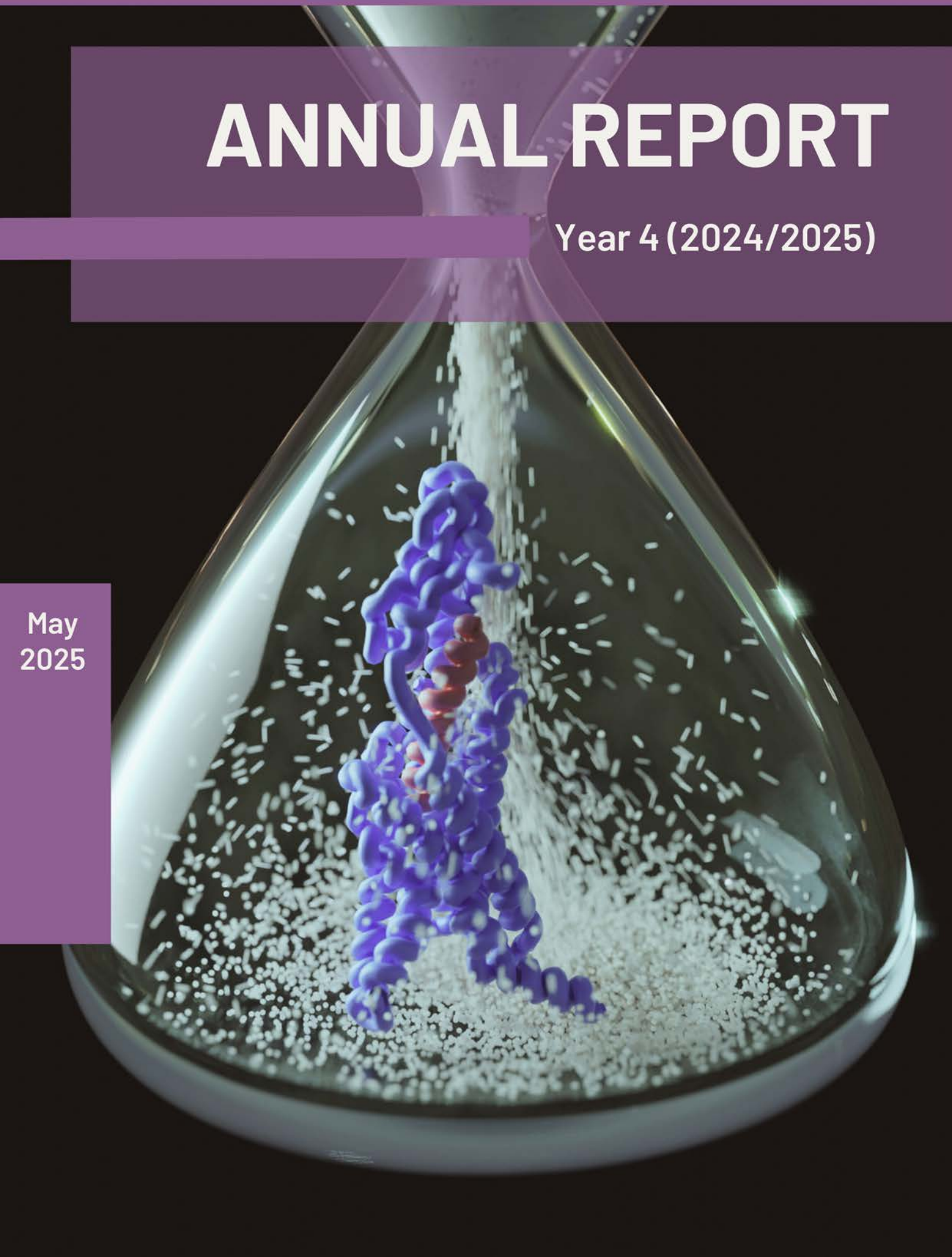
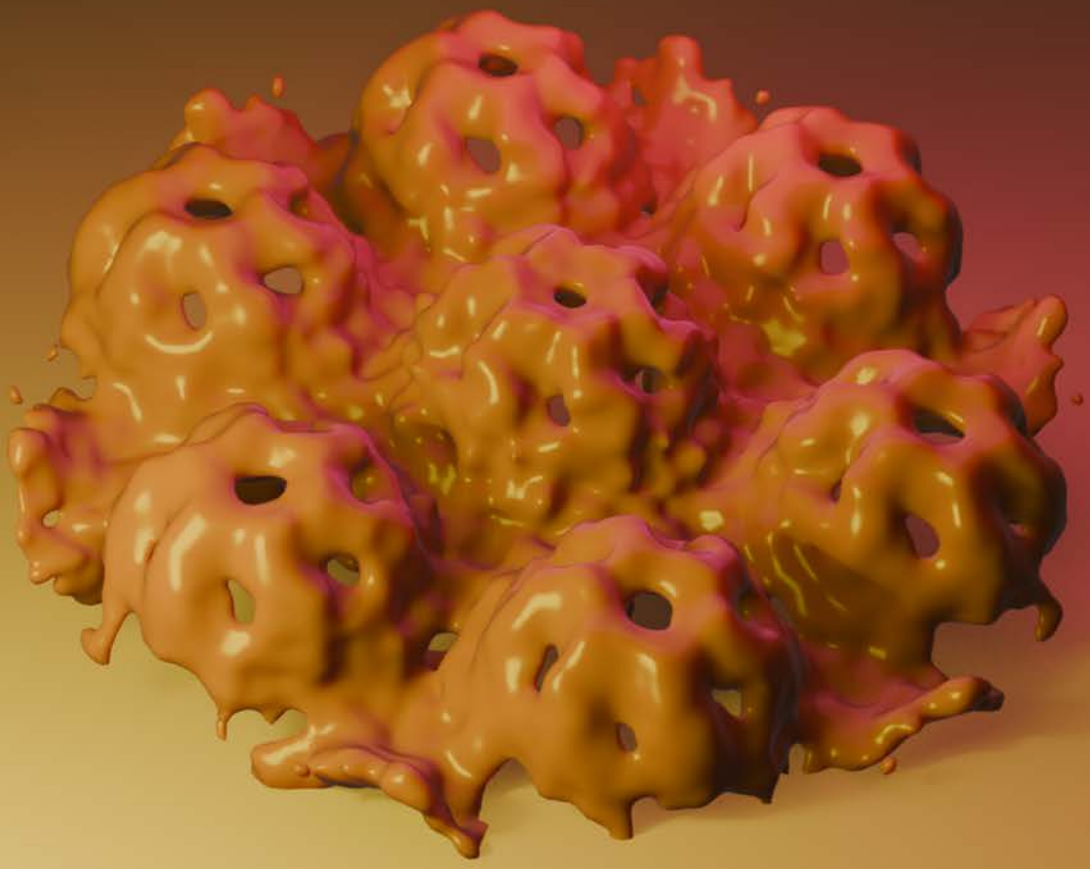
Centre for Cryo-electron Microscopy of Membrane Proteins

ANNUAL REPORT

Year 4 (2024/2025)



May 2025



From our UoM/Bio21 Node: Subtomogram average of the Metallosphaera javensis AS-7 surface layer, EMD-42578. Johnson et al., Nat Commun, 15(1):706 (2024). doi: 10.1038/s41467-024-51159-2

Image Credit Dr. Sepideh Valimehr

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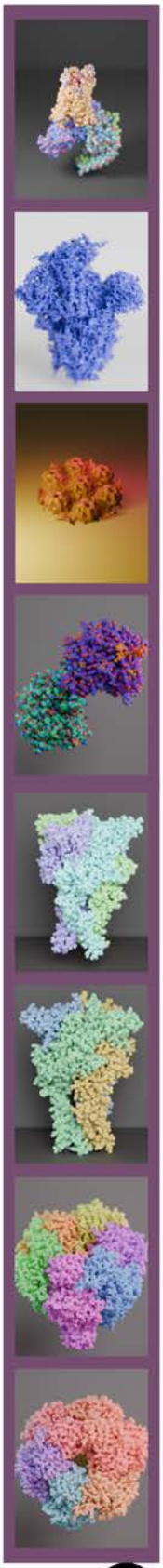


Table of Contents (cont.)





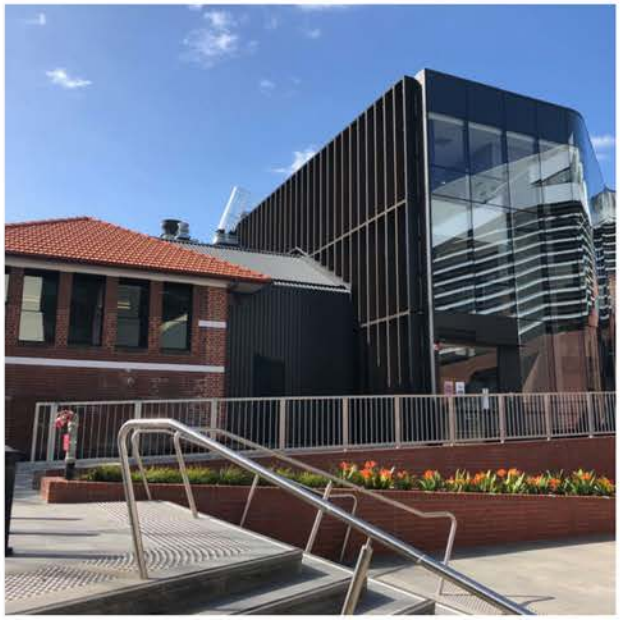



***Front & back covers: From our Monash node and ARC DECRA Fellow, Dr. Brain Cary**: Peptide 2 (GLP-1 (ACPC18)) bound to GLP-1R/Gs complex, PDB:9EBO. Cary et al., Proc Natl Acad Sci USA, 122: e2407574122 (2025). https://doi.org/10.1073/pnas.2407574122*

Image credit: Dr. Brian Cary

Centre Overview

MONASH University



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Centre Overview

The Centre for Cryo-electron Microscopy of Membrane Proteins (CCeMMP) is funded by the Australian Government through the Australian Research Council (ARC) Industrial Translation Research Program (ITRP). The Centre is an academic-industry partnership supported by the Industrial Transformation Training Centre arm of the scheme. Our core academic partners are Monash University (Administering Institution), The University of Melbourne, the Walter and Eliza Hall Institute of Medical Research (WEHI), and the University of Wollongong. Key goals of the Centre include training industry-ready, world-class graduates in cryo-electron microscopy of membrane proteins, and providing leadership and innovation in the application of cryo-EM to advance industrial expansion in structure-enhanced drug design. Expected outcomes include world-first structural biology knowledge and techniques, and the generation of next-generation cryo-EM researchers with entrepreneurial and technical skills desired by industry.

Vision

The Centre will provide a world-leading workforce that can advance Australia's biotechnological capability and to build strong linkages with the drug discovery and development industries. Our Centre will train industry-ready, world class graduates in cryo-electron microscopy of membrane proteins. The Centre's graduates and research results will enable tomorrow's industrial expansion in structure-enhanced drug design.

Director's Report

Prof. Patrick Sexton, ARC CCeMMP Director


Director, Prof. Patrick Sexton

The 4th year of operation highlighted the continued growth and success of the Centre, with expanded membership, and many significant highlights and achievements. In 2024-2025 increasing numbers of our ICHDRs undertook their embedded industry placements, and the first of our ICHDRs, Isabella Russell, submitted their thesis. Excitingly, Isabella now has a position within Industry, having made a strong impression on her Industry Partner during her PhD and her embedded placement.

The Centre continues to offer broad training in cryo-EM to members and affiliates, as well as regular workshops on data visualisation.

Governance: I was excited to take a period of long-service leave in 2024. I am grateful to our Deputy Director, Isabelle Rouiller, and to the Centre's Executive Committee, and particularly our Centre Manager, Jackie How, who provided exemplary leadership enabling me to undertake a worry-free 3 months of long-service leave. Late in 2024, Jackie commenced maternity leave ahead of the birth of her 2nd child, Quinn (congratulations!). In the interim, we are grateful to Tracie Pierce who seamlessly stepped into the role of acting Centre Manager for the 2nd time.

The Centre also completed a review of its operation, performance and strategic planning, undertaken by our expert Science and Industry Advisory Committee in November 2024, marking ~ 2-years since our last review. I am pleased to report that the Committee was very positive in their assessment of the Centre, while providing advice on strategy for ongoing sustainability as funding from the ARC draws to a close over the next couple of years.

Research Success: 2024-2025 was another very strong year for Centre members and affiliates. This included major success in the highly competitive NHMRC Investigator and Ideas grants, ARC Fellowships and grants, as well as numerous other grants and fellowships. A particular highlight was award of a prestigious Snow Fellowship to WEHI node member, Alisa Glukhova. There were also many high impact publications in journals including Science, Science Advances, Nat Commun, Nat Immunol, Nat Chem Biol, PNAS, PLoS Biol and PLoS Pathogens, and members were broadly engaged in presentation of their research at local, national and international meetings. It was also rewarding to see many members and affiliates receiving awards for their research at all levels, including Institutional, National and International Society and Conference Awards.

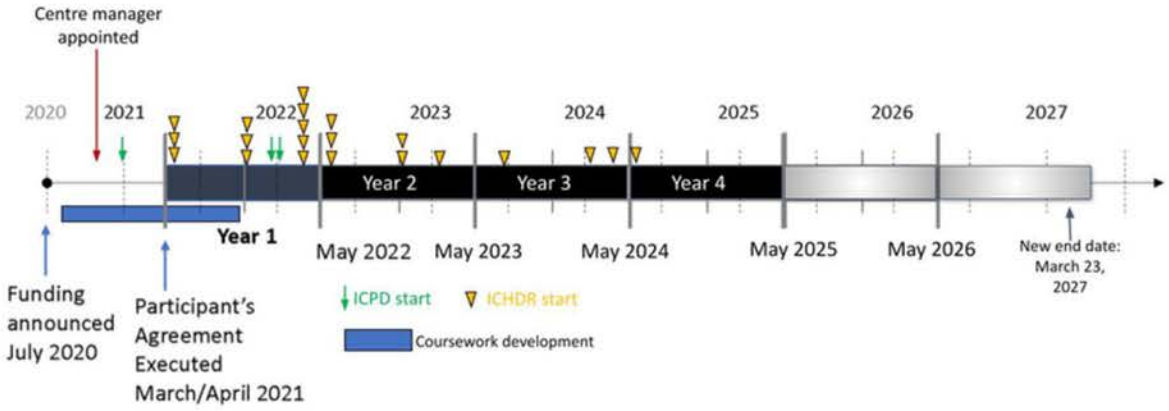
External Engagement: The Centre, through its Outreach and Engagement Committee, and Graduate Research Committee, was again very active through organisation of workshops, scientific symposia, conferences, the "In the Spotlight" initiative, the bench to art exhibition, promotion of members for International Women's Day, and of course our regular seminar series and newsletters.

I would like to extend our sincere gratitude to all members and affiliates who have contributed to the activities of the Centre during our 4th year, with particular thanks to the members of our various committees.

Patrick Sexton
ARC CCeMMP Director

CCeMMP Snapshot

Centre Operational Timeline



Current Partners

4

Academic Institutions

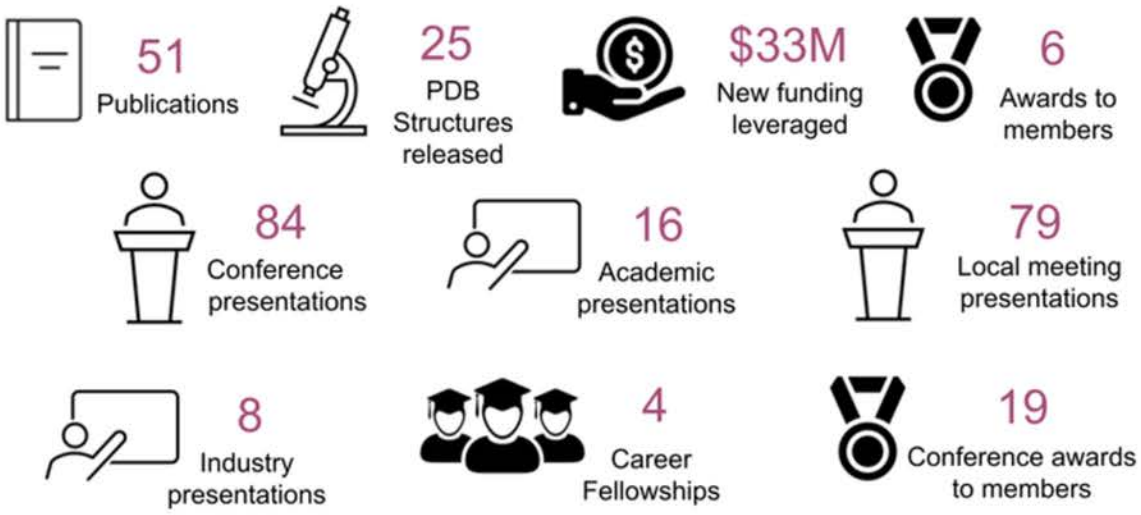
10

Industry Partners

4

Education Partners

Key Data



Our People

Expanding CCeMMP Membership

As part of its strategic plan the Centre continues to reach out to scientists, inside and 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 and to participate in Centre activities.

Since our last annual report we have welcomed 15 new members/affiliates from both within and outside of our foundational nodes. These include 2 group leaders, 5 Post Docs and 8 PhD students.

- **A/Prof. Vivek Naranbhai** (Group leader), Monash University
- **Dr. Hongyi Xu** (Group leader), ANU
- **Dr. James Davies** (Post Doc), Victor Chang Cardiac Research Institute
- **Dr. Laura Humphrys** (PostDoc), Monash University
- **Dr. Christopher Stubenrauch** (PostDoc), Biomedicine Discovery Institute, Monash University
- **Dr. David Teran** (PostDoc), The University of Melbourne
- **Dr. Luca Troman** (PostDoc), The University of Melbourne
- **Nadeesha Athukorala** (Student Affiliate), Monash University
- **Sneha Desa** (Student Affiliate), Monash University
- **Helen McGuinness** (Student Affiliate), The University of Queensland
- **Sathya Muthusamy** (Student Affiliate), The University of Melbourne
- **Isa Nuryana** (Student Affiliate), Monash University
- **Emily Park** (ICHDR), Walter and Eliza Hall Institute of Medical Research
- **Milad Reyhani** (Student Affiliate), The University of Melbourne
- **Shubha Udupa** (Student Affiliate), The University of Melbourne

Education & Training

Centre ICHDRs, EduWeek 2024. Back row, from left: Anastasia (UoM), David (UoW), Thomas (UoW), Vignesh (UoM), Isabella (Monash), Emily (WEHI), Dongju (Monash), Bhavika (Monash), Inamur (UoM), Riya (UoM), Alok (Monash), Minakshi (Monash). Front row, from left: Qinghao (Monash), Xiaomin (WEHI), Marialena (UoM). [Not pictured: Ania (Monash), MariaKatarina (UoW), Mayada (UoM), Jack (Monash)]

Education Overview

The CCeMMP Doctoral training program is a 4-year degree, inclusive of specialist training in cryo-EM of membrane proteins (3 x practical rotations in Year 1), an experiential, embedded, industry placement and a series of vocational workshops and advanced coursework. We provide updates on each of these training opportunities. In this report, we also hear from our students who have completed their experiential, embedded industry placement with industry partners Astex, Boehringer Ingelheim and Dimerix.

ICHDRs

In Year 4 we welcomed 1 new ICHDR, Emily Park, bringing the number of students currently enrolled in the Centre's HDR program to 19. We will not be taking on any more PhD students. The background and project is outlined below. Emily joins our current ICHDRs Isabella Russell, Jack Tovey, Qinghao Ou, Dongju Lee, Riya Joseph, Marialena Georgopoulou, Minakshi Baruah, Alok Pradhan, Maria Katarina Lambourne, Mayada Mazher, Ania Beyger, Xiaomin Wang, David Safadi, Bhavika Rana, Inamur Rahman, Anastasia Chen, Thomas Ficker and Vignesh Kamath.

Our ICHDRs

New Students

Emily Park

Emily is a PhD candidate supervised by Prof. Isabelle Lucet at the Walter and Eliza Hall Institute of Medical Research Node. Her project aims to understand the structure and function of Ephrin receptor pseudokinases EphA10 and EphB6 by integrating structural biology with advanced imaging technologies, chemical biology, and proteomics approaches. Emily completed her BSc Hons in Biochemistry at the University of Otago, New Zealand, and outside of research enjoys hiking, swimming, and spending time at the beach with a book.

Supervisors: Prof. Isabelle Lucet, Dr. Joshua Hardy, Dr. Andrew Thompson.

Exiting ICHDRs

Isabella Russell

Isabella is the first of our ICHDRs to complete the PhD, "Taking advantage of constitutive activity for structural determination of ligand free receptors". Isabella has had a very productive PhD with an orphan GPCR structure released in PDB, manuscripts (both published and accepted) and a completed exit seminar. Isabella is now employed at AstraZeneca (Cambridge, UK) as a senior scientist.

This year, a further three students should submit their thesis'.

Exit seminar - Isabella Russell

Industry Placements

Four students have had the fortune of completing their immersive industry placements since our last report. Jack Tovey was at industry partner Astex (Cambridge, UK), April 2024-July 2024. Dongju Lee and Qinghao Ou were both at industry partner Boehringer Ingelheim (Biberach, Germany), May 2024- August 2024. Alok Pradhan was with local industry partner Dimerix, attending on site regularly over 12 months (April 2024 - April 2025). Anna Beyger commenced industry placement with industry partner Servier (Paris), April 2025. Minakshi Baruah will return from industry partner Pfizer (Groton, CT, USA), May 2025. Bhavika Rana and Marialena Georgopoulou will commence their placements in May with industry partner, Sanofi (Paris), and Aculeus Therapeutics (Melbourne), respectively. Jack, Dongju, Qinghoa and Alok were kind enough to share their real-world industry experience.

Jack Tovey, Astex

I've been fortunate to spend the last 3 months of my life in Cambridge, working with Astex Pharmaceuticals.

Moving to the UK was a new experience for me, and yet without conscious effort, I find myself having built new friendships and lasting connections that have filled my time here with happiness.

From the first day of my placement, I was welcomed as a new member of the Molecular Sciences Team, embedded in a project completely unknown to me. I had a pre-formed idea that industry was modular, and that I would likely be responsible for generating tructures and little else. Yet, Astex is a relatively small company by pharmaceutical standards, and project members here are flexible and capable at a different range of techniques, making each project team a new combination of overlapping skills and perspectives. During that first week alone, I found myself working on an entire project pipeline, from reviewing expression efficiency, to optimizing target purifications, testing different grid making conditions, to screening cryo-EM grids in a 200kV Glacios, to setting up full data collections on a 300kV Titan.

The approach by industry to a particular problem, relative to academia, was perhaps the biggest shock. The same scientific rigour, the same techniques, the same outcome all planned and executed with a vastly different perspective and set of priorities. This adjustment for me was made easier by some of the fantastic people I had the opportunity to work with, in particular: Dr. Amir Apelbaum, Dr. Scott Jackson, Dr. Alex Berndt, Dr. Pamela Williams, and Dr. Joanna Brown.

The Astex desire for well-rounded employees extended beyond the Molecular Sciences Team, as I found myself in meetings with medicinal chemists, translational biologists, clinical trial administrators, and on a smaller second secondment to the pharmacokinetics team. A testament to their willingness to ensure I had a diverse and excellent experience during my time with them.

Over the course of these months, I observed the ins and outs of the drug discovery and development pipeline, while watching our main project advance from new construct designs to grids and preliminary datasets. A development in one phase, being echoed in the larger development pipeline, in a sort of satisfying philosophical symmetry that few people find in their careers.

All in all, I understand the role of industry far better than I would have if my only exposure had been through seminars and networking events. And I will look back on my life in Cambridge with fondness for the rest of my life.

-Jack Tovey

astex™

Dongju Lee

My recent three-month industry placement in Germany was a transformative experience, marking my first visit to Europe. I studied a bit of German before my arrival, which helped me engage with the local culture during my time there. I made an effort to communicate in German while traveling, and although I wasn't fluent, it added a special dimension to my experience.

Biberach, a small town in southern Germany, is home to the main R&D site of Boehringer Ingelheim, enhancing the relevance of my placement to my career goals. From day one, I was warmly welcomed by all members of the Structural Research Team, which created a comfortable environment both at work and in my new surroundings. I am especially grateful not only for the organization of my stay as well as the comprehensive training and support by fantastic Team members, but also to our regular lunch mates who contributed to a collaborative and friendly atmosphere.

My primary focus was on the purification of proteins for their evaluation in biophysical experiments and for cryo-EM and X-ray structure determination. This work was highly relevant to my current PhD project, and the various experiments I conducted significantly broadened my perspective on my research. The practical experience not only enhanced my technical skills but also provided critical insights that will inform my future work in structural studies. Additionally, I enjoyed a special interaction with a principal investigator from another team, which gave me a better understanding of the company's dynamics and showed the collaborative spirit of the organization.

Fortunately, in the middle of placement, I was invited to a team gathering in Neu-Ulm, where members engaged in exciting team games followed by a delightful dinner. This event truly highlighted the interactive nature of the team and reinforced the positive working environment I experienced throughout my placement.

