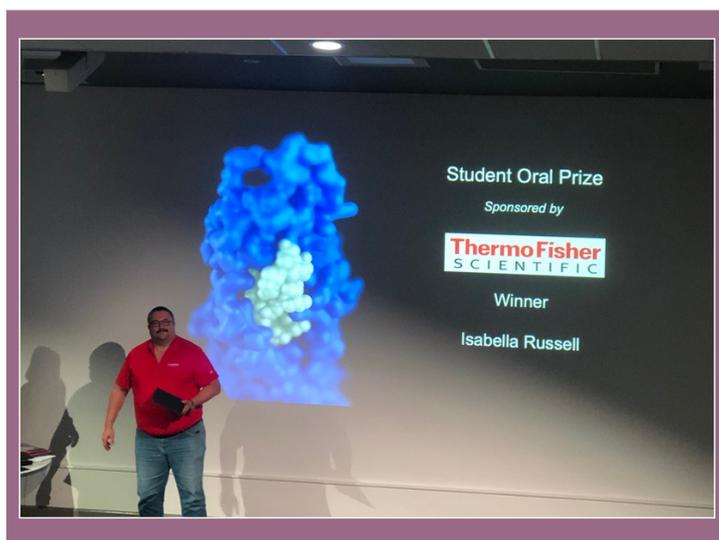
*Prof. Patrick Sexton: opening keynote, MPGPCR*



*CCeMMP sponsored the Postdoctoral Poster Prize*

The difficult task of judging this prize was undertaken by leading international researchers; Prof. Tracy Handel (UCSD), Prof. Laura Bohn (The Scripps Research Institute) and Prof. Nevin Lambert (Augusta Univ.) who selected ICHDR, Isabella Russell, to receive the award. Thermo Fisher sponsored the Student Oral Presentation Prize.

Another highlight was centre member, Dr. Jason Cao, winning the CCEMMP sponsored Best Postdoctoral Poster Presentation Prize for his work titled “Structural understanding of amylin receptors targeted therapeutics for obesity.” While Jason was awarded the poster prize, three of the other four shortlisted posters were from Centre members: Dr. Brian Cary, Dr. Wessel Burger and Dr. Cindy Zhang.



*Student Oral Presentation Prize winner, CCEMMP ICHDR, Isabella Russell*



*Postdoctoral Poster Prize winner, MPGPCR: Dr. Jason Cao*

**ThermoFisher**  
SCIENTIFIC

The world leader in serving science



## Dr. Jason Cao: MIPs Early Career Research Publication Award and Postdoctoral researcher Poster Award at MPGPCR 2024

The Faculty of Pharmacy and Pharmaceutical Sciences Awards for Excellence in Research recognise outstanding Faculty researchers at the Monash Institute of Pharmaceutical Sciences (MIPS). Awardees are nominated by their peers, evaluated against international best-practice benchmarks and selected by a subcommittee of the Faculty Executive Committee.

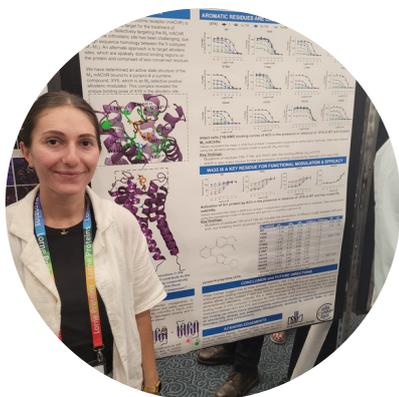
The Early Career Research Publication Award recognises excellence in research publication, for researchers with up to 5 years of experience post-PhD. Jason won the award for the publication: Cao, J., Belousoff, M.J., Liang, Y.L., Johnson, R.M., Josephs, T.M., Fletcher, M.M., Christopoulos, A., Hay, D.L., Danev, R., Wootten, D. and Sexton, P.M. (2022). *A structural basis for amylin receptor phenotype. Science*, 375(6587), p.eabm9609. DOI:10.1126/science.abm9609



**Dr. Jason Cao**

The research provides invaluable structural and mechanistic insight into how amylin receptors work, which has direct implications for future rational drug discovery and development. This study has already been cited 27 times (Google Scholar), tweeted 109 times (67 individual tweeters) and reported by 6 news outlets (Altmetric). (<https://www.monash.edu/pharm/research/faculty-awards/early-career-research-publication-award>)

## Michaela Kaoullas wins the Neuropharmacology SIG poster prize.



**Michaela Kaoullas**

The Annual scientific meeting for ASCEPT runs Special Interest Group (SIG) prizes. Student affiliate, Michaela Kaoullas, won the Neuropharmacology section of the SIG prizes for her poster “Structural Insights into Positive Allosteric Modulation at the M4 mAChR.”

## Blender Workshop, January 30, 2024

The Monash Node hosted two Blender workshops ahead of the Single Particle cryo-EM analysis workshop and the Lorne Proteins 2024 meeting. Led by Dr. Sarah Piper (MIPS) with expert support from Dr. Sepideh Valimehr (UoM/Bio21) and Dr. Joshua Hardy (WEHI) both a beginners and an advanced session were held. Participants were guided through the preparation of an image, including, demonstration of tips and tricks on structure visualisation in the Blender package.