In terms of personal experiences, Biberach provided a wonderful opportunity to immerse myself in local culture. I was fortunate enough to experience the second-largest summer festival in the Baden-Württemberg, held right in Biberach, in mid-July. Some current and former team members invited us to join in the festivities, making the experience even more enjoyable and memorable. Apart from the workdays, during holidays and weekends, I had the chance to explore 18 different cities across Germany and Austria by trains, further enriching my experience.

Overall, my placement was not just a professional endeavor. It was an enriching experience that combined work, cultural immersion, and personal growth. I am grateful for this opportunity and look forward to applying what I learned in my future endeavors.

–Dongju Lee

Boehringer Ingelheim

The Dimerix Team

My 12-month internship at Dimerix has been a significant step forward in understanding how scientific innovation is translated into commercial strategy within the biotech sector. Coming from an academic background, this experience gave me first-hand exposure to the operational, strategic, and cross-functional dynamics of a clinical-stage biotechnology company.

I had the opportunity to work on two business development cases focused on alternative indications and label expansion. These projects involved pipeline analysis, competitive landscape assessment, and target prioritization. I used tools like scoring matrices to evaluate assets based on scientific rationale, clinical feasibility, and strategic alignment with the company's long-term objectives. It was a valuable exercise in structured decision-making and aligning scientific potential with business goals.

A major part of my learning involved the development and refinement of Target Product Profiles (TPPs). I received training on how to build a TPP that integrates key regulatory, clinical, and commercial considerations. Using the TPP as a foundational tool helped guide product strategy and made me think more critically about how to define value early in the drug development lifecycle.

The internship also gave me the chance to work closely with various internal teams — including clinical development, research, contracts, and project management. This cross-functional collaboration helped me understand the interconnected nature of roles within a biotech company and how alignment between departments is essential to progressing assets through the pipeline. Additionally, I gained exposure to financial evaluation frameworks commonly used in biotech. I worked with valuation models and commercial forecasting tools that informed asset strategy and business case development. These skills have broadened my perspective on how financial and scientific insights come together to drive investment decisions in the life sciences industry.

The team at Dimerix was also extremely welcoming and I was able to very quickly settle in. I was fortunate to be included in both internal and external stakeholder engagements, including team meetings and the company's Annual General Meeting. Observing how the executive team communicates with shareholders and external partners gave me valuable insight into corporate governance, investor relations, and the broader strategic narrative of a biotech company.

Transitioning from academia to a commercially focused environment required a significant adjustment; the learning curve was steep, and the work environment was highly dynamic. But it also pushed me to develop a more agile, outcome-oriented mindset. I'm particularly thankful to Dr. Carl White, who provided consistent mentorship, thoughtful feedback, and helped me connect my academic strengths to real-world biotech challenges. I also want to thank Dr. Robert Shepherd for his strategic guidance and for helping me step back and understand the "big picture" decision-making that shapes company direction.

I'm grateful to everyone at Dimerix for making this internship so impactful and to the CCeMMP program for the opportunity. I've come away with a stronger grasp of how science, strategy, and execution converge in biotech — and I'm excited to continue building on this foundation in the future.

--Alok Pradhan

Dimerix

Qinghao Ou

The 3-month placement at Boehringer in Biberach (Riss) gave me a bite on how research goes in industry. In general, to my surprise, the research at Boehringer feels pretty similar to what it is in academia. Research fellows there have their own focused topics but are still very supportive and open to discussing issues with each other, especially with me as a newbie in the group. A special thank you to the Structural Research group at Boehringer for their generous support during my stay at BI.

The project I conducted during my stay at Boehringer was designed as an extension of my PhD project and the results are largely publishable. Meanwhile, I also established a purification protocol in their lab. So, it really feels like a collaboration. As life normally is in scientific research, some things went as expected while others did not. Nevertheless, by the end of the placement, I surely gained some experience in biophysical assays, like nanoDSF and MST for drug screening, which are great complementary aspects to my current knowledge of drug development. I also had the chance to have lunch and a casual meeting with a Medical Chemistry lab head, who also gave us a lab tour. It was absolutely precious to have this experience to know how Chemists in a Pharma company work and how the pipeline in chemistry develops.

In my case, it would have been great to have a bit more time to wrap up the work packages. However, I sincerely feel this placement is of great merit to extend my horizons in how things run in an industrial setting. After this placement, I am still open to both academia and industry since there can be some cool research happening in both cases.

--Qinghao Ou

Boehringer Ingelheim

Training visit

July 2024, Mayada Mazher had the opportunity to visit Prof. Rikard Blunck's lab at the University of Montreal, Canada. Mayada spent almost three months learning the whole-cell patch clamp electrophysiology technique. Mayada says, "This training allowed me to perform whole-cell electrophysiology experiments, which became a turning point in my PhD project. Through this training visit, I gained valuable insights into the functional characterization of my membrane protein of interest, TMEM120A, significantly advancing my research and deepening my understanding of its role."

Rotational Training

The Centre ICHDRs undertake approximately 5 months of intensive hands-on foundational training through three practical rotations: Rotation 1, Biochemistry; Rotation 2, The Theory and Operation of Cryo-EM Instruments; Rotation 3, Data Processing and Analysis. These rotations are completed in Year 1 of the program

and provide an introduction to, and core skills in, biochemical approaches to study membrane proteins, cryo-EM preparation and imaging, and data processing for 3D map reconstruction and protein modelling. The biochemistry rotation is completed soon after commencement and is Node-specific, focussing on the particular membrane proteins and techniques that their thesis projects will use. As in 2023 and 2024, we invited CCeMMP members and affiliates to participate, via Zoom, in the theoretical component of Rotation 2, ***The Theory and Operation of Cryo-EM Instruments.*** We were also able to offer a limited number of in-person places in Rotation 3, ***Data Processing and Analysis***. In the coming years we expect that more places in this unit will be available to members and affiliates. All our students (3 in this past year) have completed all their training rotations.

Rotation 2: Theory and Operation of Cryo-EM Instruments

'Rotation 2' is a series of Cryo-EM lectures and interactive tutorials, covering the theoretical and practical aspects of cryo-EM delivered by Centre members and experts in the field. Three CCeMMP ICHDRs participated in this cryo-EM training rotation in 2024. The rotation was coordinated by Dr. Matthew Belousoff and presented in person and via zoom. The lectures covered:

- Introduction to Transmission Electron Microscopy (Hari Venugopal, Ramaciotti Centre for Cryo electron microscopy),
- Negative Stain & its Application (Dr. Manasi Kumar, UoM/Bio21 Node),
- Sample Preparation & Vitrification for SPA of Membrane Proteins (Dr. Alisa Glukhova, WEHI Node),
- Introduction to Image Formation - TEM (Dr. James Bouwer, UoW Node),
- Electron Detector Technology (Dr. Matthew Belousoff, Monash Node),
- Practical Considerations for Microscope Set up - SPA (Dr. Matthew Belousoff, Monash Node).

For our ICHDRs, the lectures were interspersed with hands-on training at their respective Nodes, organised and instructed by our Centre ICPDs, Dr. Sepideh Valimehr (UoM/Bio21 Node) and Dr. Aidan Grosas (UoW Node). Following the success of 2023, we also gave Centre members and affiliates the opportunity to join in these lectures. This year, an additional 7 members and affiliates registered to join in person and 12 to join online.

Rotation 3: Data Processing and Analysis

Rotation 3: Data Processing & Analysis, 2024

This rotation was a two-week intensive in-person, hands-on training in data processing of cryo-EM data, co-ordinated by Dr. Matthew Belousoff (Monash Node), followed by self-directed learning supported by Dr. Belousoff. Three CCeMMP ICHDRs attended the Monash Node to take part in the training. They were joined by 11 other affiliates who applied for a place in the rotation, from two foundation Nodes (Monash Node, 7; WEHI Node, 2), our external affiliates (UQ, 1; Florey, 1) and a visiting postdoctoral fellow (1). Dr. Matthew Belousoff (Monash Node) and Dr. Sepideh Valimehr (UoM/Bio21 Node) delivered most of the components of this rotation. Dr. Joshua Hardy and Dr. Andrew Thompson (both WEHI Node) lectured on point group symmetry and protein construct design choices for structural biology analysis. The program concluded with Dr. Sarah Piper and Dr. Cindy Zhang (both Monash Node) presenting PDB validation and final steps for ensuring your data is ready for publication. Although all our ICHDRs have now completed this training, we will continue to provide access to this valuable opportunity to affiliate student members in future years.

The Process of Drug Discovery

Drug discovery scientists in academia and industry must appreciate how different facets of discovery science are integrated into the discovery pipeline. The Centre, in collaboration with the Drug Discovery Biology (DDB) Theme at the Monash Node provides advanced coursework that gives an in-depth understanding of the different stages of the drug discovery process. The program is made up of 12 modules and covers: the process of drug discovery, structural biology in drug discovery, biopharmaceuticals, formulation and delivery, preclinical development, hit discovery, clinical development, pharmacoepidemiology, practical applications of HTS, hit assessment, hit-to-lead and lead optimisation. Centre students in Year 2 of their PhDs take part in this 3-week intensive program within DDB at MIPS, Monash Node, that is run for all DDB PhD students. We are very fortunate that we are able to include all the Centre students in this training program; in 2024, 5 CCeMMP ICHDRs students took part in this program.

EduWeek 2024

We were pleased to continue our professional development series, "EduWeek", in 2024. These sessions were held in-person with all ICHDRs of the Centre attending at the Monash Node. Most sessions were also open to other members and affiliates of the Centre and were well attended and highly valued by members. These workshops were presented by partner organisations, ICPDs or external facilitators.

For EduWeek 2024, the workshops included:

- **How and when to use Bibliometrics** - *Mario Sos & Penny Prasta (Monash Librarians)*
- **BASH Scripting (Intermediate) Workshop** - *Dr. Matthew Belousoff (Monash Node) and Dr. Joshua Hardy (WEHI Node)*
- **IP Protection and Commercialisation in the Life Sciences Workshop -** *Dr. Brittany Ashton (Senior Associate, FB Rice) and Dr. Declan McKeveney (Partner, FB Rice)*
- **Equity and Diversity Workshop** - *Dr. Betty Exintaris and Dr. Nil Karunaratne (MOSIAC, MIPS)*
- **Resume/CV Writing and Interview training** - *Dr. Matthew Belousoff (Monash Node), Dr. Cathy Drinkwater (Biocurate), Jo Dallas (Monash HR)*
- **Tips and Tricks for Grants and Fellowships Workshop** - *Monash Research Office Team*
- **Essential Elements of a Research Grant Proposal: Hands-on Grant Writing Workshop** - *Dr Benedicta Rousseau (The GrantED Group)*

How & When to Use Bibliometrics

How and When to Use Bibliometrics

Bibliometrics, an important quantitative measure of scholarly impact/output. Whether you are applying for an award, job, promotion, fellowship, grants or becoming a scientific society member, it is essential to be abreast of what bibliometric tools are available to you and how to use them effectively for the purpose that you are applying for. Monash librarians, Mario Sos and Penny Prasta, presented this workshop on how and when to use bibliometrics; they introduced and demonstrated several common bibliometric tools that are available, how to use them, and when to use them.

BASH Scripting (Intermediate) Workshop

This workshop was a follow up to last year's very popular, Basics of BASH Scripting. BASH (Bourne Again Shell) is a fully fledged scripting programming language. This short workshop , presented by Dr. Matthew Belousoff (Monash Node) and Dr. Joshua Hardy (WEHI Node), introduced the concepts of writing custom scripts for text file and file system manipulation. It covered concepts of program loops, logic statements and how the syntax works in BASH.

BASH Scripting (Intermediate) Workshop

IP Protection & Commercialisation in the Life Sciences Workshop

IP Protection and Commercialisation in the Life Sciences Workshop

This workshop, presented by Dr. Brittany Ashton (Senior Associate, FB Rice) and Dr. Declan McKeveney (Partner, FB Rice), from our educational partner, FB Rice, examined real-world intellectual property and commercial scenarios as they relate to the life sciences. The exercises provided during the workshop covered topics such as filing patent applications, addressing authorised and non-authorised disclosures and understanding what constitutes a prior art disclosure, determining inventorship and ownership, in-licensing and out-licensing of patents, and patenting and freedom to operate (FTO) considerations.

Equity and Diversity Workshop

This was a 2-hour interactive workshop designed for researchers aiming to deepen their understanding of Equity, Diversity, and Inclusion (EDI) within team environments. The workshop explored the crucial intersection between EDI principles and effective teamwork, fostering an inclusive culture that values diverse perspectives and promotes meaningful collaboration. The aim of this workshop was to equip attendees with practical tools and strategies to enhance inclusivity and trust in their teams, creating stronger, more resilient, and collaborative research environments.

Equity & Diversity Workshop

Resume/CV Writing and Interview Training

This workshop was split into two parts; tips and tricks around resume and CV writing and how to prepare for an interview, which was open to members and affiliates, and mock interviews which was open to ICHDRs only. The workshop went through general tips and tricks on the approach to a job application and also looked at the process from both an academic and industry perspective. Dr. Matthew Belousoff from the Monash Node, presented 'General tips and tricks on overall approach to your job application' and the 'interview process/principles'; Dr. Cathy Drinkwater from our educational partner, BioCurate presented 'Applying for an industry position'; and Jo Dallas from Monash University HR recruitment presented 'Applying for an academic position'. Following the presentations, there was a staged interview with Dr. Matt Belousoff, Theo Nettleton and Dr. Laura Humphrys - with open discussion on what to do and not to do.

Resume/CV Writing & Interview Training

Following this workshop, ICHDR students were given a position description for an "advertised" Post Doctoral position and asked to prepare for an "interview", at the end of the week. Three consecutive panels were run with Prof. Denise Wootten, Prof. Isabelle Lucet and A/Prof. Isabelle Rouiller as Chairs. Each Chair assigned their own panel and interviewed and provided feedback to the students. It is not often that you are able to get feedback on your interview performance (aside from whether you do or do not have the job); we truly appreciate the time taken by each of the panels to provide the students with this valuable experience and the associated feedback.

Tips and Tricks for Grants and Fellowships Workshop

A fundamental and essential skill in research is the ability to attract funding through developing competitive proposals, both grants and fellowships. The Monash Research Office's (MRO), Research Development Team (RDT) have read, reviewed and analysed hundreds of proposals, both competitive and non-competitive with the aim of improving the funding success of Monash researchers. This workshop was presented by the Monash RDT: Dr. Amanda Walmsley (Senior Manager, Major Initiatives), Erica Tippet (Senior Project Manager), Brock Conley and Sharon Morley (Senior Research Development Officers) and was targeted to early career researchers (ECR). The aim was to give advice and tips/tricks for putting together a competitive grant or fellowship proposal with particular focus on the ARC and NHMRC funding schemes. The RDTshared key learnings and insights that they have garnered in their role at the MRO and examined the different Australian funding schemes available to ECRs, such as ARC DECRA, NHMRC Investigators (EL1 & 2), ARC Discovery Projects and NHMRC Ideas Grants. Other topics covered included: General tips for success; Dissect the important elements of the all important first page; and Discover and action the secrets to a stronger Research Opportunity and Performance Evidence (ARC) and Relative to Opportunity and Career Context (NHMRC) sections. Lessons learned were reinforced during breakout sessions in which the RDT provided examples for participants to analyse alongside RDT members and peers.

Grants & Fellowships Workshop

Essential Elements of a Research Grant Proposal: Hands-on Grant Writing Workshop

The final workshop, presented by Dr Benedicta Rousseau (The GrantED Group), was aimed more towards our PostDocs, targeting those researchers that may have a current project idea or grant that they could bring to the workshop to develop further. As there are a series of common parts to a research grant proposal, no matter the funder, this session aimed to demystify these components, enabling researchers to develop a skeleton draft of a research grant proposal from their idea, and help them develop an understanding of how to write about: the significant drivers and need for their research; how their research innovatively addresses an important problem in their discipline; how past outcomes of the applicant or applicant team make the new project feasible; the planned significant new knowledge, outcomes, products and/or services their project plans to deliver; engagements required prior to, during and after the project is executed to enable benefit and research impact.

Hands-on Grant Writing Workshop

Other Workshops

Peer Review Training Workshop, May 16, 2024

Peer review is critical to the advancement of science, and through application of their expertise, reviewers help maintain the quality of the published literature and advance the field. Reviewers also get a preview of the latest research and gain insight into best practices when it comes to preparing their own manuscripts. Our CCeMMP Director, Prof. Patrick Sexton, a past and current member of many editorial advisory boards, presented a workshop on Peer Review Training. The workshop was designed to educate the audience on good peer review practices, including ethics in peer review and how to become a more thorough and objective reviewer. This workshop was open to all Centre members and affiliates. Ten ICHDRs attended (either in person or via zoom), they were joined by 14 other members and affiliates.

Mentoring Best Practices Session, 12 June, 2024

Director, Prof. Patrick Sexton and Centre Manager, Dr. Jackie How held a mentoring session, 'How to be a good Mentee' (via zoom) for all ICHDRs. They covered the basics of how to be a proactive and engaged mentee and also what to look for in a good mentor. This session has prepared students for their first meeting with a mentor and given them tips on how to drive a mentoring session and to get the most out of the relationship. Since the session, most of our ICHDRs have been teamed with an industry mentor and most have opted into the optional CCeMMP Academic Mentoring Program.

SPA Workshop, 12-14 June 2024

Single Particle Analysis (SPA) workshops regularly occur throughout the year. This year there was one in June (12-14th June, 2024), supported by Thermo Fisher Scientific, and organised by Dr. Sepideh Valimehr (ICPD, UoM/Bio21) at the Ian Holmes Imaging Centre at Bio21. The workshop covered training in sample preparation (room temperature and cryo), use of TEMs and data collection. Dr. Alisa Glukhova (WEHI Node) delivered some of the lectures, along with Dr. Nicholas Kirk (WEHI) while all of the practical training was presented by Dr. Sepideh Valimehr (UoM/Bio21 Node), Dr Matthew Belousoff (Monash Node), Dr Hamish Brown (UoM/Bio21 Node) and Dr. Joshua Hardy (WEHI Node).

SPA Workshop, June 2024

There were 10 attendees from Monash University, The University of Melbourne, WEHI and from New Zealand (The University of Canterbury and University of Otago).

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FB Rice - IP seminar, 27 August 2024

In addition to EduWeek 2024, our educational partner, FB Rice also presented a zoom-only seminar. The presenters were Dr. Brittany Ashton (Senior Associate) and Dr. Declan McKeveney (Partner). The aim was to provide researchers with a comprehensive understanding of the various forms of IP protection, particularly as they relate to research and development in the life sciences. With a focus on patents, they delved into: the requirements to obtain a granted patent, the patenting process, timing academic publications with a patent application filing, preparing experimental data to support a patent application, a consideration of trade

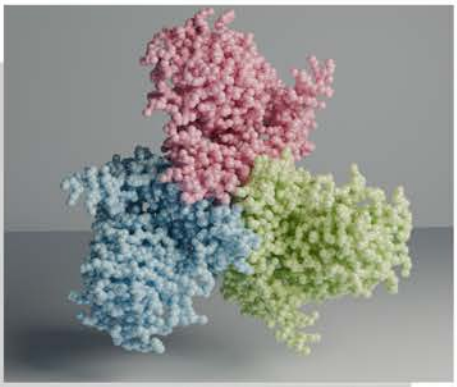
secrets, and who is an inventor and who is an owner. The seminar concluded with a discussion on the value of patents, and how they can be used to facilitate commercialisation of research and development in the life sciences.

Linked In Workshop, 14 October, 2024

The Centre organised Monash University HR to present an online workshop on "Maximising LinkedIn: Strategies for Professional Growth and Networking" to CCeMMP members and affiliates. Seventeen registered to attend, including 10 ICHDRs to learn about unlocking the full potential of their LinkedIn profileand enhancing their personal brand by creating a compelling and professional online presence to attract recruiters and business prospects.

Blender Workshops

Blender3D workshops are a regular feature of the Centre and are well attended and highly valued by the participants. Just in time for the CCeMMP Bench to Art Competition, Dr. Sarah Piper (Monash Node) facilitated two Blender3D workshops. The first was held online on June 4 2024 with the able assistance of Dr. Joshua Hardy (WEHI Node) and Dr. Sepideh Valimehr (Bio21/UoM Node). The second, to accommodate the high local interest generated by the first workshop, was held on July 11. These were interactive workshops where the attendees were taken step-by-step through the creation of an image, learning little tips and tricks along the way. Sarah provided extensive notes to work from, that will also help later to create images. For the first workshop, 11 attendees joined online for the beginners and advanced sessions across all our nodes and external affiliates; The University of Sydney was well represented with 7 affiliates (including students of affiliates). Other members/affiliates were from University of Queensland, University of Canterbury (NZ), UoW Node and UoM Node. Ten attendees registered for the second workshop from the Monash (8) and UoM (2) Nodes, including new affiliates.



ASCT2: Image Credit Bronte Caroll

CCeMMP Mentoring Program

As part of the feedback received from the CCeMMP Strategic Annual Retreat (December 2023), an area for development was establishing an in-house mentoring program to support the career development of ECRs and PhD students. All PhD students have been paired with an industry mentor, students also had the choice to opt in for an academic mentor. Industry mentors committed 12 months to the program.

CCeMMP targeted researchers within the Centre to volunteer to be academic mentors for Centre ECRs and students. We had an overwhelming response with 32 researchers across the Centre agreeing to support the program as (academic) mentors. CCeMMP called out for Centre students and ECRs to be part of the program as mentees and had 16 people sign up. The mentees and mentors have been paired and mentoring commenced in July 2024, with mentees driving the meetings and conversations.

Mentoring Session - visiting scientists

While members and affiliates were in the strategic planning session at the CCeMMP Research symposium, Centre students were able to take part in a mentoring session with our invited keynote speakers, Prof. Renae Ryan and Assistant Prof. Oliver Clarke; 17 ICHDRs took part in the mentoring session.

Research

Research Overview

The Centre has 3 major program areas that address Key Objectives (KO) of the ARC Industrial Transformation Training Centre Scheme. These key objectives and activities against the 3 program areas are described below.

Centre objectives:

Key objective 1. Industry-ready, world-class graduates with critical and highly-sort after expertise in the application of cryo-EM to drug discovery.

Key objective 2. Innovation in membrane protein cryo-EM that advances robustness, resolution and cycle times that will be internationally leading.

Key objective 3. Solution of novel membrane protein structures that are relevant to drug development.

Key objective 4. Advancement of Australian biotechnological capacity and improved linkages with major pharmaceutical partners.

Research Programs

Program Area 1. Advanced Training in Single Particle Cryo-EM of Membrane Proteins

Details of the bespoke 4-year Doctoral Training Program were outlined in the Year 1 report (KO1; core ITTC subprogram objective). In 2024, 3 ICHDRs completed the 3 technical rotations (biochemistry; microscopy; data processing and structure determination) comprising ~5 months of intensive hands-on training in the core disciplines for the field. This year marked the second time that Rotations 2 (microscopy) and 3 (data processing and analysis) were open to other members and students within the Centre (not formally enrolled as Centre-funded ICHDRs). A total of 19 members and students joined the ICHDRs for the theoretical component of Rotation 2. Participation in the full Rotation 3 program, outside of Centre-funded ICHDRs, was by application with 11 students admitted into the Rotation in 2024. The Centre also runs, contributes to, numerous externally facing workshops in support of cryo-EM training as described elsewhere in this report.

Program Area 2. Innovative Research for Implementation of Cryo-EM in Membrane Protein Structure-Based Drug Design.

Academic and academic-industry partnered research across membrane protein targets to deliver on KO2, KO3 and KO4 of the Centre (aligned to the core objective of the ITTC subprogram). We have included reference to publications formally published in 2024/25 or which were deposited into a publicly accessible pre-print server during 2024/25.

Theme 1: Technological Advancements

Subproject 1. Integrated Methods to Study Membrane Protein Dynamics

To understand membrane protein conformational dynamics and mechanism of drug action, ARC CCeMMP researchers are continuing to apply integrated approaches that describe the intrinsic conformational dynamics of membrane (and other) proteins and how these are influenced in a ligand-specific (natural ligands and/or drugs), including conformational variance information that can be directly extracted from cryo-EM data. Complementary techniques include molecular dynamics simulations (e.g. Burger et al, BioRxiv 2025; El-Eid et al, BioRxiv 2025; Cary et al, PNAS 2025; Cao et al, Nat Commun 2025 collaboration with Novo Nordisk), biophysical and biochemical methods including fluorescence anisotropy and fluorescence quenching (Harikumar et al, PLoS Biol 2024; Harikumar et al, Nat Commun 2024), and cysteine-scanning and cross-linking (Harikumar et al, Nat Commun 2024). In ongoing work, CCeMMP researchers continue expanding the integrated application of hydrogen-deuterium exchange-mass spectrometry (continuous and pulsed) to interrogate differential and sequential conformational changes upon membrane protein engagement with

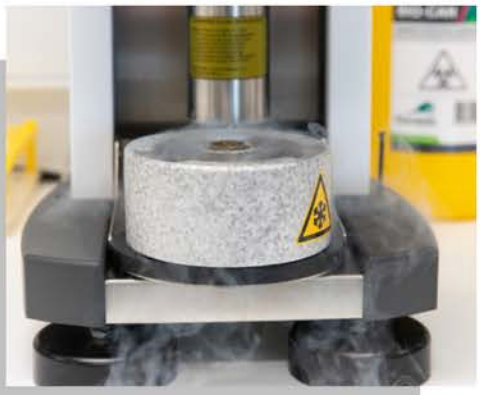
different ligands (e.g. presentations by T. Nettleton). Centre researchers continue to assess and apply new algorithms and latest versions thereof for analyses of conformational information within cryo-EM data, including CryoDRGN, a neural network for continuous heterogeneous reconstruction developed at MIT, and 3DVA & 3DFlex (cryoSPARC) (e.g. Cao et al, Nat Commun 2025; Cary et al, PNAS 2025), as well as new graphical tools for visualisation of 3D variance data (e.g. "Wiggle", manuscript in preparation).

Subproject 2. Structural Utility of 200kV Cryo-EM

With the expense, and limited access to high-end 300kV instruments, CCeMMP researchers continue to investigate the structural resolutions that can be achieved with 200kV imaging on membrane protein samples of differing complexity (yield, dynamics, heterogeneity), and also how this can support commercial and academic drug discovery and development at lower cost. Centre members have recently explored the ability to use even lower cost, lower voltage, existing instruments such as 120kV side-entry microscopes to support structural work. Here integration of a sub-200kV direct electron detector (Gatan Alpine) with a standard Tecnai 120kV LaB6 G2 Spirit TWIN microscope was demonstrated to support medium resolution structure determination of multiple proteins, including a GPCR complex (Venugopal et al, Sci Adv 2025).

Subproject 3. General Advances in Cryo-EM

Work is continuing on development of new cryo-EM sample preparation devices (noted in the Year 1-3 reports). The second iteration, with a simpler design and a 2-fold speed increase has completed its testing phase and small numbers of units are being built for CCeMMP members, while alternate instrumentation to support application in fast time-resolved cryo-EM is in development with support of an ARC Discovery Project grant. In parallel, optimisation of sample vitrification is continually pursued by Centre members and Partners. Centre members also continue to apply their learning to cryo-EM of soluble and peripheral membrane proteins, and more complex samples using both single particle and tomographic imaging (Johnson et al, ISME J 2024; Johnson et al, Nat Commun 2024; Venugopal et al, Sci Adv 2025; Rose et al, Nat Commun 2025; Tan et al, Nat Commun 2025). We are also developing a new AI-based particle picking program, PartiNet, which is agnostic to particle diameter and demonstrates significantly faster performance when benchmarked against existing tools such as Topaz and crYOLO (Perera et al., manuscript in preparation).



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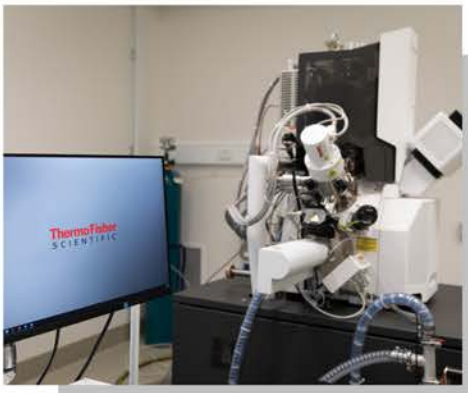

Theme 2. Cell Surface Receptors (G Protein-Coupled Receptors, GPCRs)

GPCRs are a major membrane protein family studied by many researchers within the Centre. Of note, while we have divided the research into subproject areas, in many instances publications and collaborative partnerships cross over between subprojects. As such, outputs may appear in more than one subproject research update.

Subproject 1. Understanding Receptor Activation and Transducer Coupling

We have continued to determine structures of different agonist-receptor complexes to support understanding of how individual ligands control efficacy and selectivity. Within this subproject area are current collaborative projects with our Industry partners Novo Nordisk, Boehringer Ingelheim, AstraZeneca and Dimerix. In addition to determination of novel ligand-receptor complexes (e.g. Burger et al, BioRxiv 2025, El Eid et al, BioRxiv 2024; Lu et al (in review); Cary et al, PNAS 2025; Cao et al, Nat Commun 2025, with Novo Nordisk collaborators), we have been exploring the relationship between constitutive activity at different receptor subtypes, and different transducer proteins, and stability of agonist-receptor complexes to support structure determination as part of our collaborations with Astra Zeneca (Russell et al, manuscript in preparation) and Boehringer Ingelheim.

As noted in previous annual reports, our structural work also continues to inform (and is being informed by) in vitro and in vivo studies on the mechanism and consequences of GPCR activation (e.g. Yuliantie et al, Biochem Pharmacol, collaboration with Boehringer Ingelheim; Tomašević et al, J Biol Chem 2024; Payne et al, ChemBioChem 2024; Liu et al, J Med Chem 2024; Liong et al, Brain Behav Immun 2024; Li et al, Purinergic Sig 2025; Kos et al, ACS Pharmacol Transl Sci 2024; Keov et al, Mol Pharmacol 2024, collaboration with Novo Nordisk; Harikumar et al, Nat Commun 2024; Harikumar et al, PLoS Biol 2024; Cao et al, Nat Commun 2025, collaboration with Novo Nordisk). Centre researchers have also continued to collaborate with bioinformatic and animal physiology groups to combine structural insights into understanding of genetic variation in GPCRs (El Eid et al, BioRxiv 2024; Shajan et al, Hum Genom 2024).

Subproject 2. Molecular Mechanism for Biased Agonism

Understanding efficacy and biased agonism (the ability of individual ligands acting at the same receptor to generate different profiles of transducer and regulatory protein binding and activation) remains a major area of research within Theme 2. This continues to be a productive area of research with multiple papers exploring the structure and function of GPCRs in complex with different agonist ligands (e.g. Cary et al, PNAS 2024; Cao et al, Nat Comm 2024 – with Novo Nordisk; Keov et al, 2024 - with Novo Nordisk). Within this subproject area, we have industry collaborations with Boehringer Ingelheim, Servier, Septerna and Novo Nordisk where multiple manuscripts are now being finalised.

Subproject 3. Allosteric and Bitopic Regulation of GPCRs

We are continuing our pharmacological and structural research across multiple fronts.
(i) small molecule modulation of receptors, with ongoing work on muscarinic structures (Burger et al, BioRxiv 2025) and pharmacology (Liu et al, J Med Chem 2024; Nguyen et al, Br J Pharmacol 2024), as well as studies on class C GPCRs (CaSR, mGlu5) (Dinh et al, Int J Mol Sci 2025; Kos et al, ACS Pharmacol Transl Sci 2024), class B GPCRs (Yuliantie et al, Biochem Pharmacol 2024, collaboration with Boehringer Ingelheim).

(ii) endogenous regulation of receptors by membrane lipids, exemplified by work on the CCK receptor family (Harikumar et al, PLoS Biol 2024) that has implications for pathological effects associated with disease states with high cholesterol (e.g. obesity).

(ii) protein-protein modulation of receptors by other GPCRs and by accessory proteins (Harikumar et al, Nat Commun 2024; Cao et al, Nat Commun 2025, collaboration with Novo Nordisk), and have additional collaborative projects with Dimerix in this research area.

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Subproject 4. Inhibitor-Bound GPCR Structures

We have been performing correlative assessment of chimeric receptors and the ability of software such as AlphaFold to predict optimal constructs, including extension of this work by ICHDR Baruah during her placement with Pfizer in early 2025. These constructs have been investigated via pharmacological and biochemical approaches, and we are continuing to assess how different constructs behave in cryo-EM imaging. This has provided insight into parameters associated with stable biochemistry and improving resolution leading several inhibitor-bound receptor complexes at moderate to high resolution as monomer or dimer complexes. The initial work from this study is currently being finalised for publication (collaboration with Pfizer). In parallel, we are starting to assess the ability of new computational tools such as Boltz-2 to predict ligand interaction with target receptors.

Pfizer

Subproject 5. Orphan Receptor Structures

Work has progressed well on the collaborative projects with our industry partners AstraZeneca and Boehringer Ingelheim. Multiple constructs have been generated and the ability of receptor constructs to potentially form a transducer bound complex with different G proteins has been performed. In parallel, pharmacological evaluation of the extent of constitutive activity for each construct with different G proteins has been assessed (presentations from Lee and from Russell). We have also explored the relationship between constitutive activity and biochemical stability with an exemplar receptor that provides insight into approaches for orphan receptor structure determination (manuscript in preparation, collaboration with AstraZeneca). As reported in last year's annual report, stable complex formation of a target orphan GPCR, GPR3, was achieved (Russell et al, Biochemistry 2024, collaboration with AstraZeneca), revealing that this receptor constitutively engages with lipid activators, with potential ligands identified by mass spectrometry. We have now solved additional structures putative endogenous lipid ligands and are assessing whether different lipids alter the dynamics of the receptor complex. Manuscripts on structures of other orphan receptors (GPR88, collaboration with Servier; GPR52, collaboration with Phrenix – a biotechnology spinout company co-founded by Centre members), are currently being finalised.

AstraZeneca Boehringer Ingelheim phrenix therapeutics

Theme 3. Other Membrane Proteins

Subproject 1. Applying Cryo-EM to Understand Receptor Tyrosine Kinase Structure and Function

Work is ongoing to develop best methodology to express and purify the full-length membrane receptor tyrosine pseudokinase, EphA10 in its native state. To support our structural studies, we have successfully developed a robust expression system for producing truncated constructs of the ectodomain and intracellular domains of EphA10. Using a comprehensive and rigorous screening approach, we have identified in collaboration with the Centre of Biological Therapy (CBT, WEHI) four high-affinity lead candidates that selectively target distinct epitopes on EphA10. To evaluate their functional relevance, we have implemented a cell-based approach using fluorescently labelled full-length EphA10 and demonstrated that our lead antibodies selectively recognise EphA10 at the plasma membrane. Notably, three antibodies co-internalise with EphA10, while one demonstrates blocking activities.

A key objective of the associated PhD project is to determine the structures of EphA10 ectodomain-antibody complexes to map epitopes and reveal the molecular basis of antibody binding and selectivity. These finding will guide the optimisation and development of antibody-based therapeutics targeting EphA10 expressing malignancies, including aggressive cancers, such as triple-negative breast cancer (TNBC), lung adenocarcinoma (LUAD)

Subproject 2. Structural and Functional Studies of Potassium Ion Channels

Subproject 2a. Structural & Functional Studies of Potassium Ion Channels Linked to Epilepsy

The primary aim of this project is to determine cryo-EM structures of Kv7.3 and heteromeric Kv7.2/Kv7.3 and to determine effects of a Kv7.3 epilepsy mutation on channel function. Work is ongoing to optimise the expression and purification of the full-length potassium ion channel Kv7.3. A domain of particular interest is Helix D, a proposed tetramerisation domain located at the distal end of the long and flexible cytoplasmic C-terminal tail, where a novel epilepsy mutation has been identified. Due to its inherent flexibility, this region has remained unresolved in published cryo-EM structures of Kv7 family members. To address this, we have successfully used X-ray crystallography to determine novel structures of Helix D peptides, revealing both a Kv7.2 homotrimer and a Kv7.2/Kv7.3 heterotetramer. To further confirm the oligomeric state of homomeric Helix D in isolation, which showed contrasting results to previous studies, we employed a suite of biophysical techniques on MBP-tagged Helix D, including size-exclusion chromatography (SEC), mass photometry, and SEC coupled to multi-angle light scattering (SEC-MALS). All approaches consistently indicate that homomeric Kv7.2 and Kv7.3 Helix D peptides form trimers. In parallel, we are working on cloning and expressing a Kv7.2/Kv7.3 concatemer to produce a full-length heteromeric channel for structural and functional studies.

Subproject 2b. Structural Determination of Homo- and Hetero-Tetrameric KCNQ Channels

The structural determination of homo- and hetero-tetrameric KCNQ channels is still ongoing. We have now established a robust expression and a purification system to produce truncated Kv7.5 ion channel based on an in-house prepared GFP-Nb resin and are currently working on doing so with Kv7.3/7.5 heteromeric ion channels as well. Preliminary structural data has been collected for Kv7.5. One of the primary aims will be the structural determination of Kv7.5 with a range of potential drug candidates to allow the creation of more subtype specific activators and inhibitors. We are furthermore in the development of a system that will allow the marking of specific subunits of a heteromeric channel based on a site-specific spontaneous protein ligation reaction. This is expected to help in overcoming the challenge of processing symmetrical heteromeric

channels, in which the subunits have high structural homology at low resolution, and therefore, lose the subunit specific information during alignment.

Subproject 3. Cryo-EM on Membrane Proteins Involved in Chronic Pain

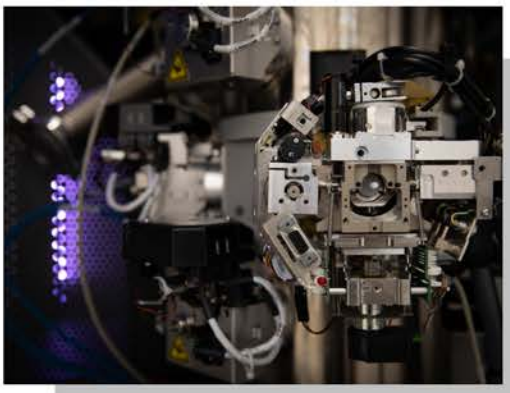
Progress on this project has been limited due to the chronic illness of the ICHDR on the project. Unfortunately, the severity of the illness has led to the student's withdrawal from the HDR program. Another ICHDR has now taken over this project and has completed the measurements of $GABA_B$ receptor-mediated cAMP modulation in forskolin-stimulated CHO cells expressing the human $GABA_B$ receptor. Using a sensitive assay for intracellular cAMP levels, the student has demonstrated that baclofen, a selective orthosteric agonist of the $GABA_B$ receptor, caused a concentration-dependent decrease in cAMP levels. In contrast, the analgesic α-conotoxins (Vc1.1, cVc1.1, RgIA), which act as allosteric agonists, did not significantly alter cAMP levels. Control experiments with α-conotoxins that do not activate the $GABA_B$ receptor (RgIA4, MII) similarly showed no effect on cAMP levels in forskolin-stimulated CHO cells. These findings support the concept of biased agonism at the $GABA_B$ receptor, with baclofen and analgesic α-conotoxins eliciting distinct signalling outcomes.

Subproject 4. Structural and Functional Studies of SARS-CoV-2 Co-receptors

This subproject focuses on two SARS-CoV-2 co-receptors that are also emerging cancer targets: Neuropilin-1 (NRP1) and Leucine-Rich Repeat-Containing Protein 15 (LRRC15). We have made significant progress on both fronts. Using a combination of negative-stain and cryo-electron microscopy (cryo-EM), as well as hydrogen-deuterium exchange mass spectrometry (HDX-MS), we have identified previously uncharacterised, non-canonical binding sites of NRP1 on the SARS-CoV-2 spike protein. For LRRC15, we have successfully mapped the binding epitope of samrotamab-vedotin—a phase I clinical trial antibody-drug conjugate—using cryo-EM and HDX-MS. Ongoing efforts are focused on further optimisation and validation of these findings to ensure their robustness and reproducibility.

Subproject 5. Structural and Functional Characterisation of F1-ATPase

We recently determined the molecular structure of an axle-less F1-ATPase (Furlong et al, BBA Bioenergetics, 2025). This study deepened our understanding about the mechanisms of ATP hydrolysis by the molecular motor, F1Fo ATP synthase. The F1 portion of the enzyme contains a central rotor subunit (γ) that spins within a ring of non-catalytic (α) and catalytic (β) subunits, driving hydrolysis. We generated an "axle-less" variant of an F1-ATPase, where the central γ subunit was truncated, resulting in the loss of critical interactions between the γ subunit and the β subunits. Cryo-EM analysis of this variant revealed an unexpected conformation, which suggests that the complete γ subunit is important for coordinating efficient ATP binding of F1-ATPase.



Program area 3. Joint Research Projects with Industry Partners and Embedded Industrial Training

Industry-partnered research to deliver on KO4 of the Centre (aligned to Linkage Program objectives (a) – (c), and the core objective of the ITTC subprogram). The Centre continues its active engagement with Industry, both through our founding and new partner organisations and via other industry partnerships. This included commencement of a new commercial and academic project in 2024 with our partner Novo Nordisk, continuing their productive collaboration with Centre members. There were additional projects between Centre members and local biotechnology spin out companies that commenced in 2024. We currently have multiple ongoing collaborative projects with our industry partners (detailed below), inclusive of regular joint meetings that provide important experiential training for the project participants.

Investigation of factors driving resolution of receptor structures and interactions with low affinity ligands. Astex hosted one of our ICHDRs for their industry placement (April - July 2024). Dedicated project members: 1xICHDR, 1xICPD; additional support from the Monash ARC ICPD [monthly joint meetings].

Methods for orphan receptor structure determination. Dedicated project members: 1xICHDR; additional support from the Monash ARC ICPD [monthly joint meetings]. This project was completed in early 2025, coinciding with the thesis submission of the ICHDR engaged in the project.

(i) Investigation of molecular mechanisms for biased agonism at incretin receptors. (ii) Structure determination for orphan receptors. Boehringer Ingelheim hosted two of our ICHDRs for their industry placement (May - August 2024). Dedicated project members: 2xICHDR, 2xICPD, additional support from the Monash ARC ICPD [monthly joint meetings]. The project with the ICPDs was completed in early 2025, with ongoing collaboration for the ICHDR projects continuing until late 2025.

Structure and allosteric regulation across GPCR oligomers. Dimerix is a partner with the Monash Node of the Centre and is conducting collaborative research on GPCR dimers. Dimerix hosted one of our ICHDRs for their industry placement over 12 months (April 2024 to April 2025). Dedicated project members: 1xICHDR [monthly joint meetings].

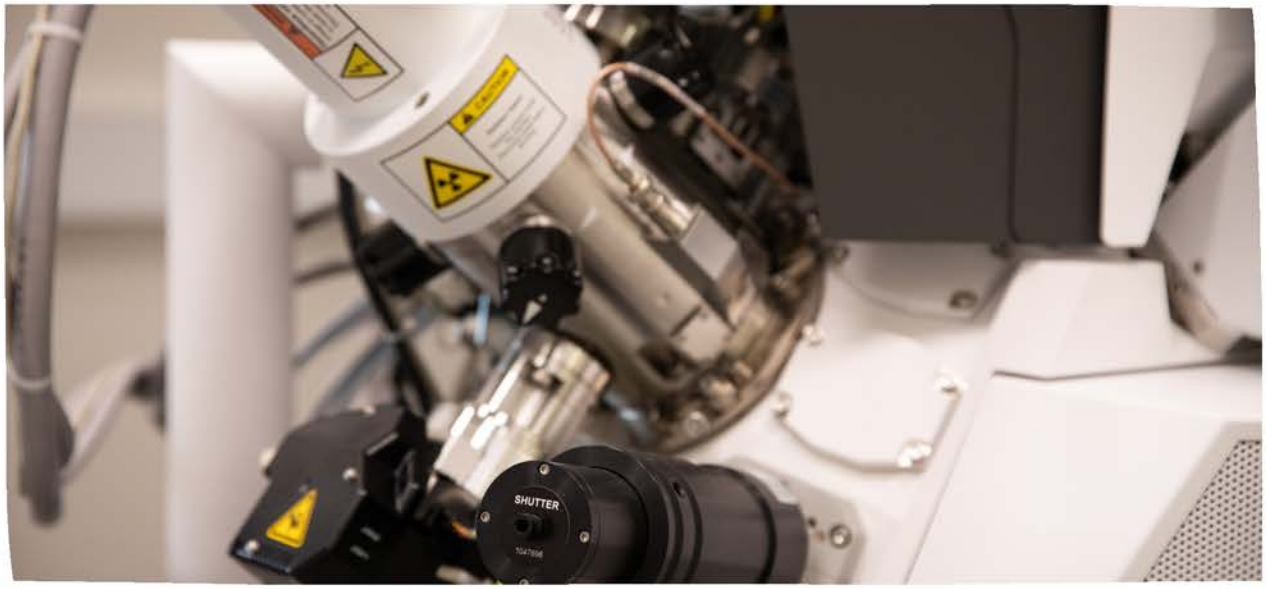
Structure and pharmacology of peptide obesity therapeutics. Dedicated project members: 1xICPD in 2023/24; additional support from the Monash ICPD [minimally monthly joint meetings, additional ad hoc meetings]; New project commencing in 2024 on structure of novel peptide-GPCR structures for obesity targets. Dedicated project members: 2xFTE equivalent ICPD; additional support from the Monash ICPD [monthly joint project meetings].

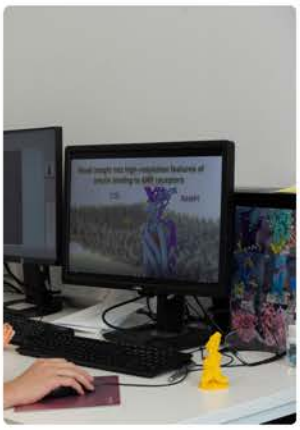
Methods for determination of inhibitor-bound structure determination. Pfizer hosted one of our ICHDRs for their industry placement (late January - early May 2025). Dedicated project members: 1xICHDR [monthly joint meetings].

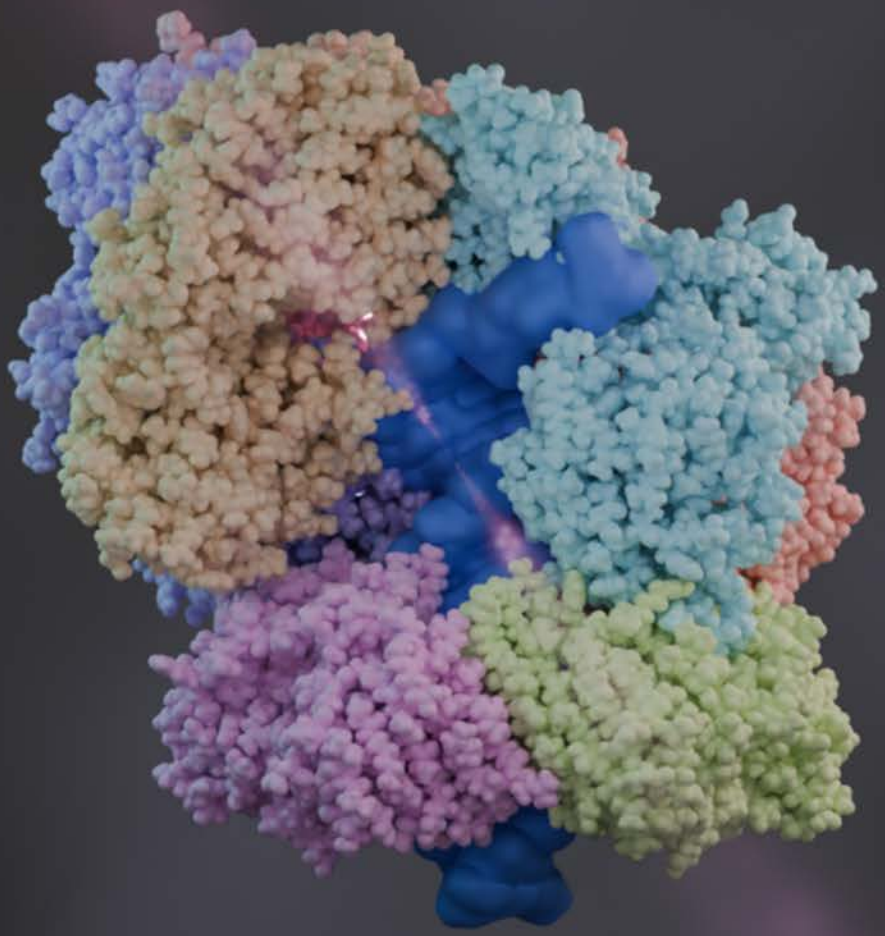
Industry partner Sanofi will be hosting two ICHDRs for their industry placements in 2025.

Structural mechanisms for activation and inhibition of chemokine receptors. Servier is currently hosting an ICHDR for their industry placement 2025. 1xICHDR [monthly meetings].

The Centre continues its broad partnership with Thermo Fisher Scientific in the areas of innovations in cryo-EM, improving workflows for drug discovery and implementation of training in cryo-EM. ThermoFisher will be hosting up to five ICHDRs for their industry placement during 2025/26.