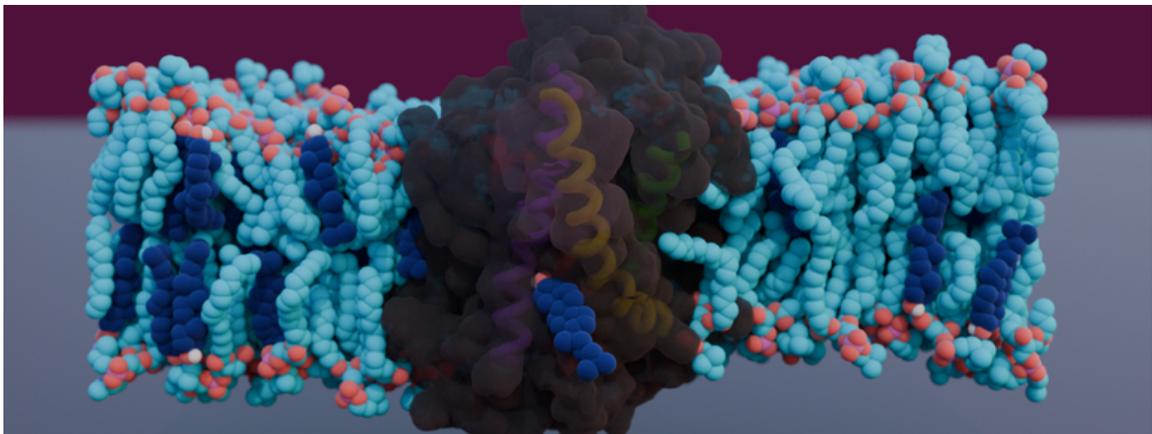
**Blender workshop, session 1**

There were 13 in person attendees, from Monash, ANU, UQ and WEHI comprising members/affiliates or PhD students from the labs of our external affiliates. Sarah has also created a handout for the Blender workshop. If you would like to access it, please contact her directly: [sarah.piper@monash.edu](mailto:sarah.piper@monash.edu).



*Blender workshop, session 2*

Sarah plans to run these in-person workshops on a regular basis, but also aims to hold a dedicated online only session for interstate members and affiliates. Watch this space (or your inbox)! On a separate note, one of Sarah's images will grace the cover of the NH&MRC 2024 Research Excellence Awards booklet. Which one?... find out on the awards night (March 27) or in our next newsletter.



*Blender image of the glycine transporter, GlyT2, interacting with membrane lipids, imported using MolecularNodes by PhD student, Ada Quinn (Prof. Megan O'Mara's lab, UQ)*

## Single Particle Analysis Workshop Jan 31st - Feb 2nd, 2024 at MIPS

The Monash Node also hosted a cryo-EM data processing workshop. Organised by Dr. Matthew Belousoff (MIPS) with expert support from Dr. Sepideh Valimehr (Bio21), Prof. Michael Landsberg (UQ) and Dr. Brian Cary (MIPS) this single particle analysis (SPA) workshop was held just prior to the 2024 Lorne Proteins Meeting. The workshop covered both fundamental theoretical and practical aspects of SPA cryo-EM. Over the three days the entire image processing workflow was covered from collection of micrographs to 3D map calculation. They were assisted by Theodore Nettleton and Qinghao Ou.

There were 17 attendees from New Zealand and most of the universities from the East coast of Australia. The overall consensus was that it was a very worthwhile workshop, even for the experienced user with a good mix of theory and practice.



*SPA workshop, Jan 2024*



*SPA workshop instructors and attendees*

Here's just a sample of what the participant's had to say -

"I just would like to say thank you Matt and Sepideh for running an amazing workshop. I am a somewhat advanced user, but I was still able to learn a lot from this workshop and helped with processing my own dataset. I also think it's great that we covered a lot theoretical aspects of the CryoEM SPA, which can take a lot of time to master for some, particularly if we were to learn by ourselves."

"Really enjoyed the theory sections woven into the processing."

"The hands-on approach was great to keep me engaged and also help me learn more about the process and theory. It was useful to go over the different software packages used to process data too."

"The instructors are very knowledgeable and helpful. The course is well structured."

Thank you to all those who attended, and for your constructive feedback. Thank you to our instructors, Matt, Sepideh and Michael; your dedication, expertise and knowledge is always appreciated.

Due to the popularity of the workshop, another will be run very soon, 20th-22nd of March this year which will be mostly for researchers in the Melbourne area.

The workshop was supported by CCEMMP and the Moansh MASSIVE High Performance Computing.

## Grants awarded

### Prof. Denise Wootten awarded NHMRC L2 grant

Prof. Denise Wootten was awarded an NHMRC L2 Leadership Investigator grant (2026300): "*Mechanistic understanding of biased agonism and dimerisation for co-targeting incretin receptors for metabolic diseases*". The Investigator grant provides salary and research support for 5 years (2024-2028), \$2,897,165.



**Prof. Denise Wootten**



**Prof. Patrick Sexton**

### Prof. Patrick Sexton awarded NHMRC L3 grant

Prof. Patrick Sexton was awarded an NHMRC L3 Leadership Investigator grant (2025694): "*Structure, function and modulation of peptide hormone G protein-coupled receptors (GPCRs)*". The Investigator grant provides salary and research support for 5 years (2024-2028), \$2,953,040.

**New members:** Dr Yan Li (BDI) and Prof. Trevor Lithgow (BDI)

---

## University of Melbourne (Bio21) Node

Associate Professor Isabelle Rouiller

Node Leader and Deputy Director, University of Melbourne

### Dr. Debnath Ghosal awarded CGCPT Foundation grant

Dr. Debnath Ghosal was awarded \$1.5M in round one of the foundation grants from the Cumming Global Centre for Pandemic Therapeutics (CGPT) for the project “*A comprehensive structural (-cell) biology platform for rapid characterisation of any pathogen of pandemic potential*”. Together with the other CI’s, Prof. Michael Parker, Prof. Eric Hanssen, Dr. Matthew Johnson and Dr. Roxanne Smith, they aim to develop and establish new methods that will aid in rapid characterization of pathogenic bacteria and viruses and inform therapeutic interventions. The foundation grants are for projects to develop novel therapeutics for pathogens of pandemic potential.



Dr. Debnath Ghosal

### Dr. Sepideh Valimehr awarded AU-NZ Knowledge Exchange award



Dr. Sepideh Valimehr

January 12, 2024, ICPD Dr. Sepideh Valimehr, was awarded the AU-NZ Knowledge Exchange award from Microscopy Australia (\$2,400). This award will allow her to travel to the University of Wollongong Node to their cryo-EM facility for one week. While at the facility, Sepideh will further her cryo-EM knowledge.