From our UoW Node: E. coli clamp loader with closed clamp on primed template DNA, PDB: 8GJ2. Xu et al., Nat Commun, 15: 8372 (2024). https://doi.org/10.1038/s41467-024-52623-9

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Engagement

CCeMMP Social Media

LinkedIn

44K	519	1.0K
impressions	followers	engagements

last 12 months

Twitter/X

819
followers
last 12 months

Youtube

13.3K	646	154.7K
views	subscribers	impressions

last 12 months

Follow us

@ccemmp-outreach.bsky.social

ccemmp_outreach

External facing events

1	Research Symposium
11	CCeMMP seminars*
1	Competition (Bench to Art)
1	SPA workshop

*68 Average seminar attendance

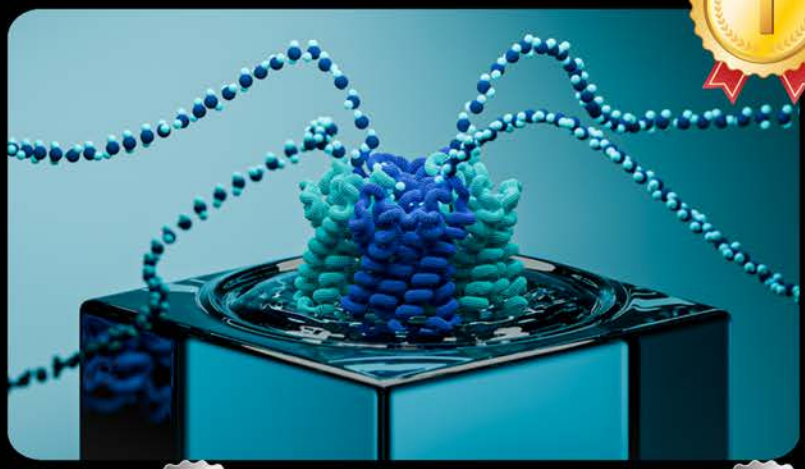
Internal events

7	EduWeek workshops
1	Joint careers forum (with the University of Melbourne)
4	Professional workshops
2	Blender workshops

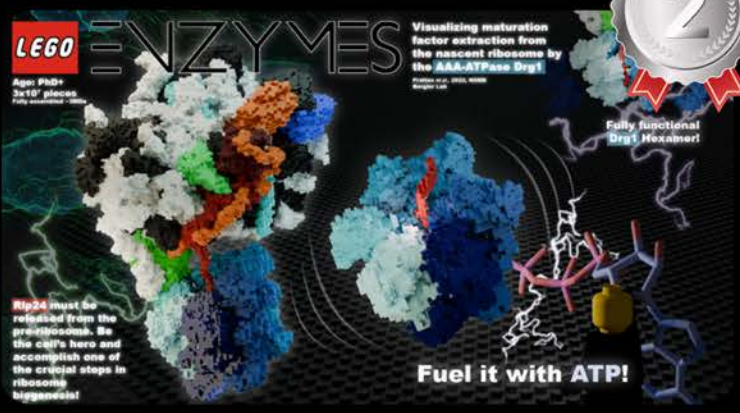
4	Newsletters
1	Annual Report
1	Calendar

BENCH TO ART COMPETITION

Judge's AWARD



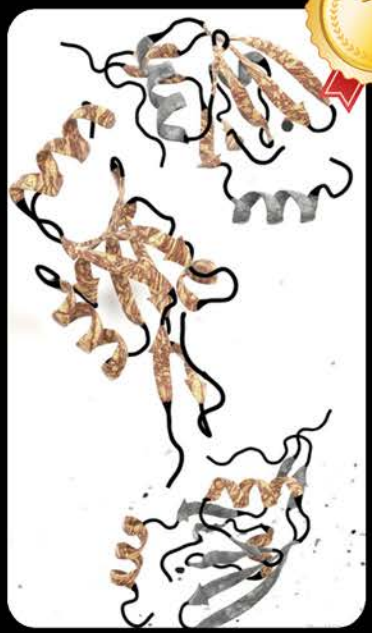
Aquaporin: The Portal of Life



Lego Enzymes

Iron Bound

People's CHOICE



Tanatic Delirium

Crochet Motors Drive Bacterial Swimming

Knot Bound

Academic and Public Engagement

CCeMMP Bench to Art Competiton

In 2024, we were pleased to present the inaugural ARC CCeMMP Bench to Art Exhibition that was aligned with National Science week, 10-18 August, 2024. Our online 'exhibition' was on display 13-27 August with viewers having the ability to vote for their favourite piece. We welcomed art from around the world that represented experiments on CryoEM or on membrane proteins using other techniques. In all, there were 28 entries: 16 entries were from members/affiliates, a further 2 came from researchers within our nodes, the remaining 10 were from outside of the Centre.Entrants were from: Monash Node, UoM/Bio21 Node, UoW Node, WEHI Node, Victor Chang Cardiac Research Institute, University of Queensland, University of British Columbia (Canada), University of Graz (Austria), St. Louis University (USA), Washington University School of Medicine in St Louis (USA), Scixel (Spain), Mendel Studios (UK) and IBMC-CNRS (France). We used the expertise of three judges: Brady Johnston, scientist and Blender3D guru; Dr. Maja Divjak, scientist and award winning biomedical animator; and Tamara Tegethoff, career artist, Germany, to find our winning entry. The judges awarded First Prize to "Aquaporin: The Portal of Life" by Mohammad Turhan Pathan. It was a tie for second place between "Iron Bound" by Dr. Jesse Mobbs and ""Lego Enzymes" edition: The AAA-ATPase Drg1 Remodels the Precursor of the Large Ribosomal Subunit" by Michael Prattes.' Judging was also open to the community for the People's Choice Award. We had an amazing response with 500 votes registered. The People's Choice Award was awarded to "Tanatic Delirium" by Juan Valenzuela (Mexico). Second and third prizes of the People's Choice went to "Crochet Motors Drive Bacterial Swimming" by Daniel Fox and "Knot Bound" by Laura Humphrys, respectively.

Graduate Careers Forum

Graduate Careers Forum, Nov 2024

November 8, 2024, a Graduate Research Career Forum was held at Melbourne University in collaboration with CCeMMP. ICHDRs Riya Joseph and Marialena Georgopoulou were members of the organising committee. This event provided an opportunity for PhD students to enhance their career readiness and also explore diverse career paths beyond academia. The forum was presented in two sessions. The first by HR professionals on crafting impactful CVs and cover letters, mastering interviews,optimizing LinkedIn profiles and developing resilience in the job search. The second gave the students the opportunity to engage with industry experts and network with professionals across a variety fields: large corporations, small enterprises, start-ups, government, clinical trials, patenting and communications. The latter career forum panel was co-chaired by ICHDR Marialena Georgopoulou. In this session, students were given the opportunity to ask questions to the invited speakers regarding their career paths.

In the Spotlight

To promote members of the CCeMMP, the Outreach & Public Engagement Committee instigated a publicity initiative in 2023 called "In the Spotlight" that has a primary (but not exclusive) focus on newer members of the Centre. These took the form of feature articles that highlighted members and affiliates in our newsletter and our social media platforms (LinkedIn, Twitter/X and more recently Instagram and Bluesky), and included information about their scientific background, current research, and hobbies. We continued this feature in our Newsletters throughout 2024 and 2025. We have had four newsletters featuring "In the Spotlight", showcasing eight of our members/affiliates: ICPD Dr. Sepideh Valimehr (UoM/Bio21 Node), ICPD Dr. Aidan Grosas (UoW Node), ICHDR Emily Park (WEHI Node), Dr. Jesse Mobbs (Monash Node), Dr. Bronte Johnstone (UoM/Bio21 Node), Dr. Jacob Lewis (UoW Node), ICHDR Alok Pradhan (Monash Node) and Susovan Das (WEHI Node).

In the spotlight

Sepideh Valimehr

CCeMMP Postdoc at Bio21 node
Twitter/X: @SValimehr

Background
I earned a bachelor's and master's in cell and molecular biology in Iran and a PhD in biochemistry at Melbourne University, Bio21 institute.

Current research
CryoEM sample preparation optimisation, data collection and processing. Organising teaching and instructing the cryoEM workshops. I'm happy to collaborate on cryoEM projects.

Looking forward
Advice for students:
Always ask questions. Don't postpone tasks to the future and learn things more in depth.

About me
I enjoy hiking, cycling, playing board games, and spending time with friends. I am also an ice cream lover.

If you're a CCeMMP member and would like to be featured, please reach out to the CCeMMP Outreach and Public Engagement Committee (sarah.piper@monash.edu).

In the spotlight

Aidan Grosas

CCeMMP Postdoc at UoW node
Twitter/X: @AidanGrosc

Background
I completed my PhD at the ANU where I used biophysical and structural techniques to study protein folding and aggregation problems.

Current research
I'm working on membrane transport proteins using cryo-EM. I am also elucidating the structure of amyloid fibrils by cryo-EM using helical processing – please feel free to chat to me about it!

Looking forward
The advances in cryo-electron tomography are exciting, in situ structural biology is going to be a game changer!

About me
What inspired me to pursue a career in research: An innate desire to know how the world around me works and the ability to satisfy my scientific curiosity.

If you're a CCeMMP member and would like to be featured, please reach out to the CCeMMP Outreach and Public Engagement Committee (sarah.piper@monash.edu).

In the spotlight

Emily Park

Centre ICHDR student at WEHI node
linkedin.com/in/-emily-par

Background
I completed a Bachelor of Science (Honours) in Biochemistry at the University of Otago. My Honours research developed a pipeline for screening nanobodies against Tribbles-1 for therapeutic applications.

Current research
I've recently started a PhD with Professor Isabelle Lucet investigating the structure and function of Eph receptor pseudokinases in cell-cell communication.

Looking forward
What excites me about this project is the opportunity to learn techniques in both structural and cell biology as ways to visualise protein behaviour.

About me
I have been inspired to pursue a career in research by the passionate and supportive teams, supervisors, and mentors I've had the privilege to work alongside.

If you're a CCeMMP member and would like to be featured, please reach out to the CCeMMP Outreach and Public Engagement Committee (sarah.piper@monash.edu).

In the spotlight

Jesse Mobbs

Postdoc at Monash node
Twitter/X: @JesseMobbs

Background
I completed my PhD in 2016 at the University of Melbourne with Prof. Paul Gooley, specialising in NMR spectroscopy and X-ray crystallography. This is where my interest in protein structure and dynamics first began.

Current research
My current research uses single-particle cryo-EM to support drug discovery. My current focus is on the allosteric modulation of G protein-coupled receptors, such as opioid receptors, a key target for treating pai

Looking forward
Advice for students: I suppose this applies to any technique. But take this time to gain as much hands-on experience as possible—from sample preparation and microscope operation to data processing.

About me
Anything outdoors really. But currently running and getting out for a hike some weekends.

If you're a CCeMMP member and would like to be featured, please reach out to the CCeMMP Outreach and Public Engagement Committee (sarah.piper@monash.edu).


IN THE spotlight
Bronte Johnstone
@bronteaj
@bjohnstone.bsky.social
http://linkedin.com/in/bronte-johnstone-809533b129
Background
I completed my undergrad studies at Monash and then Honours and my PhD at the University of Melbourne with Prof. Michael Parker, which focused on bacterial pore-forming toxins.
Current research
I am using cryo-ET to study virus-host interactions using a pseudovirus and proteoliposome system. I have experience using membrane vesicles for both single-particle cryo-EM and cryo-ET, so happy to chat with others doing similar!
Looking forward
Advice for students: Try to embrace hurdles and troubleshooting as much as possible and use it as an opportunity to grow. It is frustrating when things don't work, but those situations are when you will probably learn much more than you would otherwise.
About me
I enjoy cooking and baking, although seem to gravitate towards more intense baking challenges – basically anything with numerous components or layers!
you're a CCeMMP member and would like to be featured, please reach out to the CCeMM
Outreach and Public Engagement Committee (sarah.piper@monash.edu).


IN THE spotlight
Jacob Lewis
@Jacob_Lewis90
@helixhero.bsky.social
Background
Watching DNA helicases assemble under the microscope felt like catching nature in the act – revealing the choreography of initiation of DNA replication.
Current research
I'm currently using cryo-EM and single-molecule imaging to build a detailed framework mapping human DNA replication, exploring heterogeneity in the process, and uncovering how errors trigger cancer. Feel free to reach out for processing advice.
Looking forward
I'm most excited about hybrid approaches combining single-molecule fluorescence imaging to track dynamic processes in solution with cryo-EM to visualize their structures in stunning detail.
About me
Outside of research, I enjoy landscape photography, a pursuit of fleeting moments in nature that helps me recharge and find inspiration.
you're a CCeMMP member and would like to be featured, please reach out to the CCeMM
Outreach and Public Engagement Committee (sarah.piper@monash.edu).


IN THE spotlight
Alok Pradhan
@alokcpradhan
@alokcpradhan.bsky.social
linkedin.com/in/alokcpradhan
Background
I started my academic journey with an Engineering degree in Biotechnology and was introduced to cryo-EM during my Master of Research (Biological Sciences). I was able to continue my cryo-EM journey with the CCeMMP PhD program in Pharmaceutical Sciences.
Current research
I am using pharmacology and cryo-EM to investigate GPCR heteromerization and its implication in different disease conditions, which will aid in developing targeted therapies to help unmet need. Feel free to reach out if you're into any form of oligomers.
Looking forward
I look forward to a future where we fully understand network of receptors and other biomolecules enough to build biological transistors, which will go head-to-head with the best semi-conductor chips while only demanding a fraction of the energy.
About me
I do macro, wildlife and nature photography. I also love going on very long hikes and getting inspiration from nature to help me with unlocking the mysteries of the universe.
you're a CCeMMP member and would like to be featured, please reach out to the CCeMM
Outreach and Public Engagement Committee (sarah.piper@monash.edu).


IN THE spotlight
Susovan Das
@dsusovan774
linkedin.com/in/susovan-das-a09087148
Background
I completed master's in biotechnology at IIT Kharagpur, India, and am currently a final-year PhD at WEHI/University of Melbourne, using Cryo-EM to study receptor proteins (Frizzled) involved in cancer progression and develop novel therapies.
Current research
In my PhD, we uncovered a novel process through which Frizzled receptors transduce signals by studying their atomic structure and developed potent therapeutic antibodies to block these receptors, helping improve cancer treatment.
Looking forward
In general, I'm excited about the recent Cryo-ET advancements, as Cryo-ET can reveal protein structures directly inside cells, capturing their native environment and offering insights into biologically relevant molecular interactions.
About me
Outside of research, I enjoy cooking, exploring photography, and taking relaxed bicycle rides around the city. These hobbies help me maintain work-life balance and stay refreshed.
you're a CCeMMP member and would like to be featured, please reach out to the CCeMM
Outreach and Public Engagement Committee (sarah.piper@monash.edu).

CCeMMP Reserch Symposium, 11-12 November, 2024

Our second in person CCeMMP Symposium was held 11-12th November 2024 at Bio21 Molecular Science & Biotechnology Institute, Parkville. We had both national and international keynote speakers: Prof. Renae Ryan (The University of Sydney, Sydney, Australia) opened the meeting and Assistant Prof. Oliver Clarke (Columbia University, New York, USA), closed the symposium. In all 137 registered to attend the meeting with 13 selected speakers and 33 posters presented.

Dr. Nie Xin, Prof. Patrick Sexton, Prof. Renae Ryan, Assistant Prof. Oliver Clarke

The meeting was organised entirely by Centre ICHDRs and Post Docs (pictured below, left to right): Dr. Winnie Tan, Dr. Wessel Burger, ICHDR Xiaomin Wang, Dr. Sepideh Valimehr (Chair), ICHDR Emily Park and ICHDR Riya Joseph. A lot of unseen work goes on behind the scenes for these meetings to come together, from organising the program, to catering, to set up and pack down and everything in between.


CCeMMP Research Symposium Organising Committee

Talks were presented by members, affiliates, partner organisations and the local scientific community: Dr. Nicholas Kirk (WEHI), Isabella Russell (ICHDR, Monash), Dr. Matthew Johnson (UoM), Fabian Munder (Monash), Dr. Felix Bennetts (Monash),Yiling Yu (The Florey), Dr. Winnie Tan (WEHI), Dr. Hongyi Xu (Australian National University), Mihin Perera (WEHI), Dr.Sarah Piper (Monash), Dr. Nie Xin (ThermoFisher Scientific, Singapore), Dr. Rhys Grinter, (UoM), Mahmuda Yeasmin (Monash). Our session Chairs (Dr. Sepideh Valimehr, Dr. Joshua Hardy, Dr. Wessel Burger, Dr. Sarah Piper, Dr. Winnie Tan and Dr. Aidan Grosas) ensured the smooth running and keeping to time of each of the sessions.

Thermofisher Scientific sponsored the Poster Prizes. Our 14 judges (Dr. Matthew Belousoff (Monash), A/Prof. Gökhan Tolun (UoW), Dr. Matthew Johnson (UoM/Bio21), Dr. Richard Birkinshaw (WEHI), Dr. Jesse Mobbs (Monash), Dr. Rhys Ginter (UoM), Dr. Fabian Bumbak (Monash), Dr. Nicholas Kirk (WEHI), Prof. Eric Hanssen (UoM/Bio21), Dr. Manasi Kumar (UoM/Bio21), Dr. Shadi Maghool (UoM/Bio21), Dr. Mohammad Tanipour (Monash), Dr. Bronte Johstone (UoM/Bio21), A/Prof. Debnath Ghosal (UoM/Bio21)) awarded the prize for best poster to Daniel Fox (UoM/Monash) and runner up to Dr. Luca Troman (UoM).

The People's Choice award for the most popular oral presentation was awarded to Mihin Perera (WEHI).

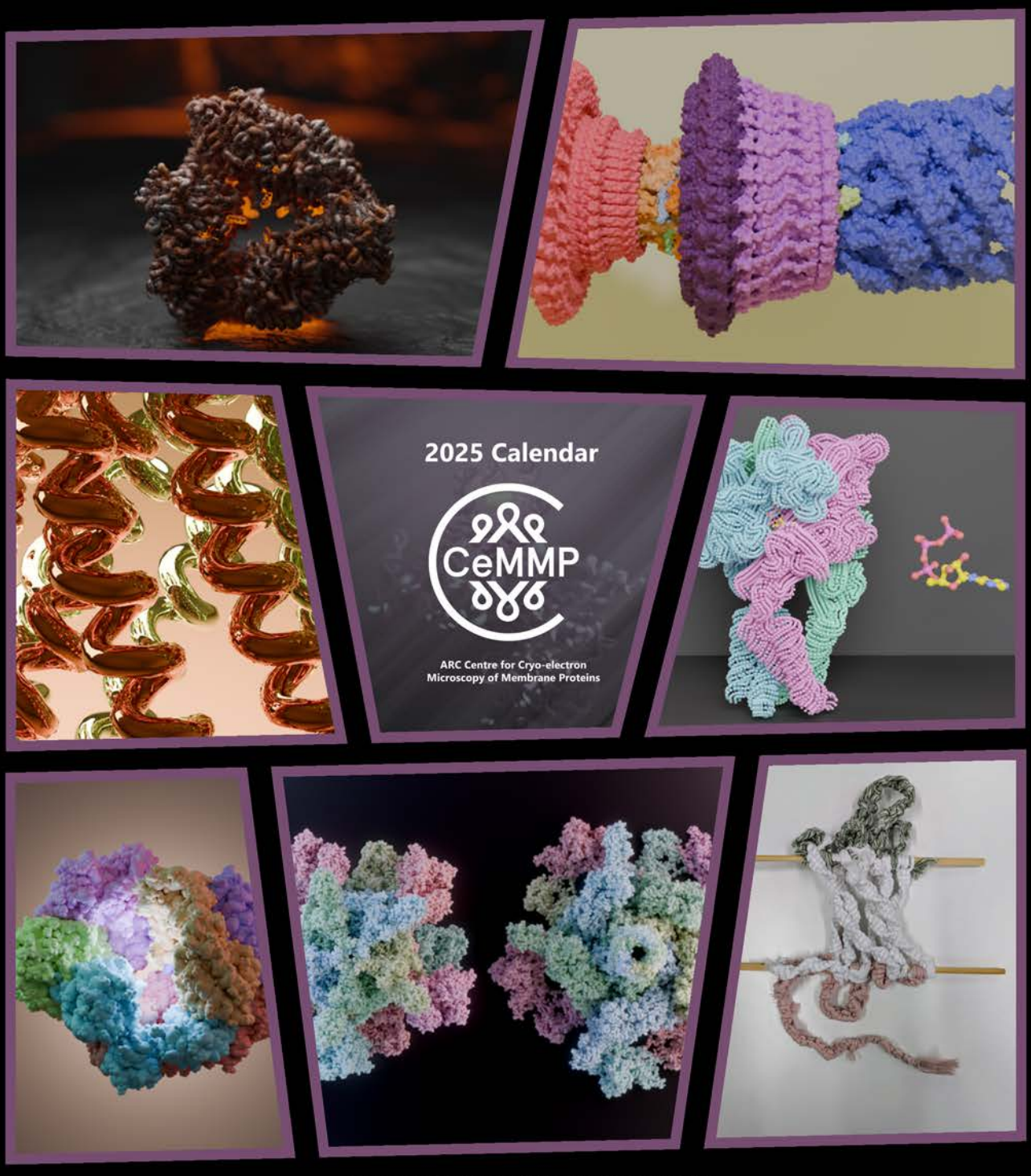
To inspire engagement at question time, we ran a raffle for the most questions asked; every question asked, a raffle ticket was added to the 'bowl'. Two prizes were awarded at the end of the Symposium.

Our generous sponsors of the symposium were Thermo Fisher Scientific, BioCurate and MiTegen.


CCeMMP Research Symposium Prize Winners

			SPEAKERS				
137	15	33	2	1	3	4	5
ATTENDEES	SPEAKERS	POSTERS	KEYNOTES	INDUSTRY TALK	GROUP LEADERS	POSTDOCS	PHD STUDENTS

CCeMMP Research Symposium, Nov 2024



Selection of 2025 CCeMMP calendar images

The 10th International Congress on Electron Tomography, 28-30 January, 2025

The CCeMMP sponsored a $250 poster prize at the 10th International Congress on Electron Tomography. The congress was co-hosted by WEHI and the University of Wisconsin-Madison. WEHI hosted day 1, before moving to the Bio21 Molecular Science and Biotechnology Institute at the University of Melbourne for Days 2 and 3. Featuring an impressive lineup of international speakers, the congress provided a platform for cutting-edge discussions and exchange of knowledge. Several Centre members also had the opportunity to present their research, contributing to the dynamic and engaging program. Much of the local organising committee was made up of Centre members (Prof. Eric Hanssen, A/Prof. Debnath Ghosal, Dr. Sepideh Valimehr, A/Prof. Shabih Shakeel, Prof. Isabelle Lucet). The CCeMMP poster prize was awarded to student affiliate Shubha Udupa, a PhD student in A/Prof. Debnath Ghosal's group.

CCeMMP Poster Prize winner : Shubha Udupa with ICPD Dr. Sepideh Valimehr

CCeMMP 2025 Calendar

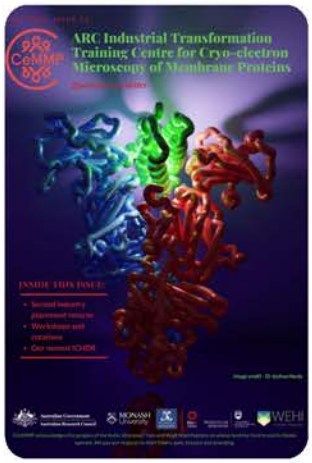
We continued our CCeMMP calendar for 2025. This edition showcased structures determined by Centre members and affiliates with image contributions from all our nodes: Monash University, University of Melbourne/Bio21, WEHI and University of Wollongong, including external affiliates and winners of our Bench to Art competition. A huge thanks to our Blender-Render-gurus: Dr. Sarah Piper, Dr. Joshua Hardy and Dr. Sepideh Valimehr who rendered the images based on the centre structures. We aim to continue to produce these calendars in future years, showcasing structures from each of our Nodes and external affiliates that have been released from the previous calendar year.

International Women's Day (IWD), 2025

To celebrate and recognise IWD this year, the Outreach and Public Engagement Committee invited members and affiliates to nominate Centre members to be recognised for their contributions. It was heart-warming to read the reasons for the nominations, particularly for our PhD students, our future leaders. We hope the recipients felt honoured and appreciated for being recognised in this way; they may feel like they are just doing their job but it is nice to know that "just doing your job" can make such a positive impact on those around you.

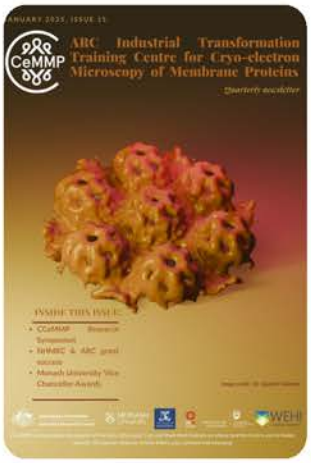
Newsletters

We continued our quarterly newsletters that keep our members and stakeholders abreast of current research and achievements of the Centre. All newsletters can be accessed via the Centre website. We rotate the covers of the newsletters between our Nodes so that each newsletter cover image is of a membrane protein structure determined from the laboratory of a member or affiliate within that Node.



July 2024

October 2024



January 2025

April 2025

CCeMMP Seminar Series

In Year 4 of operation, the Centre continued its seminar series focussed on the advancement of research on cryo-EM and membrane proteins. Speakers were selected and invited by the CCeMMP Seminar Subcommittee. The committee aims to choose a diverse range of international and domestic speakers across academic, industry, including those with different career paths and strives for gender balance. The scheduled monthly seminars are open to the scientific and public communities and highlight leading researchers and research in the field. With the presenters consent, the seminars are recorded and posted on our webpage (and YouTube channel). Since our last annual report, we have had 9 speakers in our regular program, and 2 special seminars, as detailed below. Unfortunately, due to circumstances beyond our control, the June and October seminars had to be cancelled. Seminars run from February to December, inclusive.

Dr. Alastair Stewart
Victor Chang Cardiac Research Institute,Sydney, Australia - Transporting drugs & protons: E. coli ATP synthase & human OCT1 *(May 14, 2024)*

Ali Punjani
CEO & Co-Founder, Structura, Toronto, Canada - Methods and tools in CryoSPARC for processing of membrane protein cryo-EM data *(July 9, 2024)*

Dr. Elizabeth Kellogg
Associate Member, St. Jude Children's Research Hospital, Memphis, USA - Mechanistic insights into RNA-guided DNA integration using trans-posons *(August 13, 2024)*

Prof. Megan O'Mara
Australian Institute for Bioengineering & Nanotechnology, The University of Queensland, Australia - Exploiting protein/lipid interactions for modulators of chronic pain *(Sept 17, 2024)*

Dr. Basil Greber
Institute of Cancer Research, London, UK - High-resolution structures of the human CDK-activating kinase bound to inhibitors: Harnessing the power of cryo-EM for discovery of cancer therapeutics *(Special seminar Oct 1, 2024)*

Prof. Renwick Dobson
University of Canterbury, Christchurch, New Zealand - TRAPped in an elevator: Amino-sugar uptake & utilisation by bacteria *(Nov 19, 2024)*

Prof. Dr. Mikhail Kudryashev
Max-Delbrück-Centrum für Molekulare Medizin (MDC), Berlin, Germany- Structure of membrane proteins in native membranes by cryo-EM *(Special Seminar Dec 3, 2024)*

Prof. Mei Hong
Massachusetts Institute of Technology, Cambridge, MA, USA - Structures & dynamics of the SARS-CoV-2 envelope protein from solid-state NMR *(Dec 10, 2024)*

Prof. Isabelle Rouiller
The University of Melbourne, Parkville, Australia - Unravelling VCP dynamics: Structural insights into cellular homeostasis & DNA repair *(Feb 11, 2025)*

Prof. Isabelle Lucet
Walter & Eliza Hall Institute of Medical Research, Parkville, Australia - Ephrin receptor pseudokinases communication: Translating cellular imaging & structural insights into novel therapies *(Mar 11, 2025)*

Dr. Brian Cary
Monash University, Parkville, Australia - Prolonged signaling of backbone-modified glucagon-like peptide-1 analogues with diverse receptor trafficking . *(Apr 8, 2025)*

Industry Engagement

Members and student members continue to have their regular project meetings with their respective industry partners (Boerhinger Ingelheim, Astex, Servier, AstraZeneca, Dimerix and Pfizer). In addition, some members have presented to industry virtually, during a visit/industry placement (see Industry Presentations, p74) or involved in roundtable discussions:

Prof. Arthur Christopoulos, Prof. Patrick Sexton and Prof. Denise Wootten: Septerna Founders symposium. **Septerna Inc.**, San Francisco, CA, USA, 24-25 February, 2025. Presentations and roundtable discussions

Prof. Patrick Sexton: Research Project Meetings between Monash and Novo Nordisk, **Novo Nordisk A/S.** Novo Nordisk Park, Måløv, Denmark, 28-29 October, 2024.

Prof. Patrick Sexton: Seminar and round table. Molecular insights into glucagon-like peptide-1 (GLP-1) receptor function, **Astex**, Cambridge, UK, 21 January, 2025.

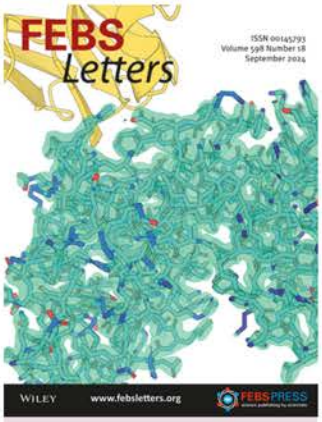
Prof. Denise Wootten and Prof. Patrick Sexton. Roundtable discussions. **Novo Nordisk**, Boston USA, 27 February, 2025.

Industry Placement

Minakshi Baruah - 3 month industry placement, **Pfizer** (CT, USA), late January- early May 2025.
Anna Beyger - 3 month industry placement, **Servier**, France, commenced April 22, 2025, currently on placement.
Dongju Lee - 3 month industry placement, **Boehringer Ingelheim**, Biberach, Germany, April - July 2024. Dongju's reflections can be found Pg 14.
Qinghao Ou - 3 month industry placement, **Boehringer Ingelheim**, Biberach, Germany, April - July 2024. Qinghao's reflections can be found Pg 16.
Bhavika Rana - 3 month industry placement, **Sanofi**, France, commencing May 2025.
Jack Tovey - 3 month industry placement, **Astex**, Cambridge, UK, April - July 2024. Jack's reflections can be found Pg 13.
Alok Pradhan - Industry placement (regular weekly attendance over 12 months), **Dimerix**, Fitzroy, commenced April 2024. Alok's reflections can be found Pg 15.

Media Engagement

Journal Highlights

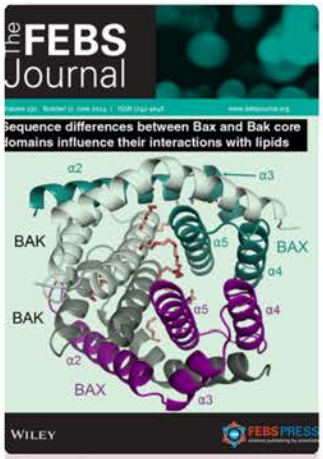


"Cover illustration Composite omit map of density, contoured to 2 σ, corresponding to αβ-Hb in the NbE11-Hb crystal lattice. This figure refers to Fox et al. 'The structure of a haemoglobin–nanobody complex reveals human β-subunit-specific interactions.'"

Fox, DR, Samuels I, Binks S, **Grinter R** (2024).The structure of a haemoglobin–nanobody complex reveals human β-subunit-specific interactions. **FEBS Letters**, 598(18): 2240-2248

Editor's Choice article from the 29 September 2024 issue **& cover illustration** *"Cover illustration Composite omit map of density, contoured to 2 σ, corresponding to αβ-Hb in the NbE11-Hb crystal lattice. This figure refers to Fox et al. 'The structure of a haemoglobin–nanobody complex reveals human β-subunit-specific interactions.'"*

Miller MS, Cowan AD, **Brouwer JM**, Smyth ST, Peng L, Wardak AZ, Uren RT, Luo C, Roy MJ, Shah S, Tan Z, Reid GE, Colman PM, **Czabotar PE** (2024). Sequence differences between BAX and BAK core domains manifest as differences in their interactions with lipids. **FEBS Journa**l, 291(11): 2335–2353. doi: 10.1111/febs.17031. **Editor's Choice** (from the June 2024 edition)**, Research Highlights** (Vol 29(11): 2332-2334. https://doi.org/10.1111/febs.17162) **& cover illustration**



"Cover Illustration The crystal structure of BAK-BAX heterodimer in the presence of detergent reveals insights into lipid binding. Image by Michelle Miller and Jason Brouwer, authors of the Original Article included in this issue, pages 2335–2353."

Commentary: The FEBS Journal (Bijelic and Macheroux)
Structure of human phospholipase D3, a single-strand exonuclease associated with Alzheimer's disease, **Ishii et al.,** 2024 https://doi.org/10.1111/febs.17319
Comment on: Ishii et al., Crystal structure of Alzheimer's disease phospholipase D3 provides a molecular basis for understanding its normal and pathological functions. https://doi.org/10.1111/febs.17277.

Editor's Choice article from the 18 December 2024 issue, **The FEBS Journal. Ishii K**, Hermans SJ, **Georgopoulou ME**, **Nero TL**, Hancock NC, Crespi GAN, Gorman MA, Gooi JH, **Parker MW** (2024). Crystal structure of alzheimer's disease phospholipase D3 provides a molecular basis for understanding its normal and pathological functions. FEBS J, 291 (24): 5398-5419. https://doi.org/10.1111/febs.17277

CCeMMP Members in the News

Media Releases - Digital & Print Media

May 24, 2024. Prof. Chris Langmead - Faculty of Pharmacy and Pharmaceutical Sciences website: The Aussies still hoping for better treatments after 75 years https://www.monash.edu/news/articles/the-aussies-still-hoping-for-better-treatments-after-75-years. Write up of an opinion piece published in the Canberra Times.

August 22, 2024. Faculty of Pharmacy and Pharmaceutical Sciences website: Prof. Arthur Christopoulos awarded ASCEPT lectureship. https://www.monash.edu/pharm/about/news/news-listing/latest/monash-university-dean-awarded-prestigious-2024-ascept-lectureship.

September 30, 2024. Bennetts FM, Venugopal H, **Glukhova A, Mobbs J**, Ventura S, **Thal DM**. Structural insights into the human P2X1 receptor and ligand interactions. Nat Commun 15: 8418 (2024) DOI: https://doi.org/10.1038/s41467-024-52776-7.,was picked up by 11 news outlets, https://nature.altmetric.com/details/168665783/news

- **9 News, September 30** (https://www.9news.com.au/national/new-advancement-for-development-of-hormonefree-male-contraceptive-pill/faed33be-2b41-4013-880e-5586a7a96121);
- **Perth Today, September 30** (https://www.perthnow.com.au/business/major-breakthrough-in-hormone-free-male-contraceptive-pill-research-c-16226946);
- **NY Breaking, September 30** (https://nybreaking.com/male-contraceptive-pill-breakthrough-htmlns_mchannelrssns_campaign1490ito1490/);
- **Mirage News, September 30** (https://www.miragenews.com/breakthrough-in-hormone-free-male-contraceptive-1326691/);
- **Phys Org, October 1** (https://phys.org/news/2024-10-3d-key-protein-advance-hormone.html);
- **Whats new 2 day, September 30** (https://whatsnew2day.com/australian-scientists-make-breakthrough-in-developing-a-male-contraceptive-pill/);
- **Express Digest, September 30** (https://expressdigest.com/aussie-scientists-make-huge-breakthrough-in-male-contraceptive-pill/);
- **COSMOS Magazine, September 30** (https://cosmosmagazine.com/science/biology/structure-of-important-male-contraceptive-target-finally-solved/);
- **Daily Mail, September 30** (no link);
- **Yahoo! News, September 30** (https://au.news.yahoo.com/major-breakthrough-pill-men-020103502.html?guccounter=1);
- **The National Tribune, September 30** (https://www.nationaltribune.com.au/new-advancement-for-development-of-hormone-free-male-contraceptive-pill/)

https://www.mitegen.com/news/events/– CCeMMP Research Symposium featured on our sponsors website **(Mitegen Events page)**

October 1, 2024: Images created by Dr. Sarah Piper and A/Prof. David Thal have been used in news articles for the **Sydney Morning Herald** (https://www.smh.com.au/national/the-australian-research-and-brains-that-led-to-a-new-schizophrenia-drug-20240926-p5kdsl.html) and **Monash Lens** (https://lens.monash.edu/@medicine-health/2024/10/01/1387056/how-australian-scientists-helped-pave-the-way-for-a-new-class-of-medicines-to-treat-schizophrenia). Included in both articles is the research led by Prof. Arthur Christopoulos and A/Prof. David Thal.

Nov 19, 2024. Herald Sun, "Piece of brain's puzzle unlocked" by Robyn Riley, page 9, (and syndicated to **news.com.au – Townsville Bulletin, Daily Telegraph, Adelaide Now; 4BC and 5AA radio)**."Melbourne researchers crack code on key Alzheimer's enzyme". Highlighting the research paper for members Marialena Georgopoulou, Kenta Ishii and Michael Parker. Ishii et al., FEBS J, 26 September 2024. https://doi.org/10.1111/febs.17277


Herald Sun
Piece of brain's puzzle unlocked
Alzheimer's enzyme find

Nov 19, 2024. Herald Sun,

Feb 7, 2025. Faculty of Medicine Dentistry and Health Sciences media release. A/Prof Debnath Ghosal grant with The Faculty of Medicine, Dentistry and Health Sciences and the Indian Institute of Technology Kanpur -https://mdhs.unimelb.edu.au/news-and-events/funding-sparks-innovation-and-collaboration-between-researchers-from-melbourne-and-india.

March 25, 2025. - Snow Medical media release - Alisa Glukhova Snow Fellowship https://www.snowmedical.org.au/news/media-release-snow-fellowship-recipient-2025

March 25, 2025, Mirage News media release - Alisa Glukhova Snow Fellowship https://www.miragenews.com/new-snow-fellow-targets-cancer-at-its-roots-1431603/

March 31, 2025 . St Vincents Medical Research - Highlighting the research paper for members Marialena Georgopoulou, Kenta Ishii and Michael Parker. Ishii et al., FEBS J, 26 September 2024. https://doi.org/10.1111/febs.17277 https://www.svi.edu.au/news-events/bacterial-toxins-holes-in-cells/

April 4, 2025 - April 4, 2025 - Philanthropy News - media release Alisa Glukhova Snow Fellowship - https://www.philanthropy.org.au/news-and-stories/sector-news-wrap-up-2/

April 14, 2025. Australian Academy of Science Media Release– Dr. Sarah Piper and JG Russell Award. https://www.science.org.au/news-and-events/news-and-media-releases/five-emerging-scientists-receive-2025-j-g-russell-award

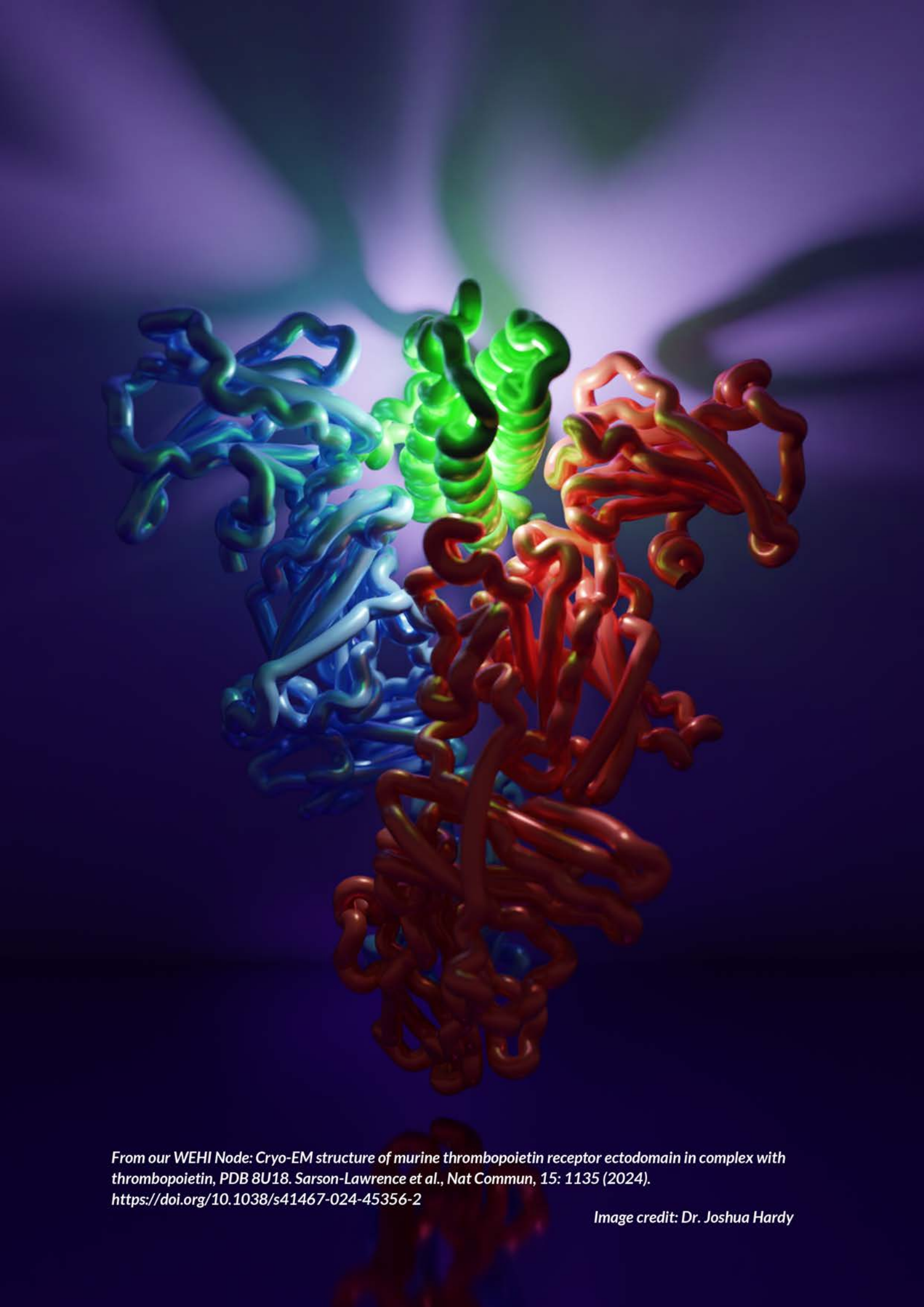
April 16, 2025. Monash University - Faculty of Pharmacy and Pharmaceutical Science Media release– Dr. Sarah Piper and JG Russell Award. https://www.monash.edu/pharm/about/news/news-listing/latest/mips-scientist-receives-australian-academy-of-science-award

Social Media

With the exodus of scientists away from Twitter, CCeMMP started two alternative social media accounts, Instagram and Bluesky as well as maintaining the Twitter and LinkedIn accounts. Follow us!

@ccemmp-outreach.bsky.social

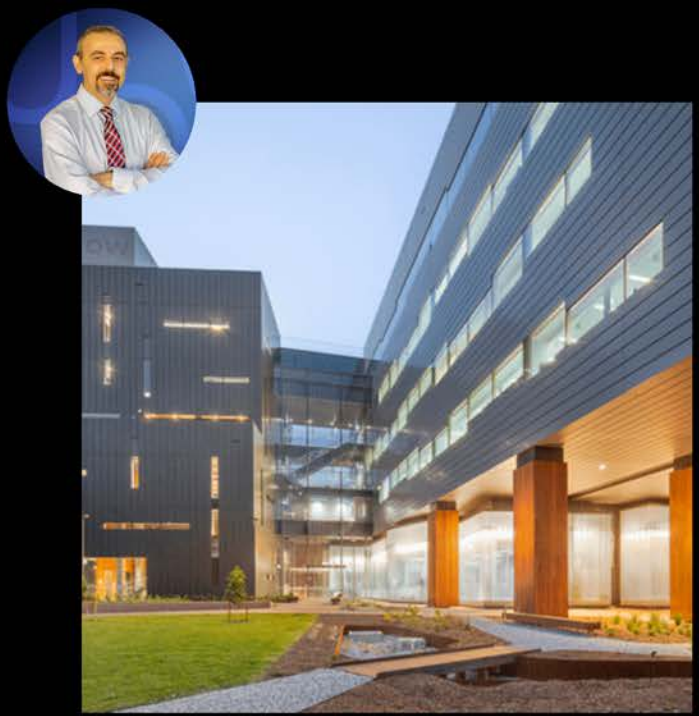
ccemmp_outreach

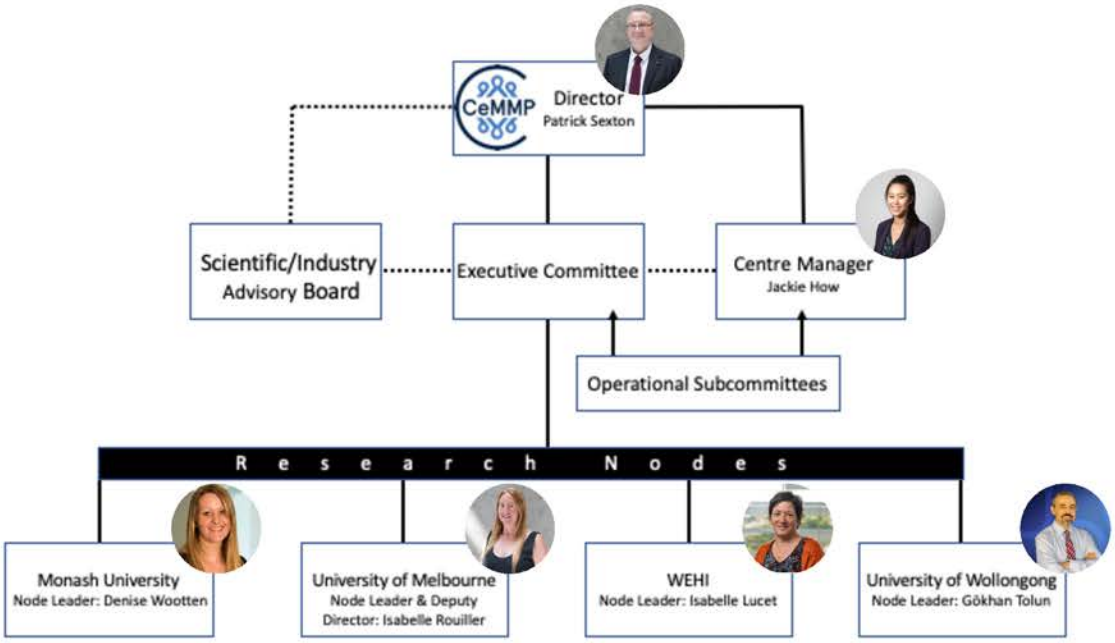


From our WEHI Node: Cryo-EM structure of murine thrombopoietin receptor ectodomain in complex with thrombopoietin, PDB 8U18. Sarson-Lawrence et al., Nat Commun, 15: 1135 (2024). https://doi.org/10.1038/s41467-024-45356-2

Image credit: Dr. Joshua Hardy

Governance





Changes to Governance

Centre Manager

The Centre Manager Dr. Jackie How commenced maternity leave November 2024. She will return November 2025. Dr Tracie Pierce has taken the role of Acting Centre Manager in her absence.

ICPD

ICPD Aidan Grosas took up a position as lecturer and group leader at the UoW Node. UoW Node is currently looking to replace the ICPD position.

Executive Committee

Ms. Minakshi Baruah (Monash Node) completed her twelve month term as ICHDR representative at the end of January 2024. Alok Pradhan was elected by a ballot of the current ICHDR cohort, as the new ICHDR representative for 2025.

Science & Industry Advisory Committee (SIAC) Review

The Centre is fortunate to have an expert team of academic and industry advisors: Lisa Dube (MTPConnect), Radostin Danev (University of Tokyo, Nellie Georgiou-Karistianis (Pro Vice Chancellor Research & Training, Monash University), Leigh Farrell (Adned), Anne-Laurre Puaux (Head Business Development, WEHI), Alastair Stewart (University of Melbourne and Director of the ARC ITTC for Personalised Therapeutics Technologies),Cathy Drinkwater (formerly Biocurate). The committee assists in ensuring that the Centre fulfils its key objectives. In-line with our goals of continued improvement, we asked members of the SIAC to review the operation, performance and strategic planning of the Centre on November 2024. This marked approximately 2 years since our last review. The committee was impressed by the number and quality of the manuscripts, as well as the extent of leveraging of new partnerships and income supporting translational impact. They also found that CCeMMP represented an outstanding return on investment. We are very grateful to all members of our SIAC for making time in their busy schedules to support the Centre.

Strategic Planning

As part of the CCeMMP Research Symposium, the Centre invited members and affiliates attending the meeting to join a strategic meeting to discuss our current position and plan for the future. As part of this, five ICHDRs presented on their projects to date; there were 52 attendees to this session. The strategic meeting took place after the student talks, 23 people joined in the discussion of where we are now and planning for the future.

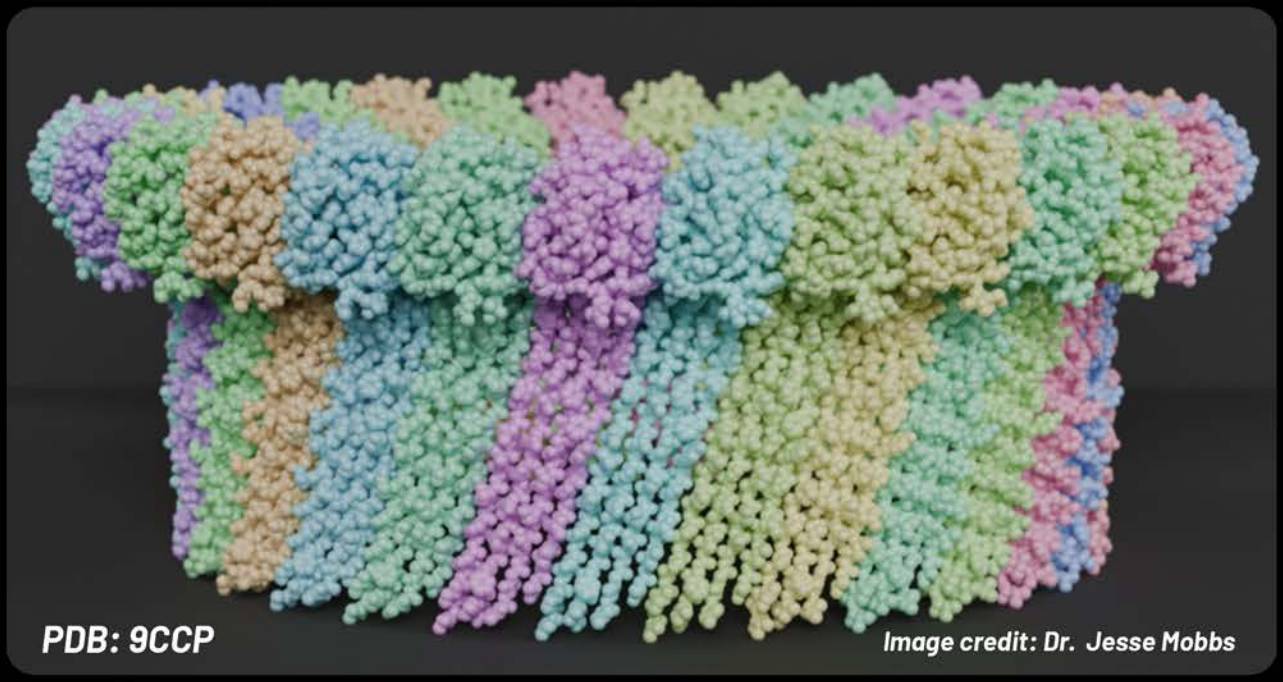
CCeMMP Executive (L to R): Prof. Denise Wootten, Prof. Patrick Sexton, Prof. Isabelle Rouiller, A/Prof. Gökhan Tolun, Prof. Isabelle Lucet and Dr. Jackie How .