### Bindusmita Paul awarded best student talk, CryOZ 2023

Student affiliate, Bindusmita Paul from Dr. Debnath Ghosal’s lab was awarded best student talk at the recent CryOz meeting, 23-24 November 2023, The University of Queensland, Brisbane, for the presentation “*Characterisation of the structure and dynamics of oral polymicrobial biofilms at molecular resolution.*”

---

## University of Wollongong Node

Professor Lezanne Ooi

Acting Node Leader, University of Wollongong

### Jordan Nicholls wins best student poster and best student talk

At the recent CryOz 2023 (23-24 November, The University of Queensland, Brisbane) and ASB 2023 (3-6 December, 2023, The University of Wollongong, Wollongong) meetings, Jordan Nicholls won best student poster and best student talk, respectively, for “Unravelling Herpesvirus DNA Annealing: Cryo-EM structure of BALF2.” He was also nominated for the Sydney Protein Group Thompson Prize.

#### New Members:

Dr Jacob Lewis

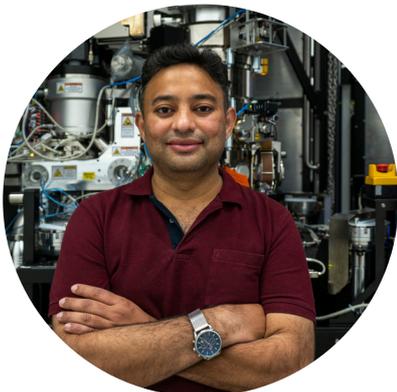
Jacob also secured a DECRA (prior to joining CCeMMP but this amazing achievement must be recognised); “Using cutting-edge electron and light microscopes, Dr Lewis’ project will help to better understand the molecular processes where DNA is replicated and split in cell divisions, by determining the individual shapes and visualise the dynamic behaviours of these protein complexes. This will generate new techniques and information to support the biotechnological and pharmaceutical industries in developing new therapeutic strategies to treat cancer and other diseases.” [from <https://www.uow.edu.au/media/2023/seven-researchers-recognised-with-early-career-awards-.php>]

## WEHI Node

Associate Professor Isabelle Lucet

Node Leader, WEHI

### Grants awarded



Dr. Shabih Shakeel

### WEHI’s New Medicines and Advanced Technologies awards Dr. Shabih Shaakeel

Dr. Shabih Shaakeel was awarded \$24,000 from WEHI’s New Medicines and Advanced Technologies for hiring Monash students through the Monash Industry Team Initiative (MITI) program in order to develop a new particle picking algorithm. Past projects from this funding include making a plunge freezer and a second iteration of the project has enabled a device that is a simpler design with a two-fold speed increase.

### Dr. Winnie Tan awarded NHMRC Investigator Grant

Dr. Winnie Tan was awarded a NHMRC Investigator EL1 Grant (2026635): “Capturing atomic snapshots to visualise chromatin remodelling machinery for disease insights and drug discovery”, \$662,000.



Dr. Winnie Tan

---

## External Affiliates Update

### Dr. Alastair Stewart awarded the Commonwealth Health Minister's Award for Excellence



**Dr. Alastair Stewart, Victor Chang Cardiac Research Institute**

November 29, 2023, Dr. Alastair Stewart was awarded the Commonwealth Health Minister's Award for Excellence in Health and Medical Research. This award recognises Alastair's outstanding research in infection control, in particular, antimicrobial resistance; his work contributes to the understanding of how drugs interact with their bacterial targets, thus facilitating antimicrobial therapeutic drug development. The Commonwealth Health Minister's Award for Excellence is awarded to NHMRC's top ranked Investigator grant in the Emerging Leadership Level 2 category (from the previous year's round). Alastair will also receive \$50,000 to support his research.

### Prof. Megan O'Mara awarded the McAuley-Hope Prize for original biophysics from the Australian Society for Biophysics

Biophysics requires the development of new techniques, equipment and models, as such, the biophysicist needs to be innovative. Prof. Megan O'Mara was awarded the McAuley-Hope Prize for Original Biophysics at the 2023 Annual Meeting of the Australian Society of Biophysics, 3-6 December 2023, at The University of Wollongong. This Prize recognises *true originality and innovation in the field of biophysics* and is only awarded when a biophysicist, recognised for truly original research, is nominated by other members of the society. Megan's use of novel computational methods in order to look at membrane proteins and their interactions is clearly original and innovative. The award consists of a medal and \$1,000 to further develop Megan's work.



**Prof. Megan O'Mara, University of Queensland**

### Prof. Megan O'Mara elected president AMMA

Prof Megan O'Mara was elected President of the Association of Molecular Modellers of Australasia, at their recent annual meeting, 7-10 December 2023, The University of Wollongong. With both conferences at The University of Wollongong, Megan also took the opportunity to visit the UoW node.

### Dr. Alice Shin wins Poster Prize, ASBMB 2023

Dr. Alice Shin won a poster prize at the 67th Annual Meeting of the Australian Society for Biochemistry and Molecular Biology at ANU, 15-17th November, 2023 for her poster "*Structural investigation of multi-drug resistance ABC transporter CDR1 of Candida albicans.*"

## Grants awarded



Prof. Renae Ryan,  
University of Sydney

### Successful LIEF Funding for Prof. Renae Ryan

Prof. Renae Ryan was part of the team securing a successful ARC Linkage Infrastructure, Equipment and Facilities grant, administered through The University of Sydney (Prof. Chris Ling; Dr. William Lewis; **Prof. Renae Ryan**; Prof. Rongkun Zheng; Prof. Antonio Tricoli; Dr. Lauren Macreadie; Assoc. Prof. Neeraj Sharma; Prof. Philip Gale; Dr. Fei Liu; Dr. Feng Li; Prof. Valeska Ting; Prof. Bostjan Kobe; Prof. Jack Clegg; Prof. Jennifer Pringle; Prof. Christopher Sumby. Funding is \$1,341,398 over 1 year in order to establish a dedicated high-throughput 3D-electron diffractometer, the first in the Southern Hemisphere. This will benefit the chemists, physicists, biologists, geologists, and engineers who rely on detailed structural knowledge in order to optimise the properties of their compounds.

## Upcoming Events



Our seminar series commenced on Tuesday 13th of February and continues for the remainder of the year on the second Tuesday of the month, 10:00 AM - 11:00 AM (AEST/AEDT). In the first quarter for 2024 we will hear from Dr. Cindy Zhang (Monash University), Dr. Lisanne Spenkelink (University of Wollongong) and Professor Brett Collins (University of Queensland).