ANDERS EARLY CAREER
AWARD WINNERS
AbCellera
Michael Healy
The University of Queensland
Brooke Hayes
Monash University
Wessel Burger


POSTER PRIZES
MANY THANKS TO ALL THE JUDGES & STUDENTS
BIOCHEMICAL JOURNAL


Biomolecular Complex Structures Demonstrate
How Cryo-EM Reveals Molecular Mechanisms

Performance



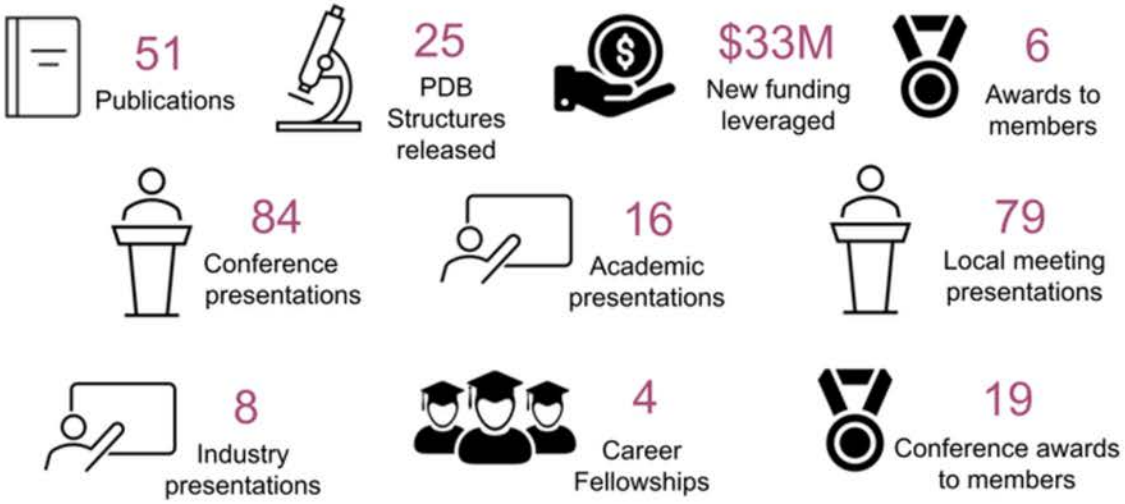
PDB: 9CCP

Image credit: Dr. Jesse Mobbs

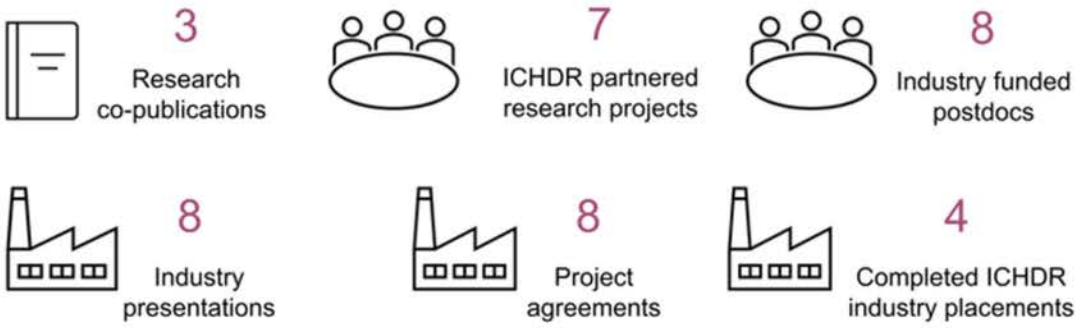
RELEASED	RELEASED	HOLD FOR
25	34	15
PDB STRUCTURES	EMD STRUCTURES	RELEASE

NEW	PUBLISHED	UPDATED
42	4	9
PUBLICATIONS	PREPRINTS	PUBLICATIONS

Key Performance Measures



Industry Related Performance Measures



Structures Published in Publicly Accessible Databases (PDB & EMD)

Structures have been published from all of our Nodes and also our external affiliates. Some structures were published through collaborations between nodes (Monash-WEHI); or between external affiliates (from multiple institutions) and UoW (VCCRI-UQ-USyd-UoW). Following is a list of all structures published and released in PDB and/or EMD. Visual images of these structures are found later in this report. There are a further 15 structures on hold for release.

PDB	EMD	PUBLISHED IN	STRUCTURES
25	34	10	15
STRUCTURES	STRUCTURES	MANUSCRIPTS	ON HOLD

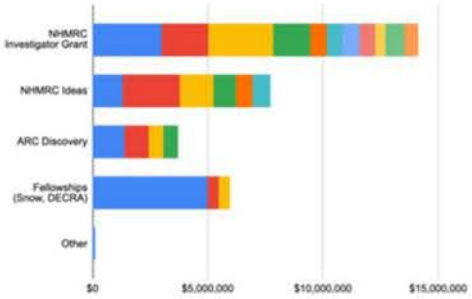
- Furlong et al., (2024) Biochim Biophys Acta Bioenerg, 1866: 149521-149521. https://doi.org/10.1016/j.bbabio.2024.149521
  - PDB:8U1H, EMD-41811, EMPIAR-12183 [Axle-less Bacillus sp. PS3 F1 ATPase mutant]
  - PDB:9AVJ, EMD-43903 [PS3 F1 ATPase Wild type]
- Johnson et al., (2024) Nat Commun, 15: 7066-7066. doi:10.1038/s41467-024-51159-2
  - EMD-42578 [Subtomogram average of the Metallosphaera javensis AS-7 Surface layer]
  - EMD-42579 [Subtomogram average of the the Metallosphaera javensis AS-7 primed nanotube]
- Bennetts, et al., (2024) Nat Commun, 15: 8418-8418. https://doi.org/10.1038/s41467-024-52776-7
  - PDB:9B73, EMD-44370 [ATP-bound human P2X1 receptor (desensitised)]
  - PDB:9B95, EMD-44299 [NF449-bound human P2X1 receptor (closed)]
- Burgess et al., (2025) Sci Adv, 11(9):eadq4187. doi: 10.1126/sciadv.adq4187
  - PDB:9BJZ, EMD-44638 [DDD-Ube2e2 complex]
- Harikumar et al., (2024) PLoS Biol, 22: e3002673-e3002673. https://doi.org/10.1371/journal.pbio.3002673
  - PDB:9BKJ, EMD-44642 [Cholecystokinin 1 receptor, Y140A mutant, Gq chimera (mGsqi) complex]
  - PDB:9BKK, EMD-44643 [Cholecystokinin 1 receptor, sterol 7M mutant, Gq chimera (mGsqi) complex]
- Cao et al., (2025) Nat Commun, 16: 3389. https://doi.org/10.1038/s41467-025-58680-y
  - PDB:9BLB, EMD-44652 [Human Calcitonin Receptor in Complex with Gs and Cagrilintide Backbone (non-acylated) in bypass conformation]
  - PDB:9BLC, EMD-44653 [Human Calcitonin Receptor in Complex with Gs and Cagrilintide Backbone (non-acylated) in CT-like conformation]
  - PDB:9BLW, EMD-44678 [Human amylin1 Receptor in complex with Gs and Cagrilintide backbone (non-acylated)]
  - PDB:9BP3, EMD-44760 [Human Amylin1 Receptor in complex with Gs and cagrilintide]
  - PDB:9BQ3, EMD-44796 [Human Amylin2 Receptor in Complex with Gs and Cagrilintide]
  - PDB:9BTW, EMD- 44898 [Human Amylin3 Receptor in complex with Gs and cagrilintide]
  - PDB:9BUB, EMD-44904 [Human calcitonin Receptor in complex with Gs and cagrilintide in the bypass conformation]
  - PDB:9BUC, EMD-44905 [Human calcitonin Receptor in complex with Gs and cagrilintide in the bypass conformation (repeat)]
  - PDB:9BUD, EMD-44906 [Human calcitonin Receptor in complex with Gs and cagrilintide in the CT-like conformation]
  - PDB:9BUE, EMD- 44907 [Human calcitonin Receptor in complex with Gs and cagrilintide in the CT-like conformation (repeat)]

- Johnstone et al., (2025) Sci Adv, 11:eadt2127. DOI:10.1126/sciadv.adt2127
  - PDB:9CCP, EMD-45451 [Cryo-EM structure of the EaCDCL pore]
  - PDB:9CCQ, EMD-45453 [Cryo-EM structure of the prepore-like EaCDCL short oligomer]
  - EMD-45448 [Double-stacked pore and prepore-like complex (C1 symmetry)]
  - EMD-45449 [Double-stacked pore and prepore-like complex (C30 symmetry)]
  - EMD-45450 [EaCDCL pore complex (C1 symmetry)]
  - EMD-45452 [Prepore-like EaCDCL short oligomer (C1 symmetry)]
  - EMD-45454 [EaCDCL pore complex, non-stacked control (C1)]
  - EMD-45455 [EaCDCL pore complex, non-stacked control (C30 symmetry)]
- Mazigi et al., (2025) Proc. Natl. Acad. Sci. U.S.A. 122(1): e2417544121-e2417544121. doi:10.1073/pnas.2417544121
  - EMD-46788 [VFLIP Spike trimer with 4C12-B12 FAB]
- Cary et al., (2025) Proc Natl Acad Sci USA, 122 (14): e2407574122. https://doi.org/10.1073/pnas.2407574122
  - PDB:9EBN, EMD-47882 [Peptide 1 (GLP-1 (Aib16, ACPC18)) bound to GLP-1R/Gs complex]
  - PDB:9EBO, EMD-47883 [Peptide 2 (GLP-1 (ACPC18)) bound to GLP-1R/Gs complex (conformer 1)]
  - PDB:9EBQ, EMD-47884 [Peptide 2 (GLP-1 (ACPC18)) bound to GLP-1R/Gs complex (conformer 2)]
- Callegari et al., (2025) Science, 388(6744):303-310. DOI: 10.1126/science.adu6445
  - PDB: 9EIH, EMD-48083 [PINK1 TOM complex]
  - PDB:9EII, EMD-48084 [PINK1 TOM complex, symmetry expanded]
  - 9EIJ, EMD-48085 [PINK1 TOM complex, extended TOM20 helix class]

  - PDB:8G32 [Pro-form of a CDCL short from E. anophelis] (X-ray crystallography)
  - PDB:8V5T [Alzheimers disease phospholipase D3] (X-ray crystallography)

Leveraged Research Funding

$32.7M
Leveraged funding:
Competitive



$12M
Leveraged funding:
Industry

novo nordisk®

+ local biotech

ARC	ARC	NHMRC	NHMRC
11	2	4	6
DISCOVERY	DECRA	IDEAS	INVESTIGATOR

Funding

Major Funding

ARC Discovery Project: Prof. Arthur Christopoulos (CIB), "Development of allosteric and bitopic ligands to tune receptor signalling", $1,053,670.
ARC Discovery Project: Prof. Arthur Christopoulos (CIB), "Understanding how adenosine regulates neural circuit signalling", $623,274.
ARC Discovery Project: Dr. Tracy Josephs (CIA); **Prof. Patrick Sexton** (CIB), "Dynamics of calcitonin family receptor activation", $636,811.
ARC Discovery Project: Dr. Jacob Lewis (CIA); **Dr. Lisanne Spenkelink** (CIB), "High-resolution imaging of mitochondrial DNA replication", $699,000.
ARC Discovery Project: Prof. Megan Maher (CIA), "A mechanistic exploration of fern proteins that target lepidopteran pests", $819,000.
ARC Discovery Project: Prof. Megan O'Mara (CID), "Precision receptor-specific miticides for safeguarding Australian bees ", $844,766.
ARC Discovery Project: Prof. Megan O'Mara (CIB), "Next generation engineered antiviral coatings", $591,594.
ARC Discovery Project: Prof. Michael Parker (CIA), "Deciding cell fate: the beta common receptor family", $755,000.
ARC Discovery Project: Prof. Patrick Sexton (CIA); **Dr. Matthew Belousoff** (CIB), "Interrogating GPCR dynamics through high-resolution, time-resolved cryo-EM", $1,396,173.
ARC Discovery Project: Dr. Shabih Shakeel (CIA), "How cells perform error-free repair of damaged DNA?", $691,000.
ARC Discovery Project: Dr. Alastair Stewart (CIA), "Understanding biological energy synthesis", $421,502.
Canterbury Medical Research Foundation: Dr. Kelsi Hall (PI), "Killing pathogenic bacteria by inhibiting TRAP transporters – a new drug discovery approach." $120,000.
DECRA (DE250101183): Dr. Brian Cary, "Leveraging electron microscopy to study receptor structure and function", $488,453.
DECRA (DE250100386): Dr. Sarah Piper, "Understanding structure, dynamics and function of receptor splice variants", $482,907.
NHMRC Ideas Grant (2038906) **Dr. Brian Cary** (CIB) "Impact of biased agonism at the GLP-1R in the treatment of obesity and type 2 diabetes", $2,488,624.
NHMRC Ideas Grant (2039377) **A/Prof. Karen Gregory** (CIA) "Dissecting the genetic diversity and therapeutic potential in targeting trace amine receptor 1 for psychiatric disorders", $1,446,409.
NHMRC Ideas Grant (2036811): **Prof. Megan Maher** (CIB), **Dr. Evelyne Deplazes** (CID), **Dr. Matthew Belousoff** (AI) "Harnessing structural insights into bacterial zinc efflux for new therapeutics", $1,297,682.
NHMRC Ideas Grant (2037809) **Prof. Renae Ryan** (CIA), **Dr. Yan Jiang** (CIC), "The twisted link between a dual function transporter and Episodic Ataxia", $987,264.
NHMRC Investigator Grant: (2042668) **Emerging Leadership 1 (EL1) Dr. Wessel Burger**, "Dissecting divergent pathway activation at Frizzled receptors", $ 688,405.
NHMRC Investigator Grant: (2042010) **Emerging Leadership 1 (EL1) Dr. Jianjun (Jason) Cao,** "Structural approaches to assist the development of selective antagonists of adrenomedullin receptors", $ 688,405.
NHMRC Investigator Grant: (2042847) **Leadership 3 (L3) Prof. Arthur Christopoulos,** " Allosteric modulation of muscarinic receptors for the treatment of neurocognitive deficits", $ 2,000,000.
NHMRC Investigator Grant: (2042090) **Leadership 3 (L3) Prof. Peter Czabotar** "Exploring Cell Death Signaling for Drug Target Discovery", $ 3,014,025.
NHMRC Investigator Grant: (20434072) **Emerging Leadership 2 (EL2) A/Prof. Alisa Glukhova** "Decoding the Mechanisms of Signal Propagation through the Wnt Signaling Pathway", $ 1,623,700.
NHMRC Investigator Grant: (2043281) **Leadership 1 (L1) A/Prof. David Thal** "Harnessing protein allostery to accelerate drug discovery",$ 2,818,905.

Quantum-Enabled Low-Field Magnetic Resonance Imaging for High-Performance Sport (2024-2027) through the Queensland Government Department of Environment, Science and Innovation Quantum 2032 Challenge Program: **Prof. Megan O'Mara**, this project aims to integrate innovative quantum technologies for low-field MRI to enhance imaging of the musculoskeletal system in Olympic and Paralympic athletes. This will build on previous advancements in portable and low-cost magnetic resonance imaging, $999,855.
Snow Fellowship: **A/Prof. Alisa Glukhova,** The Snow Fellowship, $5M AUD.

Small Grants (<$100,000)

Haibo Yu, **Aidan Grosas, Nicholas Dixon,** "A high-throughput computational pipeline for the development of experimentally testable inhibitors of efflux pumps relevant to antimicrobial resistance", 2024 Molecular Horizons Collaborative Grant.
Dr. Lou Fourriere-Chea, **Dr. Manasi Arcot Anil Kumar, Dr. Debnath Ghosal,** Prof. Paul Glesson."Ultrastructure of newly described dendritic golgi by electron cryotomography in human iPSC-derived neurons from healthy donors and Alzheimers patients" 2024 MDHS Early and Mid-Career Researcher Project Catalyst Grants, $24,975.70.
Dr. Natalie Diepenhorst: TIA Pipeline accelerator grant "Lead discovery for the orphan GPCR, GPR88", $30,000.

Travel Grants

- Lucy Fitschen: Congress bursary award (for travel and registration) for the joint congress of the 21st International Union of Pure and Applied Biophysics (IUPAB2024) and the 62nd Biophysics Society of Japan, Kyoto, Japan.
- Monica Suehrio: Student registration award to attend the International Mass Spectrometry Conference, August 2024.
- Dr. Winnie Tan: WEHI Postdoctoral Association Professional Award to attend the EMBL Transcription and Chromatin Conference and visit the EMBL Imaging Centre, Heidelberg, Germany to learn CLEM and FIB-milling from the lab of Dr. Julia Mahamid.

Fellowships

- Dr. Brian Cary: DECRA Fellowship.
- Prof. Arthur Christopoulos: 2024 Fellow of the American Society for Pharmacology and Experimental Therapeutics (ASPET).
- A/Prof. Alisa Glukhova: The Snow Fellowship.
- Dr. Sarah Piper: DECRA Fellowship.


Dr. Brian Cary


Prof. Arthur Christopoulos


A/Prof. Alisa Glukhova


Dr. Sarah Piper

Awards

- **Dr. Jason Cao: Mollie Holman Medal** for best Doctoral Thesis (2023), Faculty of Pharmacy and Pharmaceutical Sciences, Monash University.
- **Prof. Chris Langmead and Dr. Greg Stewart**: **Vice-Chancellor's Excellence Awards**, Monash University (Award for Excellence in Research Enterprise and/or Commercialisation).
- **Prof. Chris Langmead and Dr. Greg Stewart: Faculty Award for Research Enterprise** (Faculty of Pharmacy and Pharmaceutical Sciences, Faculty Awards).
- **Dr. Sarah Piper: JG Russell Award** from the Australian Academy of Science.
- **Prof. Denise Wootten**: **Vice-Chancellor's Excellence Awards**, Monash University (Researcher of the Year).
- **Prof. Denise Wootten**: **Faculty Research Award** (Faculty of Pharmacy and Pharmaceutical Sciences, Faculty Awards).

Dr. Jason Cao

Prof. Chris Langmead

Dr. Greg Stewart

Dr. Sarah Piper

Prof. DeniseWootten

Conference Awards

- **Dr. Wessel Burger: Anders Young Investigator Award**, Lorne Proteins, 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.
- **Prof. Arthur Christopoulos**: **ASCEPT Lecturer Award**, ASCEPT, APFF, APSA Joint Congress, 1-4 Dec 2024, Melbourne, VIC.
- **Somavally Dalvi: First runner up for the oral presentation prize**. Mobile Genetic Element Meeting 2025 (Australian Society for Microbiology), 17 - 18 Feb 2025, LaTrobe University, Melbourne City Campus, VIC.
- **Somavally Dalvi: Student speaker prize, best talk**. Phage bites Symposium 2025 (Australia Society for Microbiology), April 1 2025, online via zoom.
- **Thomas Ficker: Best Poster Award,** BioMolecular Horizons 2024, 22-26 September 2024, Melbourne, Australia.

Dr. Wessel Burger

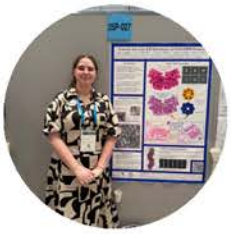
Prof. Arthur Christopoulos

Somavally Dalvi

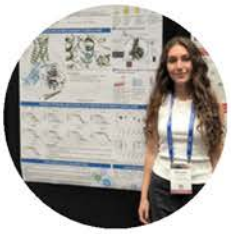
Thomas Ficker

- **Lucy Fitschen: Sydney Protein Group Thompson Prize,** The 33rd annual Sydney Protein Group Thompson Prize, 22 Nov 2024.

- **Lucy Fitschen:** Winner **Student and Early Career Researcher Poster Award,** Joint congress of the 21st International Union of Pure and Applied Biophysics (IUPAB2024) and the 62nd Biophysics Society of Japan, 24-28 June 2024, Kyoto, Japan.
- **Dr. Brooke Hayes: Anders Young Investigator Award**, Lorne Proteins, 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.
- **Michaela Kaoullas: Best Oral Presentation**, ASCEPT Drug Discovery Special Interest Group Student & ECR Symposium, 11th September 2024, virtual.
- **Michaela Kaoullas: Winner poster prize**, Monash Structural Biology Symposium, 5 July 2024, Monash University, Clayton VIC.
- **Michaela Kaoullas: The ASCEPT Neville Percy Prize**, ASCEPT, APFF, APSA Joint Congress, 1-4 Dec 2024, Melbourne, VIC.
- **Michaela Kaoullas: Neuropharmacology SIG Prize**, ASCEPT, APFF, APSA Joint Congress, 1-4 Dec 2024, Melbourne, VIC.
- **Dr. Jesse Mobbs: ECR Award, DDB Scientific Symposium,** 18 July 2024, Monash University, Parkville, VIC.
- **Emily Park: Poster prize.** 22nd Melbourne Protein Group Student Symposium, 11 July 2024, Walter & Eliza Hall Institute of Medical Research, Parkville, VIC.
- **Emily Park**: **Poster prize.** WEHI Student & Postdoc Symposium, November 25-26 2024, Parkville, VIC.


Lucy Fitschen


Dr. Brooke Hayes


Michaela Kaoullas


Dr. Jesse Mobbs


Emily Park

- **Dr. Winnie Tan: Anders Young Investigator Award**, Lorne Proteins, 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.
- **Shubha Udupa:** Winner, **best student poster**. The 10th International Tomography Congress, Tomo10, 28-30 January, 2025, Parkville, Australia.
- **Prof. Denise Wootten: People's Choice Award**, DDB Scientific Symposium 18 July 2024, Monash University Parkville, VIC.
- **Dr. Cindy Zhang: ASCEPT Bellberry New Investigator Award,** ASCEPT, APFF, APSA Joint Congress, 1-4 Dec 2024, Melbourne, VIC.


Dr. Winnie Tan


Shubha Udupa (with Dr. Sepideh Valimehr)


Prof. Denise Wootten


Dr. Xin (Cindy) Zhang

Other Achievements

- **Prof. Patrick Sexton and Prof. Arthur Christopoulos** have been included in the list of the world's most influential researchers as 2024 **Clarivate Analytics Highly Cited Researchers** in the category 'Pharmacology & Toxicology'.

- **MC Newton-Vesty** 2025 - **Conferred PhD** - Understanding selective bacterial nutrient uptake through structural and functional analysis, University of Canterbury

- "In Bloom", **Dr. Sarah Piper's** image was used for the NHMRC cover art for their Annual report 2024

Of the world's population of scientists and social scientists,

HIGHLY CITED RESEARCHERS ARE 1 IN 1,000

https://clarivate.com/highly-cited-researchers/

Academic Promotions

- Winnie Tan promoted to Level B.
- Isabelle Rouiller promoted to Level E.
- David Thal promoted to Level D.
- Celine Valant promoted to Level D.

Dr. Winnie Tan

A/Profs. Celine Valant & David Thal

Prof. Isabelle Rouiller

Conference Presentations

International Conference Presentations (Invited Talks)

Prof. Arthur Christopoulos: **Keynote** speaker. Hallmarks of GPCR allostery:structure, function and beyond. 9th European Congress of Pharmacology, EPhar 2024, 23-26 June 2024, Athens, Greece.

Prof. Patrick Sexton: **Keynote** speaker. Efficacy and biased agonism at the Class B1 glucagon-like peptide-1 (GLP-1) GPCR.n 9th European Congress of Pharmacology, EPhar 2024, 23-26 June 2024, Athens, Greece.

Prof. Patrick Sexton: **Keynote** speaker. Understanding the structural basis for selective and non-selective amylin and calcitonin receptor agonists. 9th Royal Society of Chemistry-Biological and Medicinal Chemistry Sector Symposium on GPCRs in Medicinal Chemistry, 2-4 Oct 2024, Verona, Italy.

Prof. Brett Collins: Structure of the endosomal Commander complex mutated in Ritscher-Schinzel syndrome: combining crystallography, cryoEM and AlphaFold2. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

Dr. Evelyne Deplazes: Understanding sterol-selectivity in sponge-like aggregates of the antifungal drug amphotericin B in physiologically relevant conditions. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

A/Prof. Debnath Ghosal: Electron cryotomography of EnvB phage infection reveals signatures of eukaryotic viral replication. 10th International Congress on Electron Tomography, 28-30 Jan 2025, Melbourne, Australia.

A/Prof. Alisa Glukhova: Using cryo-electron microscopy to understand the biology and drug binding of the wnt signalling pathway. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

Dr. Rhys Grinter: Living on thin air: the structural basis of atmospheric hydrogen oxidation. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

Dr. Yan Jiang: Structures of borate transporter AtBor1 of the SLC4 family reveal the mechanisms of auto-inhibition and transport. 13th Asia Pacific Microscopy Congress 2025, 2-7 Feb 2025, Brisbane, Australia.