If you miss one of our seminars, most are recorded and can be found on our website (<https://ccemmp.org/>) and You Tube channel.

### Biomolecular Horizons 2024

Biomolecular Horizons 2024 will be held in Melbourne, September 22-26 2024 at the Melbourne Convention and Exhibition Centre.

This international meeting brings together three prestigious congresses: the 22nd ComBio conference; the 26th Congress of the International Union of Biochemistry and Molecular Biology (IUBMB); the 17th Congress of the Federation of Asian & Oceanian Biochemists & Molecular Biologists (FAOBMB).

**Call for abstracts is open (closes March 12, 2024)**  
**Early bird registration is open (early bird closes May 31, 2024)**

<https://bmh2024.com/>

# BIOMOLECULAR HORIZONS 2024:

DISCOVER CREATE INNOVATE

# ComBio 2024 MELBOURNE

22nd COMBIO CONFERENCE

22 TO 26 SEPTEMBER 2024

MELBOURNE CONVENTION AND EXHIBITION CENTRE

[www.bmh2024.com](http://www.bmh2024.com)

ComBio returns to Melbourne from 22-26 September 2024 as part of Biomolecular Horizons 2024. Join your colleagues from around the world and contribute to this important global forum. Abstract submission closes **12 March 2024** so act now! Registration is open too. Visit [www.bmh2024.com](http://www.bmh2024.com) for more information and to secure your place now!

The outstanding scientific program will be led by the following speakers:

## PARTNERING SOCIETIES



## PLENARY SPEAKERS



**BRIAN KOBILKA**  
Stanford University USA  
*Nobel Prize in Chemistry 2012  
Grimwade Award Lecturer*



**PAMELA SILVER**  
Harvard University USA  
*IUBMB Jubilee Award Lecturer*



**SERGEY OCVHINNIKOV**  
Harvard University USA



**SANDRA EADES**  
University of Melbourne AUSTRALIA



**PETRO TERBLANCHE**  
Afrigen Biologics & Vaccines SOUTH AFRICA



**CAIXIA GAO**  
Chinese Academy of Sciences CHINA

## INVITED KEYNOTE SPEAKERS



**KEI SATO**  
The University of Tokyo JAPAN



**MARIAN WALHOUT**  
University of Massachusetts USA



**YUE WAN**  
Genome Institute of Singapore SINGAPORE



**WEI XIE**  
Tsinghua University CHINA



**NORBERT PARDI**  
University of Pennsylvania USA



**ALEXIS KOMOR**  
UC San Diego USA



**ALEXANDRA NEWTON**  
UC San Diego USA



**NICK BARKER**  
Institute of Molecular & Cell Biology SINGAPORE



**JENNIFER LISTGARTEN**  
UC Berkeley USA



**SHOBHNA KAPOOR**  
Indian Institute of Technology INDIA



**ELIZABETH MCKINLEY**  
University of Melbourne AUSTRALIA



**RICHARD J ROBERTS**  
New England Biolabs USA



**PETER FINERAN**  
University of Otago NEW ZEALAND



**ROMMIE AMARO**  
UC San Diego USA



**HOZUMI MOTOHASHI**  
Tohoku University JAPAN



**JOB DEKKER**  
University of Massachusetts USA



**VICTOR NIZET**  
UC San Diego USA



**SEIGO SHIMADA**  
Max Planck Institute GERMANY



**NIENG YAN**  
Tsinghua University CHINA



**GREG COOK**  
University of Otago NEW ZEALAND



**DREW BERRY**  
VEHI AUSTRALIA



**HEATHER CHRISTOFK**  
UC Los Angeles USA



**LEO EBREL**  
University of Zurich SWITZERLAND  
*FBS Worldwide Award Lecturer*



**MICHAEL BARRETT**  
University of Glasgow UNITED KINGDOM



**YOU-ME KIM**  
KAIST KOREA



**JOHN CHAMBERS**  
Nanyang Technological University SINGAPORE



**MICHAEL FUNK**  
Science USA

**CONGRESS THEMES:** Cell, Developmental & Stem Cell Biology; Biotechnology & Synthetic Biology; Microbial World; Cell Signalling & Metabolism; Genomics, Gene Regulation & Epigenetics; Bioinformatics, Computational Biology & 'Omics; Structural Biology & Biophysics; Molecular Physiology; Education

**CONGRESS FOCUS DAYS:** RNA Technology; Gene Editing; Climate Change; Indigenous Perspectives in Biomolecular Science; Education

## INCORPORATING THE



26th Congress of the International Union of Biochemistry and Molecular Biology (IUBMB)



17th Congress of the Federation of Asian & Oceanian Biochemists & Molecular Biologists (FAOBBM)

# Outreach

## 2024 Calendars

A limited run of the 2024 CCeMMP calendar has been printed. The brainchild of Dr. Sarah Piper and the Outreach & Public Engagement Committee, with image contributions from all our nodes: Monash University, University of Melbourne, WEHI and University of Wollongong, including external affiliates Alastair Stewart (VCCRI) and Emily Furlong (ANU).

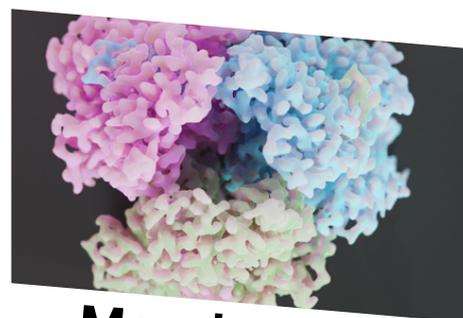
A huge thanks must go to our Blender-Render-Masters/gurus/royalty: Dr. Sarah Piper, Dr. Jesse Mobbs, Dr. Joshua Hardy, Dr. Brian Cary, Dr. Sepideh Valimehr who rendered all the images.

Do you want a free copy?... The first 10 people to email Dr Sarah Piper ([sarah.piper@monash.edu](mailto:sarah.piper@monash.edu)) will receive one.

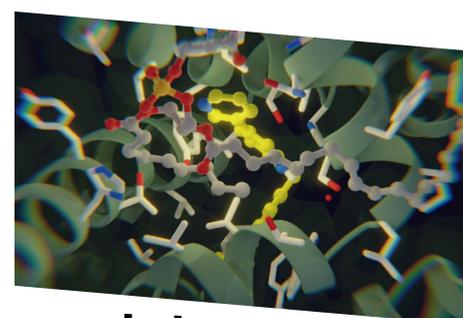
Delivery to an Australian address only.



**January 2024**



**March 2024**



**July 2024**

## In the Media

**November 21, 2023**

**Jason Cao** - Faculty of Pharmacy and Pharmaceutical Sciences post on Early Career Research Publication Award - Faculty web page

<https://www.monash.edu/pharm/research/faculty-awards/early-career-research-publication-award>

**November 29, 2023**

**Alastair Stewart** - NHMRC post on the Commonwealth Health Minister's Award for Excellence in Health and Medical Research - NHMRC web page (and twitter/X)

<https://www.nhmrc.gov.au/about-us/news-centre/dr-alastair-stewart-recognised-outstanding-achievement-health-and-medical-research>

**December 15, 2023**

**Winnie Tan** - WEHI LinkedIn post congratulating their Investigator grant awardees

<https://www.linkedin.com/feed/update/urn:li:activity:7141267467661623298/>

**Winnie Tan** - WEHI Twitter post congratulating their Investigator grant awardees

[https://twitter.com/WEHI\\_research/status/1735499277957476645](https://twitter.com/WEHI_research/status/1735499277957476645)

---

## Outreach - Training

Eric Hanssen: teacher at Microscopy New Zealand cryoEM workshop 26-29 November 2023. Hanmer Springs, New Zealand.

Matthew Belousoff, Sepideh Valimehr, Michael Landsberg, Theodore Nettleton, Qinghao Ou - SPA workshop, MIPS, January 2024

Sarah Piper, Sepideh Valimehr, Joshua Hardy - Blender workshop, MIPS, January 2024

## Outreach - Conferences

Centre members were session chairs at the CryOZ conference, CryoOZ 2023, 23-24 November, The University of Queensland, Brisbane: Dr. Sarah Piper, Dr. Matthew Belousoff.

# Recent Centre Activities and Achievements

## Industry Engagement

Members and student members continue to have their regular meetings with their respective industry partners (Boehringer Ingelheim, Astex, Servier, AstraZeneca, Dimerix and Pfizer). ICHDRs and their supervisors are also starting to talk with industry partners regarding their 3 month placements.

## Training

### Attendees

Jordan Nicholls: Attended ModelAngelo workshop, CryOz 2023, The University of Queensland

Jason Cao, Josh Hardy, Sepideh Valimehr attended the two-day cryo-tomography workshop at CryoZ 2023, The University of Queensland

Mai Vu, Alice Shin, Naveen Vankadari, Sarah Mueller, Dilanka Fernando, Amy Cheng, Solace Roche, Megan Maher: attended the CCEMMP Single Particle Analysis workshop

## Conference Presentations

### International meetings

Patrick Sexton: Opening Keynote presentation, "Towards a Structural Understanding of Class B1 GPCRs" 11th International Molecular Pharmacology of GPCRs meeting, MPGPCR 2023, 15-17 November 2023, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville.

Karen Gregory: Invited presentation, "Fine tuning glutamate receptor activity in space and time." 11th International Molecular Pharmacology of GPCRs meeting, MPGPCR 2023, 15-17 November 2023, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville.

Patrick Sexton: Invited presentation, "Biased agonism at the GLP-1 receptor: from structure to animal models of disease" Great Lakes GPCR Retreat, 2-4 November 2023, Montebello, Canada.

Wessel Burger: Oral presentation, "Positive allosteric modulation at a GPCR ternary complex." 11th International Molecular Pharmacology of GPCRs meeting, MPGPCR 2023, 15-17 November 2023, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville.

---

## Conference Presentations

### International meetings

Isabella Russell: Oral presentation\*, “Lipid-dependent activation of the orphan G protein-coupled receptor, GPR3.” 11th International Molecular Pharmacology of GPCRs meeting, MPGPCR 2023, 15-17 November 2023, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville. *\*Best student oral presentation award*

Wessel Burger: Poster presentation, “1.96 Å cryo-EM structure of the M5 mAChR with a selective allosteric modulator reveals novel binding site.” 11th International Molecular Pharmacology of GPCRs meeting, MPGPCR 2023, 15-17 November 2023, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville.

Jason Cao: Poster presentation\*, “Structural understanding of amylin receptors targeted therapeutics for obesity.” 11th International Molecular Pharmacology of GPCRs meeting, MPGPCR 2023, 15-17 November 2023, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville. *\*Best postdoctoral trainee poster presentation*

Susovan Das: Poster presentation, “Structural insight into G protein coupling and activation of human FZD5 receptor.” 11th International Molecular Pharmacology of GPCRs meeting, MPGPCR 2023, 15-17 November 2023, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville.

Michaela Kaoullas: Poster presentation, “Structural Insights into Positive Allosteric Modulation at the M4 mAChR.” 11th International Molecular Pharmacology of GPCRs meeting, MPGPCR 2023, 15-17 November 2023, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville.

Peter Keov: Poster presentation, “Novel profiles of selective and non-selective peptide agonists of calcitonin and amylin receptors revealed by a selective amylin receptor activation system.” 11th International Molecular Pharmacology of GPCRs meeting, MPGPCR 2023, 15-17 November 2023, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville.

Nazanin Mohebbali: Poster presentation, “Development of biochemical methods for purification of dimeric secretin receptors for structure determination using cryo-EM.” 11th International Molecular Pharmacology of GPCRs meeting, MPGPCR 2023, 15-17 November 2023, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville.

Isabella Russell: Poster presentation, “Lipid-dependent activation of the orphan G protein-coupled receptor, GPR3.” 11th International Molecular Pharmacology of GPCRs meeting, MPGPCR 2023, 15-17 November 2023, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville.

Jack Tovey: Poster presentation, “A structural investigation into the agonism and allosteric modulation of the cholecystokinin type 1 receptor.” 11th International Molecular Pharmacology of GPCRs meeting, MPGPCR 2023, 15-17 November 2023, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville.