Prof. Megan O'Mara: Computational lipidomics of metastatic prostate cancers: lipidome changes, altered membrane properties and chemotherapy resistance. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

Dr. Sarah Piper: Seeing is believing: visualising structures and dynamics of membrane receptors in 3D animations. 10th International Congress on Electron Tomography, 28-30 Jan 2025, Melbourne, Australia.

Prof. Isabelle Rouiller: Characterizing the conformational landscape of the hexameric VCP complex from 2D cryo-EM images using molecular dynamics simulation. Biophysical Society Thematic Meetings, Emerging Theoretical Approaches to Compliment Single-Particle Cryo-Electron Microscopy, 21-25 Oct 2024, Trieste, Italy.

Prof. Patrick Sexton: Molecular insights into GLP-1 receptor function. World Life Science Conference, WLSC2024, 19-21 Oct 2024, Boao, China.

Prof. Patrick Sexton: Structural and pharmacological insights in targeting class B1 GPCRs for metabolic diseases. Molecular Pharmacology, Gordon Research Conference, 16-21 Feb 2025, Ventura Beach, CA, USA.

Dr. Alastair Stewart: E. coli ATP synthase after the addition of ATP or ADP. 21st International Union of Pure and Applied Biophysics (IUPAB 2024), 24-28 June 2024, Kyoto, Japan.

Dr. Alastair Stewart: Visualizing inhibition and cooperativity in ATP synthase. 22nd European Bioenergetics Conference (EBEC 2024), 26-31 Aug 2024, Innsbruck, Austria.

Prof. Denise Wootten: Structural insights into targeting class B1 GPCRs for metabolic diseases. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

Workshop: Protein cryoEM. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia. Chairs: Prof. Eric Hanssen & Dr. Sepideh Valimehr. Speakers: Dr. Sepideh Valimehr: "Introduction to the cryoEM"; Dr. Manasi Arcot Anil Kumar: "Subtomogram Averaging"; A/Prof. Gökhan Tolun: "How cryo-EM reveals molecular mechanisms: a technical dive. Helical or not helical? That is the question!".

International Conference Presentations (Selected Oral Presentations)

Dr. Joseph Brock: High-throughput optimisation of protein secretion in yeast via an engineered biosensor. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

Dr. Hamish Brown: Montage cryo-tomography with square and rectangular beams. 10th International Congress on Electron Tomography, 28-30 Jan 2025, Melbourne, Australia.

Dr. Aidan Grosas: Using cryo-EM to elucidate the structural implications of post-translational modifications on alpha-synuclein amyloid fibrils. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

Ashleigh Kropp: Quinone extraction drives atmospheric carbon monoxide in bacteria. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

Dr. Manasi Arcot Anil Kumar: Visualization of host pathogen interactions using electron cryotomography. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

Prof. Trevor Lithgow: Ethical bioprospecting for phages across Australian landscapes. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

Bindusmita Paul: Structural basis of biofilm formation by the oral pathogen Treponema denticola. 10th International Congress on Electron Tomography, 28-30 Jan 2025, Melbourne, Australia.

Prof. Isabelle Rouiller: Controlling a master regulator: elucidating the molecular mechanisms regulating the activity of the aaa atpase p97/vcp. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

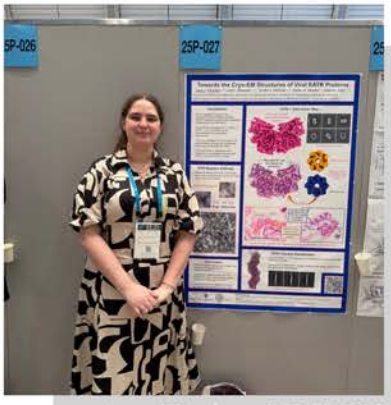
A/Prof. Shabih Shakeel: Molecular basis of epigenetic silencing by human MORC2. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

Doulin Shepherd: Investigating the molecular basis of effector delivery through the bacterial Type IV secretion system. 10th International Congress on Electron Tomography, 28-30 Jan 2025, Melbourne, Australia.

Dr. Winnie Tan: MORC2 is a phosphorylation-dependent DNA compaction machine. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

A/Prof. Gökhan Tolun: Biomolecular complex structures demonstrate how cryo-EM reveals molecular mechanisms Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

International Conference Presentation (Posters)



Lucy Fitschen, IUPAB 2024

Somavally Dalvi: Crossing the barrier: Understanding the life cycle of membrane-containing phages at molecular resolution. The 10th International Tomography Congress, 28-30 Jan 2025, Parkville, Australia.

Thomas Ficker*: 'Towards the structure of amyloid fibrils formed by the Human Glucagon-Like-Peptide 1 (hGLP-1)'. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia. ***Best Poster Award***

Lucy Fitschen: Towards the Cryo-EM Structures of Viral Annealase Proteins. 21st International Union of Pure and Applied Biophysics (IUPAB 2024 satellite) Eve Fest., 23 June 2024, Kyoto, Japan.

Lucy Fitschen*: Towards the Cryo-EM Structures of Viral Annealase Proteins" 21st International Union of Pure and Applied Biophysics (IUPAB 2024), 24-28 June 2024, Kyoto, Japan. ***Student & ECR Poster Award***

Lucy Fitschen: Towards the Cryo-EM Structures of Viral EATR Proteins. BioMolecular Horizons 2024, 22-25 Sept 2024, Melbourne, Australia.

Lucy Fitschen, IUPAB 2024

Dr. Matthew Johnson: Characterisation of microbial dark matter by electron cryo-tomography. The 10th International Tomography Congress, 28-30 Jan 2025, Parkville, Australia.

Inamur Rahman: Destroying the Human Immunodeficiency Virus before infection. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

Monica Suehiro: Identifying TDP-43's mitochondrial import pathway in ALS patient iPSCs-derived motor neurons. International Mass Spectrometry Conference, 17-23 Aug 2024, Melbourne, Australia.

Dr. Winnie Tan: MORC2 is a phosphorylation-dependent DNA compaction machine. EMBL Transcription and Chromatin conference, 24-27 Aug 2024, Heidelberg, Germany.

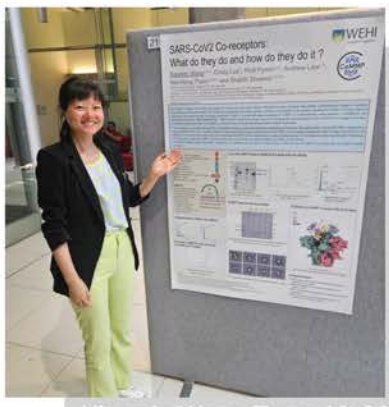
A/Prof. Gökhan Tolun: Cryo-EM structure of Salmonella Bacteriophage P22 annealase ERF reveals mechanistic details of SSA DNA recombination. Viruses of Microbes 2024, 15-19 July 2024, Cairns, Australia.

Shubha Udupa*: Visualizing the assembly and disassembly dynamics of the bacterial conjugation machinery. The 10th International Tomography Congress, 28-30 Jan 2025, Parkville, Australia. ***Winner, best student poster***

Dr. Sepideh Valimehr: Structural studies of the cross-link mutant, ABC transporter BmrA by cryo electron microscopy. International European Microscopy Congress (EMC24), 25-30 Aug 2024, Copenhagen, Denmark.

Dr. Sepideh Valimehr: Characterisation of the FAM171 neuronal receptors. Biomolecular Horizons, 22-26 Sept 2024, Melbourne, Australia.

Xiaomin Wang: SARS-CoV-2 co-receptors: What they do and how they do it? The 10th International Tomography Congress (Tomo10), 28-30 Jan 2025, Parkville, Australia.



Xiaomin Wang, Tomo 10, 2025

National Conference Presentation (Invited Talks)

Prof. Arthur Christopoulos*: **ASCEPT Lecturer.** Message in a model: GPCR allostery from theory to practice ASCEPT, APFF, APSA Joint Congress, 1-4 Dec 2024, Melbourne, VIC. ***ASCEPT Lecturer Award***

Dr. Wessel Burger* Dissecting GPCR function through nanodiscs; structural and pharmacological approaches. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC. ***Anders Award***

Prof. Renwick Dobson: TRAPped in an elevator. Crystal35 Conference, 27-29 Oct 2024, Perth, WA.

Dr. Brooke Hayes*: Invited talk Structural basis of toxin delivery by the Type VI Secretion System. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC. ***Anders Award***

Dr. Winnie Tan*: Multi-scale insights into the functions of a chromatin remodeller. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC. *** Anders Award***

National Conference Presentation (Selected Oral Presentation)

A/Prof. Alisa Glukhova, Lorne Proteins 2025

Dr. Wessel Burger: An intracellular lipid pocket at Frizzled receptors regulates transducer activity. ASCEPT, APFF, APSA Joint Congress, 1-4 Dec 2024, Melbourne, VIC.

A/Prof. Alisa Glukhova: (Sparrow session). Using cryo-electron microscopy to understand the biology and drug binding of the wnt signalling pathway. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

Dr. Aidan Grosas: Exploring the polymorphic structural landscape of alpha-synuclein amyloid fibrils using cryo-EM. East Coast Protein Meeting, 17-19 July 2024, Opal Cove Resort, Coffs Harbour, NSW.

Dr. Benjamin Gully: Uncovering the molecular basis of γδ T cell activation. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

Dr. Jackie How: Birds of a Feather (BoF) Session: E-notebooks and digital note taking for research - approaches and best practices , eResearch Australasia, 2024 Conference, 28 Oct-1 Nov 2024, Albert Park, VIC.

Dr. Yan Jiang: Structural Insights into SLC4 Transporters: Mechanisms of Activity Regulation and Substrate Transport. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

Dr. Kelsi Hall: (ANSTO Light-ning Talks). A conserved second-sphere residue in lytic polysaccharide monooxygenases controls copper-site reactivity. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.


Dr. Alice Shin, Lorne Proteins 2025

Prof. Megan Maher: (Sparrow session). Insecticidal proteins from ferns resemble Bacillus thuringiensis toxins. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

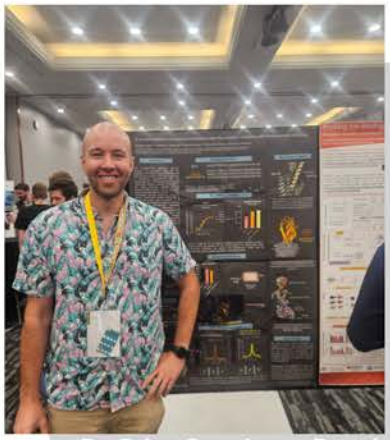
A/Prof. Gökhan Tolun, Lorne Proteins 2025

Dr. Alice Shin: (ANSTO Light-ning Talks). Structure, dynamics and evolution of the Candida albicans multi-drug resistance ABC transporter CDR1. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

A/Prof Gökhan Tolun: (ANSTO Light-ning Talks). How cryo-EM structures reveal molecular mechanisms of biomolecular complexes. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

National Conference Presentation (Posters)

Dr. Brian Cary: Prolonged signaling of backbone-modified glucagon-like peptide-1 analogues with diverse receptor trafficking. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.



Dr. Brian Cary, Lorne Proteins 2025

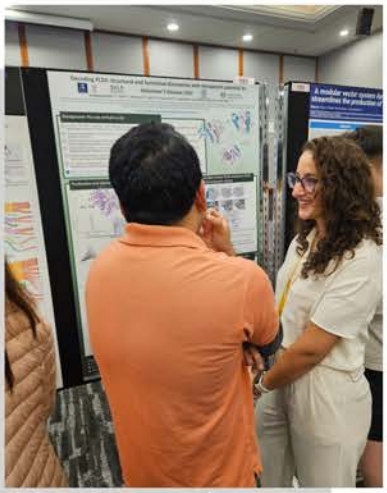
Lyn Deng: Uncovering the differential function and expression of DCLK1 isoforms in aggressive cancers. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

Sneha Desa: Investigating the structure of TolC-like proteins in Gram positive bacteria. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

Daniel Fox: AI-designed protein inhibitors can block heme uptake and inhibit growth of pathogenic E. coli . 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

Marialena Georgopoulou: Decoding PLD3: Structural and functional discoveries with therapeutic potential for Alzheimer's Disease. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

A/Prof. Karen Gregory - Hellyer et al., Dissecting the role of differential phosphorylation in mGlu5 signalling and regulation. ASCEPT, APFF, APSA Joint Congress, 1-4 Dec 2024, Melbourne, VIC.



Marialena Georgopoulou, Lorne Proteins 2025

A/Prof. Karen Gregory - Kos et al., Exploring sex differences of metabotropic glutamate receptor 5 (mGlu 5) negative allosteric modulators (NAMs). ASCEPT, APFP, APSA Joint Congress, 1-4 Dec 2024, Melbourne, VIC.

Dr. Aidan Grosas: Towards the structure of amyloid fibrils formed by the human Glucagon-Like-Peptide 1 (hGLP-1) . 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

Dr. Joshua Hardy: TEMPO: Training in Electron Microscopy Processing and Optics . 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

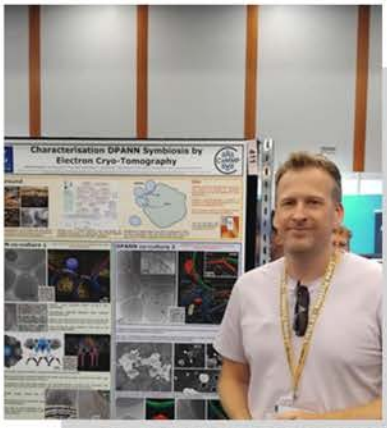
Dr. Matthew Johnson: Characterisation DPANN symbiosis by electron cryo-tomography. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

Riya Joseph: A structural perspective on pore formation and regulation of Bacteroides fragilis toxins. 50th Lorne Conference on Protein Structure and Function, 9-13 Feb 2025, Lorne, VIC.

Ashleigh Kropp: Respiratory chain coupling proteins: A novel and widespread mechanism for microbial quinone reduction. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

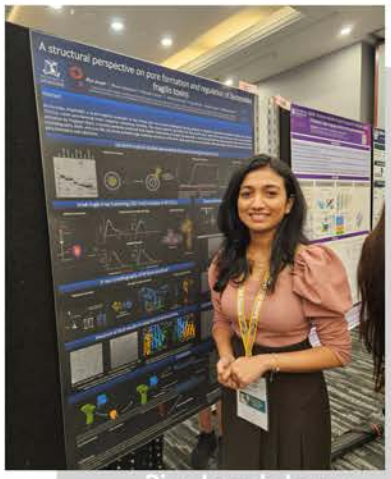
Dr. Yan Li: Structural Insights into A Novel Chi-like Phage Targeting Multiple Klebsiella spp. 50th Lorne Conference on Protein Structure and Function, 9-13 Feb 2025, Lorne, VIC.

Dr. James Lingford: [NiFe]-hydrogenases in Asgard archaea resemble Complex I. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.



Dr. Matthew Johnson, Lorne Proteins 2025

Dr. Shadi Maghool: Structural basis for ether-bridge formation by divergent alpha-ketoglutarate dependent non-heme iron enzymes involved in antibiotic biosynthesis. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, Victoria.



Riya Joseph, Lorne Proteins 2025

Dr. Jesse Mobbs: Structural investigation of allosteric modulation of the delta opioid receptor. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

Sarah Mueller: Elucidating the structural dynamics of the nickel transporter Ynt and its implications for urease activity in Proteus mirabilis. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

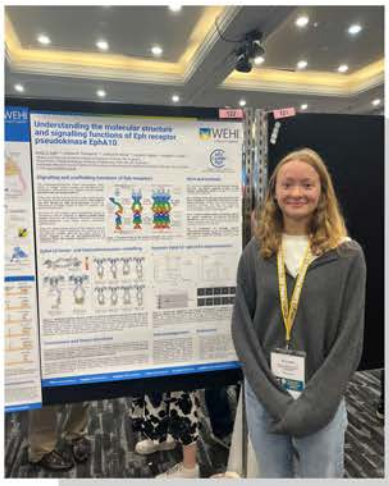
Fabian Munder: High-affinity PQQ import is widespread in gram-negative bacteria. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

Isa Nuryana: Exploring uncharacterised flagellar proteins in the S-layer containing Gram-positive bacterium, Bacillus solimangrovi. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

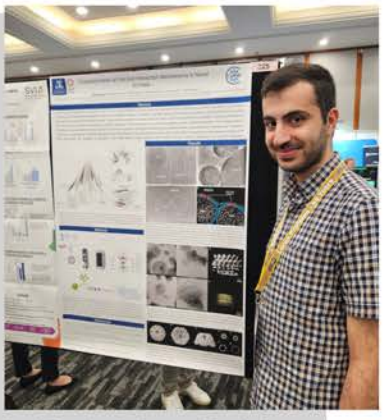
Emily Park: Understanding the molecular structure and signalling functions of Eph receptor pseudokinase EphA10. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

Dr. Sarah Piper: Visualising structural biology data of Class B1 GPCRs in 3D animations. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

Milad Reyhni*: Characterization of cell-cell interaction mechanisms in novel archaea. 50th Lorne Conference on Protein Structure & Function, Lorne Proteins 2025, 9-13 Feb 2025, Lorne, VIC. ***Student Poster Prize***



Emily Park, Lorne Proteins 2025



Milad Reyhni, Lorne Proteins 2025

Dr. Christopher Stubenrauch: How is the bacterial flagellar secreted through the Gram-positive S-layer? 50th Lorne Conference on Protein Structure & Function, Lorne Proteins 2025, 9-13 Feb 2025, Lorne, VIC.

A/Prof. David Thal: A structural basis of allosteric ligand selectivity at GPCRs. 50th Lorne Conference on Protein Structure & Function, 9-13 Feb 2025, Lorne, VIC.

Dr. Luca Troman: Single particle cryo-EM analysis of spirochete periplasmic flagella. 50th Lorne Conference on Protein Structure and Function, 9-13 Feb 2025, Lorne, VIC.

Academic Presentations

Academic Seminars (International)

Prof. Peter Czabotar: Identifying molecular targets to manipulate apoptosis through BAK and VDAC2. International Cell Death Seminar (online), 5 June 2024.

A/Prof. Karen Gregory: Enhancing translatability of preclinical drug discovery models for dementia and associated neuropsychiatric symptoms. PharmAlliance Week (June 16-20, 2024), UNC Chapel Hill, North Carolina, USA .

A/Prof. Karen Gregory: Fine-tuning glutamate receptor activity to enable drug discovery for psychiatric and neurodegenerative disorders, UCL - School of Pharmacy departmental seminar, London UK, 13 Dec, 2024.

Academic Seminars

Dr. Brian Cary: "Prolonged Signaling of Backbone-Modified Glucagon-like Peptide-1 Analogues with Diverse Receptor Trafficking." CCeMMP Seminar Series, April 8, 2025, online.

Dr Natalie Diepenhorst: "CXCR3 antagonists to treat autoimmune disorders". MIPS Seminar - Meet the emerging leaders, Monash University, Parkville, 23 Oct, 2024.

Dr. Rhys Grinter: "Using AI to design proteins that inhibit bacterial heme-piracy".Twist Bioscience webinar, 22 Jan, 2025, online.

Dr. Rhys Grinter:"Using AI to design proteins that inhibit bacterial heme-piracy". oNKo Innate seminar series, 13 Dec 2024, Melbourne.

Dr. Matthew Johnson: "Characterisation of microbial dark matter by electron cryo-tomography." Molecular Horizons seminar, Molecular Horizons, University of Wollongong, 29 Aug, 2024 ,online.

Prof. Meghan O'Mara: CCeMMP Seminar Series. "Exploiting protein/lipid interactions for modulators of chronic pain", Monash University, Parkville, 17 Sept 2024, online.

Dr. Sarah Piper: "Using Blender to visualise Class B1 GPCR structural data in 3D animations."GPCR forum (ECI talk), 7th Nov, 2024, zoominar.

Dr. Tracy Putoczki: "Untangling the complex conversations in the tumour microenvironment." Monash BDI Seminar, 18 June 2024.

Ada Quinn: "The regulatory handshake between membrane lipids and neurotransmitter transporters: Computational studies towards novel analgesics". UQ QBI Early Career Research Seminar Series, 17 May 2024.

Ada Quinn: "The regulatory handshake between membrane lipids and neurotransmitter transporters: Computational studies towards novel analgesics." UQ Centre for Theoretical and Computational Molecular Science Seminar Series, 21 June 2024.

Isabella Russell: "Investigation Constitutive Activity in Class A and B1 GPCRs", PhD exit seminar, Mar 26, 2025, Monash University, Parkville.

Dr. Winnie Tan: "MORC2 phosphorylation fine tunes its DNA compaction activity". Department of Biochemistry and Pharmacology Research Fellows Seminar, bio21, 23 June 2024.

Dr. Winnie Tan: Career pathways in academia. St Vincent's Institute of Medical Research, Aug, 2024.

Local Meeting Presentation (Invited Talks)

Prof. Denise Wootten Structural Biology Symposium, July 2024

Prof: Renae Ryan: **Keynote speaker.** The twisted link between a dual function glutamate transporter and Episodic Ataxia. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Prof. Denise Wootten: **Keynote speaker.** Harnessing CryoEM to probe the structure and function of Class B1 G protein coupled receptors. Structural Biology Symposium, 5 July 2024, Monash University, Clayton, VIC.

Dr. Natalie Diepenhorst: CXCR3 antagonists to treat autoimmune disorders. DDB Scientific Symposium, 18 July 2024, Monash University, Parkville, VIC.

Dr. Aidan Grosas: The structural elucidation of amyloid fibrils in health and disease using cryo-EM. 27 June 2024, Molecular Horizons Symposium, Wollongong, NSW.

MariaKatarina Lambourne: Structural studies of potassium ion channels implicated in epilepsy", CCeMMP Strategic Meeting, 12 Nov 2024, Parkville, VIC.

Prof. Trevor Lithgow: Surveying membrane landscapes for a new look at the bacterial cell surface. Structural Biology Symposium, 5 July 2024, Monash University, Clayton, VIC.

Dr. Jesse Mobbs*: Structural investigation of allosteric modulation of the delta opioid receptor. DDB Scientific Symposium, 18 July 2024, Monash University, Parkville, VIC. ***Best ECR presentation.***

Prof. Megan O'Mara: Simulation Toolkits to resolve biological noise. QUBIC ARC CoE symposium, 8-11 Dec 2024, Noosa, QLD.

Bhavika Rana: Structural and pharmacological validation of allosteric sites at the M5 mAChR. CCeMMP Strategic Meeting, 12 Nov 2024, Parkville, VIC.

Prof. Denise Wootten*: Biased GLP-1 agonism at the GLP-1 receptor, from structure to animal models of disease. DDB Scientific Symposium, 18 July 2024, Monash University, Parkville, VIC. ***People's choice award***

Dr. Xin (Cindy) Zhang: Structural insights into allosteric modulation of a class B GPCR. DDB Scientific Symposium, 18 July 2024, Monash University, Parkville, VIC.

Local Meeting Presentation (Selected Talks)

Dr. Felix Bennetts: Decoding the P2X1 receptor structural insights and drug development. CCeMMP Research Symposium, 11-12 Nov, 2024, Parkville, VIC.

Somavally Dalvi*: Crossing the barrier: Understanding the life cycle of membrane-containing phages at molecular resolution. Mobile Genetic Element Meeting 2025 (Australian Society for Microbiology), 17 - 18 Feb 2025, LaTrobe University, Melbourne City Campus, VIC. ***First runner up for the oral presentation prize.***

Somavally Dalvi*:Crossing the barrier: Understanding the life cycle of membrane-containing phages at molecular resolution. Phage bites Symposium 2025 (Australia Society for Microbiology), April 1 2025, online via zoom . ***Student speaker prize, best talk.***

Lucy Fitschen*: Cryo-EM Structures of the Herpes Simplex Virus 1 Annealase Protein ICP8" . Sydney Protein Group Thompson Prize, 22 Nov, 2024, University of Technology Sydney, Sydney, NSW. ****Winner of the Thompson Prize by the Sydney Protein Group.***

Dr. Rhys Grinter: Inhibiting bacteria heme-piracy using de novo designed proteins. CCeMMP Research Symposium, 11-12 Nov, 2024, Parkville, VIC.

Dr. Matthew Johnson:. Characterisation of microbial dark matter by electron cryo-tomography. CCeMMP Research Symposium, 11-12 Nov, 2024, Parkville, VIC.

Michaela Kaoullas*: Structural insights into positive allosteric modulation at the M4 muscarinic acetylcholine receptor. ASCEPT Drug Discovery Special Interest Group Student & ECR Symposium, 11th Sept 2024, virtual. ****Best Oral Presentation***

Fabian Munder: High affinity PQQ import is widespread in gram-negative bacteria. CCeMMP Research Symposium, 11-12 Nov, 2024, Parkville, VIC.

Dr. Sarah Piper: Visualising structural biology data of Class B1 GPCRs in 3D animations. CCeMMP Research Symposium, 11-12 Nov, 2024, Parkville, VIC.

Minakshi Baruah, Graduate Research Symposium, Nov 2024

Isabella Russell: Stabilisation Methods for structural determination of ligand free parathyroid receptor 1 in complex with Gs protein. CCeMMP Research Symposium, 11-12 Nov, 2024, Parkville, VIC.

Dr. Winnie Tan: MORC2 is a phosphorylation-dependent DNA compaction machine. CCeMMP Research Symposium, 11-12 Nov, 2024, Parkville, VIC.