---

## National meetings

Joe Brock: Invited presentation, "The structural basis of multidrug transport." Presented 24 November at CryOZ 2023, 23-24 November, The University of Queensland, Brisbane.

Matthew Johnson: Invited presentation, "Exploring microbial dark matter using CryoET and in situ structural biology." Presented 23 November at CryOZ 2023, 23-24 November, The University of Queensland, Brisbane.

Jesse Mobbs: Invited presentation, "Cryo-EM structures of human arachidonate 12S-Lipoxygenase (12-LOX) bound to endogenous and exogenous inhibitors." Presented 24 November at CryOZ 2023, 23-24 November, The University of Queensland, Brisbane.

Bindusmita Paul: Invited presentation\*, "Characterisation of the structure and dynamics of oral polymicrobial biofilms at molecular resolution." Presented 23 November at CryOZ 2023, 23-24 November, The University of Queensland, Brisbane. \* *Best student talk*

Shabih Shakeel: Invited talk, "Structure and mechanism of FANCD2-FANCI clamping onto DNA." 18th Australian Cell Cycle, DNA Repair and Telomere Meeting, 23-25 October, 2023, Melbourne.

Emily Furlong: Selected presentation, "Molecular structure of an axle-less F1-ATPase", Presented 24 November at CryOZ 2023, 23-24 November, The University of Queensland, Brisbane.

Jordan Nicholls: Selected presentation\* "Unravelling Herpes virus DNA annealing: cryo-EM structure of BALF2." Presented December 4, at the Australian Society of Biophysics 3-6 December, ASB 2023, University of Wollongong. \* *Best student talk*

Joydeep Baral: Oral presentation, "Structure-function insight into the twocomponent DNA repair system of Mycobacterium tuberculosis." Melbourne India Postgraduate Academy Conference, MIPAC 2023, 15-17 November 2023, Studio Melbourne Connect, Carlton.

Hamish Brown: Oral presentation, "Square beams for CryoEM dreams: Development of novel condenser aperture plates four square and rectangular illumination." Presented 24 November at CryOZ 2023, 23-24 November, The University of Queensland, Brisbane.

Joshua Hardy: Oral presentation, "TEMPO: Training in Electron Microscopy Processing and Optics." Presented 24 November at CryOZ 2023, 23-24 November, The University of Queensland, Brisbane.

Jason Cao: Poster presentation, "Structural understanding of amylin receptors targeted therapeutics for obesity." CryOZ 2023, 23-24 November, 2023, The University of Queensland, Brisbane.

Lucy Fitschen: Poster presentation, "Towards the cryo-EM structures of viral annealase proteins." EMBL Australia Postgraduate Symposium (EAPS) 2023, 1-3 November, 2023, Garvan Institute of Medical Research, Sydney, NSW.

Lucy Fitschen: Poster presentation, "Towards the cryo-EM structures of viral annealase proteins." CryOZ 2023, 23-24 November, The University of Queensland, Brisbane.

Lucy Fitschen: Poster presentation, "Towards the cryo-EM structures of viral annealase proteins." Australian Society for Biophysics, ASB 2023, 3-6 December 2023, The University of Wollongong, Wollongong.

---

Lucy Fitschen: Poster presentation, "Towards the cryo-EM structures of viral annealase proteins." 67th Annual Meeting of the Australian Society for Biochemistry and Molecular Biology, ASBMB 2023, 15-17th November, 2023, ANU, Canberra.

Emily Furlong: Poster Presentation, "Molecular structure of an axle-less F1-ATPas." 67th Annual meeting of the Australian Society for Biochemistry and Molecular Biology, 15th-17th November, ASBMB 2023, Australian National University, Canberra.

Michaela Kaoullas: Poster presentation\*, "Structural insights into positive allosteric modulation at the M4 mAChR." ASCEPT 2023, 20-23 November, 2023, Sydney. *\*Neuropharmacology Special Interest Group Prize Winner.*

Jordan Nicholls: Poster presentation\* "Unravelling herpes virus DNA annealing: cryo-EM structure of BALF2." CryOZ 2023, 23-24 November, The University of Queensland, Brisbane. \* Best student poster

Jhonnatan Reales-Gonzalez: Poster presentation, "Structural characterization of full-length human RAD52 using cryo-EM: towards its mechanism of action. " CryOZ 2023, 23-24 November, The University of Queensland, Brisbane.

Alice Shin: Poster presentation\*, "Structural investigation of multi-drug resistance ABC transporter CDR1 of *Candida albicans*." 67th Annual Meeting of the Australian Society for Biochemistry and Molecular Biology, ASBMB 2023, 15-17th November, 2023, ANU, Canberra. \*Poster prize awarded.

Sepideh Valimehr: Poster presentation, "The effect of the blot force and blot time of the Vitrobot on the ice thickness of the CryoEM grid." CryOZ 2023, 23-24 November, 2023, The University of Queensland, Brisbane

## Industry presentations

Patrick Sexton: Seminar. Vignettes on class B1 GPCR activation. November 7 2023. Septerna Inc., San Francisco, USA.

## Academic Presentations

Brian Cary: Invited oral presentation, "Structure & activity of backbone-modified class B1 GPCR agonists." CCEMMP Retreat, 4 December, 2023, Treacy Conference Centre, Parkville.

Alisa Glukhova: Invited oral presentation, "Role of lipids in G protein coupling of FZD receptors." CCEMMP Retreat, 4 December, 2023, Treacy Conference Centre, Parkville.

Aidan Grosas: Invited oral presentation, "Investigating the mechanisms of substrate polyspecificity of the RND transporter MexB using cryo-EM." CCEMMP Retreat, 4 December, 2023, Treacy Conference Centre, Parkville.

Joshua Hardy: Invited oral presentation, "Cryo-EM structure of the extracellular domain of murine thrombopoietin receptor in complex with thrombopoietin." CCEMMP Retreat, 5 December, 2023, Treacy Conference Centre, Parkville.

Michael Landsberg: Invited oral presentation, "Insights into mechanisms of ABC toxin activation and cell recognition from CryoEM." CCEMMP Retreat, 5 December, 2023, Treacy Conference Centre, Parkville.

---

Jesse Mobbs: Invited oral presentation, "Structural Investigation of the Delta Opioid Receptor (DOR)." CCeMMP Retreat, 4 December, 2023, Treacy Conference Centre, Parkville.

Winnie Tan: Invited oral presentation, "Human MORC2 is an ATP-dependent DNA compaction machine." CCeMMP Retreat, 5 December, 2023, Treacy Conference Centre, Parkville.

Susovan Das: Selected oral presentation, "Structural insight into G protein coupling and activation of human Frizzled 5 receptor." CCeMMP Retreat, 4 December, 2023, Treacy Conference Centre, Parkville.

Debnath Ghosal: Selected oral presentation, "Exploring microbial dark matter using cryoelectron tomography." CCeMMP Retreat, 5 December, 2023, Treacy Conference Centre, Parkville.

Jordan Nicholls: Selected oral presentation, "Unravelling Herpesvirus DNA Annealing: Cryo-EM structure of BALF2" Sydney Protein Group Thompson Prize, The University of Sydney, 24 November, 2023.

Yi (Jack) Zeng: Selected oral presentation, "Structural basis of promiscuous drug binding & transport by organic cation transporter 1." CCeMMP Retreat, 5 December, 2023, Treacy Conference Centre, Parkville.

Minakshi Baruah: Oral presentation, "Development of approaches for inactive state GPCR structure determination using cryoEM". CCeMMP Retreat, 4 December, 2023, Treacy Conference Centre, Parkville.

Ania Beyger: Oral presentation, "Pharmacological characterisation of CXCR3 splice variants to aid drug design". CCeMMP Retreat, 4 December, 2023, Treacy Conference Centre, Parkville.

Natalie Diepenhorst: MIPS Consumer Engagement Showcase, 23 November, 2023. Research Week: Collaborating for Impact 20-24 November, 2023. Monash University, Parkville (and online).

Mariakoula Georgopoulou: Oral presentation, "Structural studies of cell signalling adaptor protein STimulator of INterferon Genes (STING) in complex with small molecule inhibitors." CCeMMP Retreat, 4 December, 2023, Treacy Conference Centre, Parkville.

Riya Joseph: Oral presentation, "Structural studies of recently identified cholesterol dependent cytolysin like protein from B fragilis." CCeMMP Retreat, 4 December, 2023, Treacy Conference Centre, Parkville.

Dongju Lee: Oral presentation, "Structural & pharmacological insights into orphan GPCR, GPR151 with G protein couplings." CCeMMP Retreat, 4 December, 2023, Treacy Conference Centre, Parkville.

Alok Pradhan: Oral presentation, "Structure determination of GPCR heteromers." CCeMMP Retreat, 4 December, 2023, Treacy Conference Centre, Parkville.

Isabella Russell: Oral presentation, "Impacts of constitutive activity on structural determination of GPCRs." CCeMMP Retreat, 4 December, 2023, Treacy Conference Centre, Parkville.

Jack Tovey: Oral presentation, "Structural Insights into the Activation of the Cholecystokinin Type 1 Receptor." DDB Research Symposium, 26 October, 2023, Monash University, Parkville.

---

Jack Tovey: Oral presentation, "Structural Insights into the Activation of the Cholecystokinin Type 1 Receptor." 18th Annual Graduate Research Symposium, 22 November, 2023, Monash University, Parkville.

Jack Tovey: Oral presentation, "Structural Insights into the Activation of the Cholecystokinin Type 1 Receptor." CCeMMP Retreat, 4 December, 2023, Treacy Conference Centre, Parkville.

Xiaomin Wang: Oral presentation, "Interaction studies between SARS-CoV2 & it's co-receptors." CCeMMP Retreat, 4 December, 2023, Treacy Conference Centre, Parkville.

## Publications

### New Publications

Di Cesare M, Kaplan E, Rendon J, Gerbaud G, **Valimehr S**, Gobet A, Ngo T-A T, Chaptal V, Falson P, Falson M, Dorlet P, **Hanssen E**, Jault J-M, Orelle C (2024). The transport activity of the multidrug ABC transporter BmrA does not require a wide separation of the nucleotide-binding domains. *Journal of Biological Chemistry* 300(1): 105546, January 2024. doi: 10.1016/j.jbc.2023.105546

**PDB: 8DPS, 8DPT, 8QOE; EMDB: EMD-16659, EMD-18535, EMD-27641, EMD-27642.**

Metcalf RD, **Hanssen E**, Fung KY, Aizel K, Kosasih CC, Zlatic CO, Doughty L, Morton CJ, Leia AP, **Parker MW**, Gooley PR, Putoczki TL, **Griffin MDW** (2023). Structures of the interleukin 11 signalling complex reveal gp130 dynamics and the inhibitory mechanism of a cytokine variant. *Nature Communications* 14: 7543. doi: 10.1038/s41467-023-42754-w

**PDB: 8DPS, 8DPT; EMD-27641, EMD-27642**

Perera PG, Linklater DP, Vilagosh Z, Nguyen HP, **Hanssen E**, Rubanov S, Wanjara S, Aadum B, Alfred R, Dekiwadia C, Juodkazis S, Croft R, Ivanova EP (2024). Genetic transformation of plasmid DNA into *Escherichia coli* using high frequency electromagnetic energy. *Nano Letters*, January 9, 2024 (online ahead of print). <https://doi.org/10.1021/acs.nanolett.3c03464>

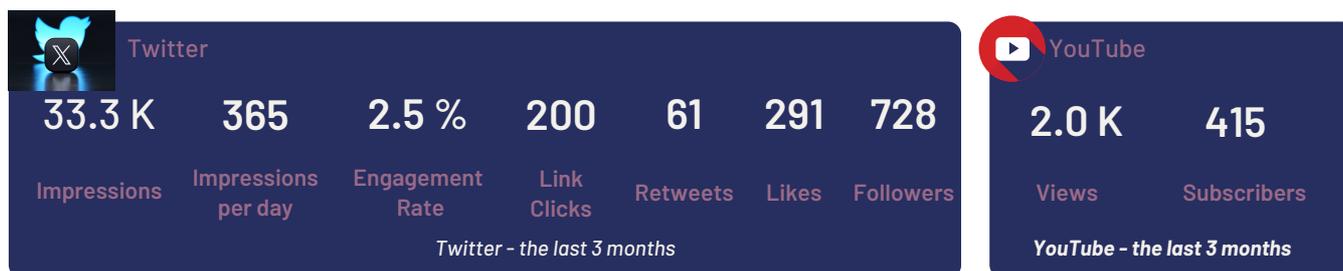
Sobti M, Ueno H, **Brown SHJ**, Noji H, **Stewart AG** (2024). The series of conformational states adopted by rotorless F1-ATPase during its hydrolysis cycle. *Structure*. Available online Jan 17, 2024. <https://doi.org/10.1016/j.str.2023.12.014>

**PDB: 8SPV, 8SPW, 8SPX; EMDB: EMD-40687, EMD-40688, EMD-40689**

**Vankadari N, Ghosal, G** (2024). Structural insights into SARS-CoV-2 nonstructural Protein 1 interaction with human cyclophilin and FKBP1 to regulate interferon production. *The Journal of Physical Chemistry Letters*. 15 (4): 919–924. <https://doi.org/10.1021/acs.jpcllett.3c02959>



## Social Media



## Released Structures

Metcalfe, R.D., Hanssen, E., Griffin, M.D.W.

Metcalfe et al., *Nat. Commun.*, 2023, doi: [10.1038/s41467-023-42754-w](https://doi.org/10.1038/s41467-023-42754-w)

- PDB: 8DPS/EMD-27641
- PDB: 8DPT/EMD-27642

Di Cesare, M., Kaplan, E., Valimehr, S., Hanssen, E., Orelle, C., Jault, J.M.

Di Cesare et al., *JBC*, 2024, doi: [10.1016/j.jbc.2023.105546](https://doi.org/10.1016/j.jbc.2023.105546)

- PDB: 8QOE/EMD-16659
- PDB: 8CHB/EMD-18535

Sobti, M., Stewart, A.G.

Sobti et al, *Structure*, 2024 <https://doi.org/10.1016/j.str.2023.12.014>

- PDB: 8SPV/EMD-40687
- PDB: 8SPW/EMD-40688
- PDB: 8SPX/EMD-40689

## CCeMMP Cryo-EM Structure Image Gallery

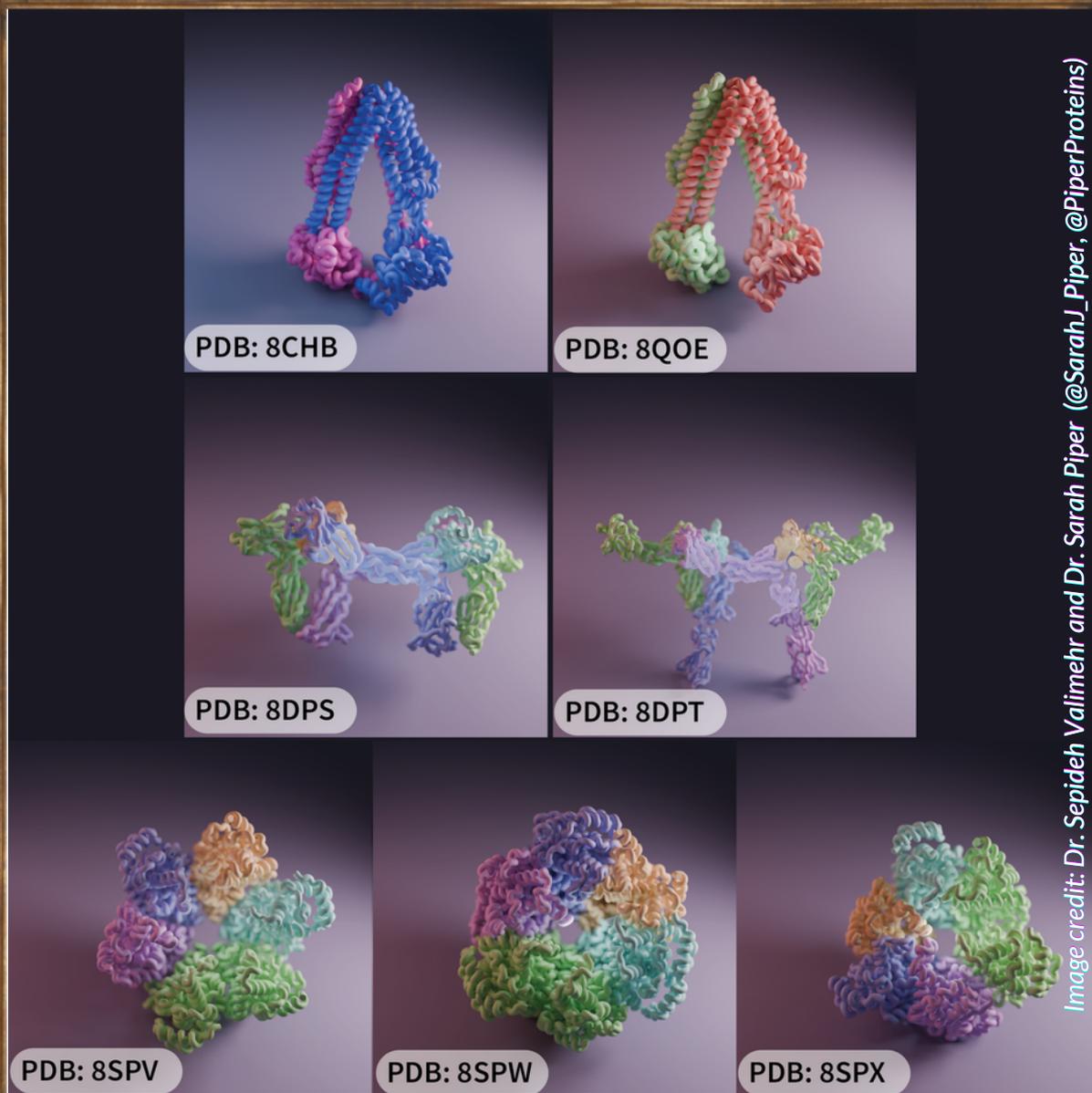


Image credit: Dr. Sepideh Valimehr and Dr. Sarah Piper (@SarahJ\_Piper, @PiperProteins)