Dr. Hongyi Xu: Electron crystallography methods for protein structure determination. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Mahmuda Yeasmin: Structural basis of the clinical candidates at muscarinic acetylcholine receptors. CCeMMP Research Symposium, 11-12 Nov, 2024, Parkville, VIC.

Yiling Yu: Identification of a high affinity antagonistic nanobody against a challenging GPCR target. CCeMMP Research Symposium, 11-12 Nov, 2024, Parkville, VIC.

Local Meeting Presentation (Oral Presentations)

Minakshi Baruah: DDB Student Symposium. Revealing ten hidden faces of GPCRs: Mapping inactive states. 30 Oct 2024, Monash University, Parkville, VIC.

Minakshi Baruah: Revealing the hidden face of GPCRs- mapping inactive states. 19th Annual HDR Symposium, 6th Nov 2024, Monash University, Parkville, VIC.

Riya Joseph: A structural perspective on pore formation and regulation of Bacteroides fragilis toxins. ANSTO Australian Synchrotron User Meeting (UM2024), 27-29 November, 2024, Australian Synchrotron, Clayton, VIC.

Michaela Kaoullas: DDB Student Symposium. Analytical and structural neuropharmacology structural insights into positive allosteric modulation at the M4 muscarinic acetylcholine receptor. 30 Oct 2024, Monash University, Parkville, VIC.

Dongju Lee: DDB Student Symposium. Structural and pharmacological insights into orphan GPCR, GPR151 with GPR151 with G protein couplings. 30 Oct 2024, Monash University, Parkville, VIC.

Dr. Sarah Piper, Sructural Biology Symposium, July 2024

Qinghao Ou: DDB Student Symposium. Cryo-EM structures of tirzepatide-bound GLP-1R in different micelle conditions. 30 Oct 2024, Monash University, Parkville.

Dr. Sarah Piper: Seeing is believing: using structural biology data to visualise Class B1 GPCR motions in 3D animations. Structural Biology Symposium, 5 July 2024, Monash University, Clayton, VIC.

Alok Pradhan: DDB Student Symposium. Structure determination of GPCR heteromers. 30 Oct 2024, Monash University, Parkville, VIC.

Bhavika Rana: Structural and pharmacological validation of allosteric sites at the M5 mAChR. CCeMMP Research Symposium Strategic Meeting, 12 November, 2024, Parkville, VIC.

Local Meeting Presentation (3MT/3 min Presentations)

Anna Beyger: DDB Student Symposium. CXCR3: The Harry Potter of the immune system. 30 Oct 2024, Monash University, Parkville, VIC.

Marialena Georgopoulou*: Department of Biochemistry and Pharmacology (DBP), University of Melbourne, 8 May 2024, Bio21 Institute, Parkville, VIC. ***Winner of 3MT competition***

Kenta Ishii: DDB Student Symposium. Seeing is believing. 30 Oct 2024, Monash University, Parkville, VIC.

Elaine Jiang: DDB Student Symposium. Elaine's weight loss plan. 30 Oct 2024, Monash University, Parkville, VIC.

Riya Joseph: Department of Biochemistry and Pharmacology (DBP), University of Melbourne, 8 May 2024, Bio21 Institute, Parkville, VIC.

Dr. Sarah Piper: Visualising structural biology data of Class B1 GPCRs in 3D animations. MIPS Research Symposium, 10 Dec, 2024, Melbourne,VIC.

Bhavika Rana: DDB Student Symposium. Analytical and structural neuropharmacology fine- tuning muscarinic receptors: The power of allosteric modulators. 30 Oct 2024, Monash University, Parkville, VIC.

Monica Suehiro: DDB Student Symposium. "Structural DynOmics who's letting in unwanted guests in motor neuron diseases?" 30 Oct 2024, Monash University, Parkville, VIC.

Local Meeting Presentation (Posters)

Michaela Kaoullas Structural Biology Symposium, July 2024

Minakshi Baruah: Determination of antagonist-bound vasopressin receptor structures by cryo-electron microscopy. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Anna Beyger: The structural and pharmacological characterization of CXCR3 isoforms. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Somavally Dalvi: Crossing the barrier: Understanding the life cycle of membrane-containing phages at molecular resolution. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Susovan Das: Structural insight into G protein goupling and activation of human frizzled receptors. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

James Davies: Structure of the human carnitine transporter. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Daniel Fox*: AI-Designed Protein Inhibitors can block heme uptake and inhibit growth of Pathogenic E. coli. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC. ***Winner ThermoFisher poster prize***

Marialena Georgopoulou: Structural studies of cell signalling adaptor protein STimulator of INterferon Genes in complex with small molecule inhibitors. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville,VIC.

A/Prof. Debnath Ghosal: Understanding the infection cycles of membrane-containing phages at molecular resolution. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Brooke Hayes: Aiming to kill: Rhs effector delivery by the Type VI Secretion System. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Kenta Ishii: Harnessing cryo-EM to understand how retatrutide interacts with GLP-1R. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Riya Joseph: Pore formation and regulation of recently identified Bacteroides fragilis Cholesterol-dependent Cytolysin Like (CDCL) proteins. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Michaela Kaoullas*: Structural insights into positive allosteric modulation at the M4 mAChR. Structural Biology Symposium, 5 July 2024, Monash University, Clayton VIC. ***Winner poster prize***

Michaela Kaoullas: Structural insights into positive allosteric modulation at the M4 mAChR. Melbourne Protein Group Student Symposium, 11 July 2024, WEHI, Parkville, VIC.

Michaela Kaoullas: Structural Insights into positive allosteric modulation at the M4 muscarinic acetylcholine receptor. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

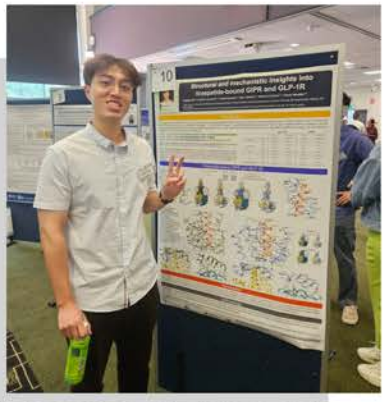
MariaKatarina Lambourne: A twist in the tail: investigating the impact of a novel epilepsy mutation on Kv7.3

protein structure and tetramerisation. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Dongju Lee: Structural and pharmacological insights into orphan GPCR, GPR151 with G protein couplings. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Mayada Mazher: Studying The potential of TMEM120A membrane protein as a voltage gated Ion channel . CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Theo Nettleton: Cryo-EM structures and HDX-MS data of PAC1R splice isoforms in different states of activation. Structural Biology Symposium, 5 July 2024, Monash University, Clayton, VIC.



Qinghao Ou , Graduate Research Symposium, Nov 2024

Theodore Nettleton: Cryo-EM structures and HDX-MS data of PAC1R splice isoforms in different states of activation. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Qinghao Ou: Structural understanding of tirzepatide on GIPR and GLP-1R. 19th Annual HDR Symposium, 6 Nov 2024, Monash University, Parkville, VIC.

Qinghao Ou: Structural and mechanistic insight into tirzepatide-bound GIPR and GLP-1R. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Emily Park*: "Understanding the structure and signalling functions of Eph receptor pseudokinase, EphA10". 22nd Melbourne Protein Group Student Symposium, 11 July 2024, WEHI, Parkville, VIC. ***Poster Prize***

Emily Park*: Understanding the molecular structure and signalling functions of Eph receptor pseudokinase EphA10. WEHI Student & Postdoc Symposium, 25-26 Nov 2024, Parkville, VIC. ***Poster Prize***

Alok Pradhan: Structure Determination of GPCR heteromers. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Inamur Rahman: Destroying the human immunodeficiency virus before infection. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Bhavika Rana: Structural and pharmacological validation of allosteric sites at the M5 Muscarinic acetylcholine receptor – a target for CNS disorders. Structural Biology Symposium, 5 July 2024, Monash University, Clayton, VIC.

Bhavika Rana: Structural & pharmacological validation of allosteric sites at the M5 Muscarinic acetylcholine receptor – a target for CNS disorders. Melbourne Protein Group Student Symposium, 11 July 2024, WEHI, Parkville, VIC.

Bhavika Rana: Structural and pharmacological validation of allosteric sites at the M5 Muscarinic acetylcholine receptor – a target for CNS disorders. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

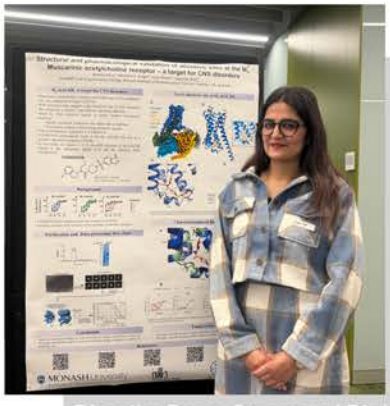
Milad Reyhani: Characterization of a large protein complex in Nanobdellota archaeon YN1. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Solace Roche: Evidence for the mechanism of pore-formation of an ABC toxin. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

David Safadi: Structure and function of the GABAB receptor upon the inding and activation by analgesic peptides. CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.

Monica Suehiro: Investigating the role of TDP-43 in mitochondrial dysfunction and neurotoxicity. 19th Annual HDR Symposium, 6 Nov 2024, Monash University, Parkville, VIC.

Jack Tovey: Binding mode of a thiazole based small molecule agonist to the cholecystokinin type 1 receptor". CCeMMP Research Symposium, 11-12 Nov 2024, Parkville, VIC.



Bhavika Rana, Structural Biology Symposium, July 2024

Dr. Luca Troman*: Single particle cryo-EM analysis of spirochete periplasmic flagella. CCeMMP Research Symposium, 11-12 Nov, 2024, Parkville, VIC. ***Runner up ThermoFisher poster prize***

Shubha Udupa: Visualizing the structure and dynamics of the horizontal gene transfer during bacterial conjugation. CCeMMP Research Symposium, 11-12 Nov, 2024, Parkville, VIC.

Xiaomin Wang: SARS-CoV-2 co-receptors: What they do and how they do it? CCeMMP Research Symposium, 11-12 Nov, 2024, Parkville, VIC.

Yi Zeng: The ins and outs of transport and inhibition of Organic Cation Transporter 1. CCeMMP Research Symposium, 11-12 Nov, 2024, Parkville, VIC.

Industry Presentations

Qinghao Ou: Seminar "Monash-Boehringer Ingelheim collaboration", 24 June 2024, Biberach, Germany.

Prof. Patrick Sexton: Seminar. "Cagrilintide and amycretin structures with target receptors." 30 Sept, 2024, Novo Nordisk A/S. Novo Nordisk Park, Måløv, Denmark.

Prof. Patrick Sexton: Seminar. "My potted history with amylin receptors and cryo-EM." 30 Oct, 2024, Novo Nordisk A/S. Novo Nordisk Park, Måløv, Denmark.

Prof. Patrick Sexton: Seminar and round table. "Molecular insights into glucagon-like peptide-1 (GLP-1) receptor function", 21 Jan, 2025, Astex, Cambridge, UK.

Prof. Patrick Sexton: Seminar. "Understanding the structural basis for selective and non-selective amylin and calcitonin receptor agonists". 27 Feb, 2025, Novo Nordisk, Boston USA.

Prof. Patrick Sexton: Septerna Founders Symposium. "Understanding the structural basis for selective and non-selective amylin and calcitonin receptor agonists". 24 - 25 Feb, 2025, Septerna Inc., San Francisco, USA.

Prof. Denise Wootten: Septerna Founders Symposium. "Targeting the GLP-1R from receptor structure to animal models of disease". 24 - 25 Feb, 2025, Septerna Inc., San Francisco, CA, USA.

Dr. Cindy Zhang: Invited speaker. "Application of cryo-EM in drug development targeting GPCRs", 24 June 2024, ThermoFisher (Shanghai, China) webinar (virtual).

Publications

Abrahamsen HL, Sanford TC, Collamore CE, **Johnstone BA,** Coyne MJ, García-Bayona L, **Christie MP**, Evans JC, Farrand AJ, Flores K, Morton CJ, **Parker MW**, Comstock LE, Tweten RK (2024). Distant relatives of a eukaryotic cell-specific toxin family evolved a complement-like mechanism to kill bacteria. Nat Commun, 15: 5028. https://doi.org/10.1038/s41467-024-49103-5 [8G32]

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Callegari S, Kirk NS, Gan ZY, Dite T, Cobbold SA, Leis A, Dagley LF, **Glukhova A**, Komander D (2025). Structure of human PINK1 at a mitochondrial TOM-VDAC array. Science, 388(6744):303-310. DOI: 10.1126/science.adu6445 [PDB: 9EIH, EMD-48083; PDB:9EII, EMD-48084; 9EIJ, EMD-48085]

Cao J, Belousoff MJ, Johnson RM, Keov P, Mariam Z, Deganutti G, Christopoulos G,Hick CA, Reedtz-Runge S, Glendorf T, Ballarín-González B, Raun K, Bayly-Jones C, **Wootten D, Sexton PM** (2025). Structural and dynamic features of cagrilintide binding to calcitonin and amylin receptors. Nat Commun 16: 3389. https://doi.org/10.1038/s41467-025-58680-y [PDB:9BLB, PDB:9BLC, PDB:9BUE, PDB:9BTW, PDB:9BTL, PDB:9BP3, PDB:9BQ3, PDB:9BUB, PDB:9BUC, PDB:9BUD] ***with industry partner Novo Nordisk***

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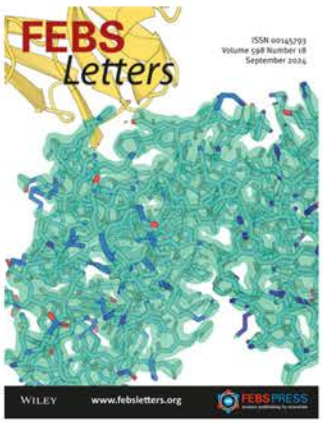
Fox, DR, Samuels I, Binks S, **Grinter R** (2024). The structure of a haemoglobin-nanobody complex reveals human β-subunit-specific interactions. FEBS Letters, 598(18): 2240-2248. https://doi.org/10.1002/1873-3468.14958 ***This is an Editor's Choice article from the 23 September 2024 issue and the cover illustration.***



Cover illustration Fox et al., 2024

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Harikumar KG, **Zhao P, Cary BP,** Xu X, Desai AJ, Dong M, **Mobbs JI,** Toufaily C, Furness SGB, **Christopoulos A, Belousoff MJ, Wootten D, Sexton PM,** Miller LJ (2024). Cholesterol-dependent dynamic changes in the conformation of the type 1 cholecystokinin receptor affect ligand binding and G protein coupling. PLoS Biol, 22(7): e3002673. doi: 10.1371/journal.pbio.3002673 [PDB:9BKK, EMD-44643; PDB:9BKJ, EMD-44642]

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Ishii K, Hermans SJ, **Georgopoulou ME, Nero TL,** Hancock NC, Crespi GAN, Gorman MA, Gooi JH, **Parker MW** (2024)**.** Crystal structure of Alzheimer's disease phospholipase D3 provides a molecular basis for understanding its normal and pathological functions. FEBS J, 291 (24): 5398-5419. https://doi.org/10.1111/febs.17277 [PDB:8VFT] ***This is an Editor's Choice article from the 18 December 2024 issue.***

Johnson MD, Sakai HD, Paul B, Nunoura T, **Dalvi S, Mudaliyar M, Shepherd DC**, Shimizu M, **Udupa S,** Ohkuma M, Kurosawa N, **Ghosal D** (2024). Large attachment organelle mediates interaction between Nanobdellota archaeon YN1 and its host. ISME Journal, 18(1): wrae154. https://doi.org/10.1093/ismejo/wrae154

Johnson MD, Shepherd DC, Sakai HD, **Mudaliyar M,** Pandurangan AP, Short FL, Veith PD, Scott NE, Kurosawa N, **Ghosal D** (2024). Cell-to-cell interactions revealed by cryo-tomography of a DPANN co-culture system. Nat Commun, 15(1): 706. doi: 10.1038/s41467-024-51159-2 [EMD-42578, EMD 42579]

Johnstone BA, Christie MP, Joseph R, Morton CJ, **Brown HG, Hanssen E,** Sanford TC, Abrahamsen HL, Tweten RK, **Parker MW**. Structural basis for the pore-forming activity of a complement-like toxin. Sci Adv. 2025;11(13):eadt2127. doi: 10.1126/sciadv.adt2127 [PDB:8G33(X-RAY); PDB:9CCP, EMD-45451; PDB:9CCQ, EMD-45453; EMD-45448; EMD-45449; EMD-45450; EMD-45452; EMD-45454; EMD-45455]

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Boehringer Ingelheim

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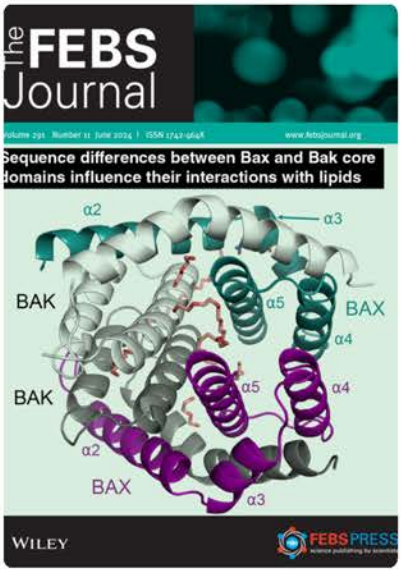

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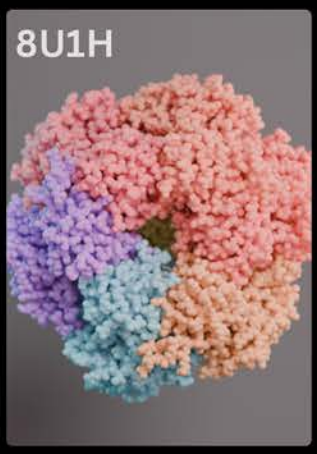

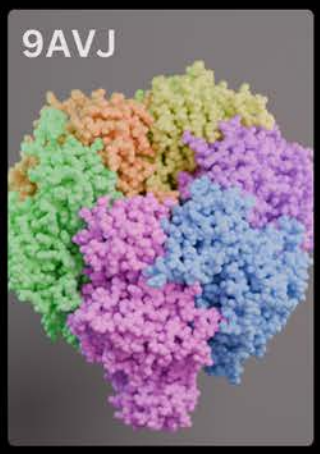

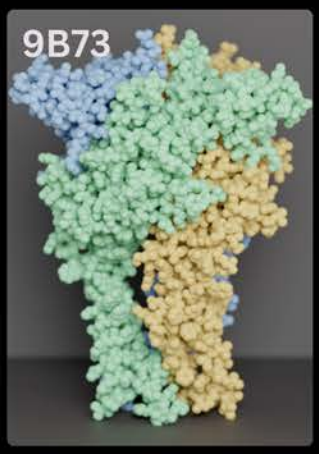

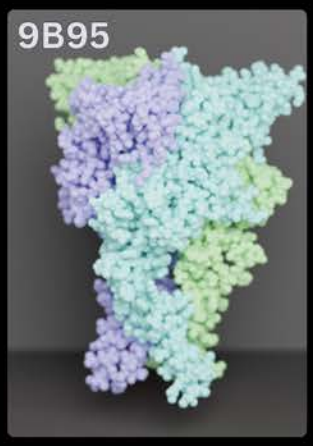

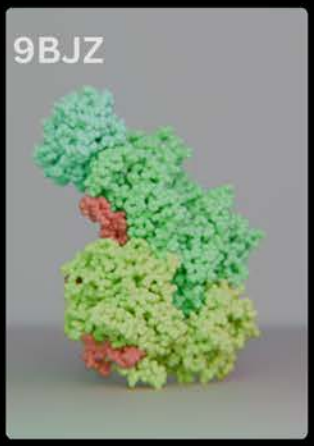

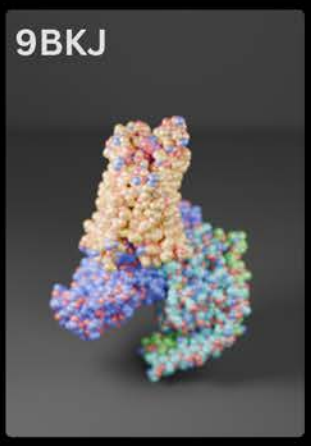

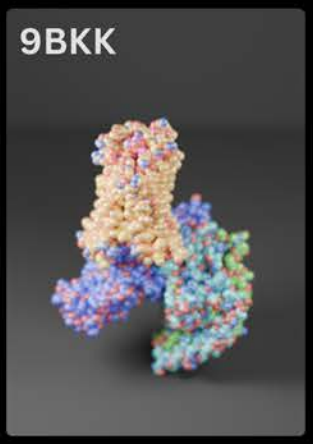

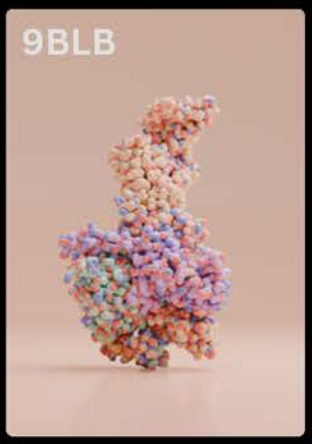

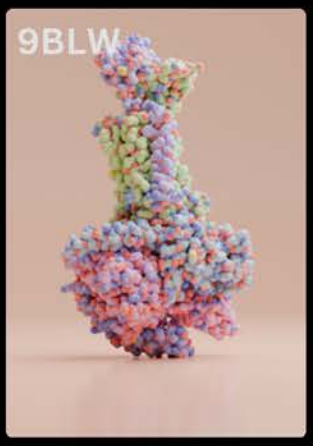

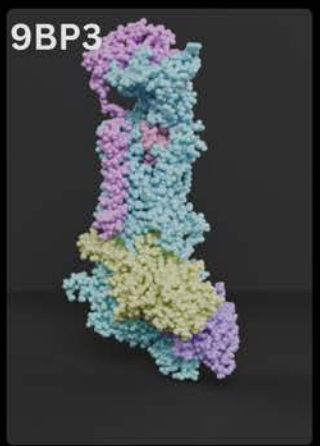

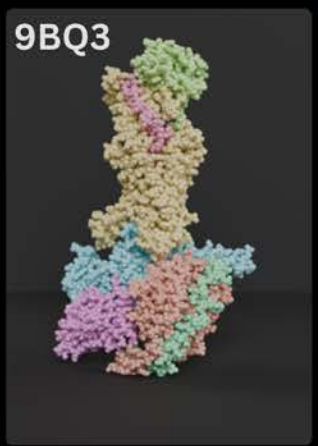

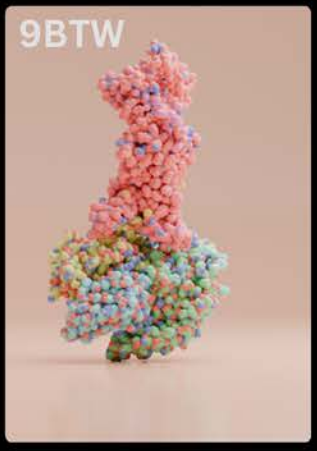

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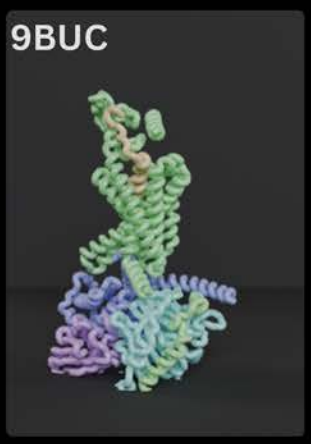

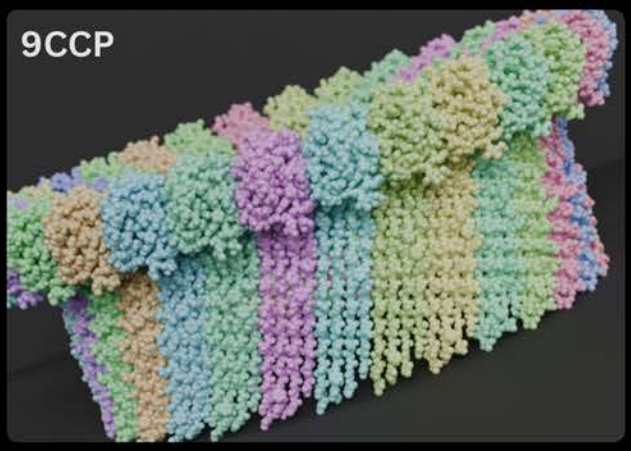

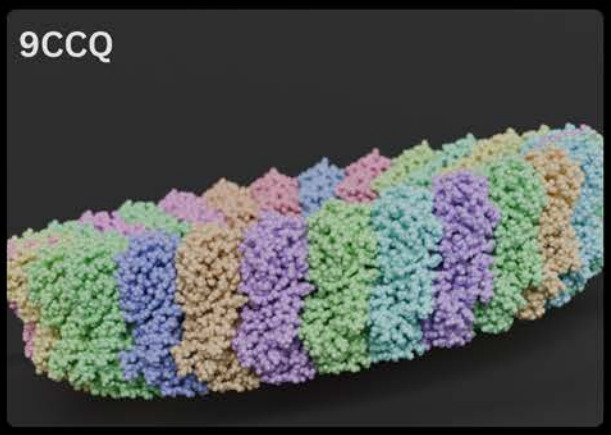

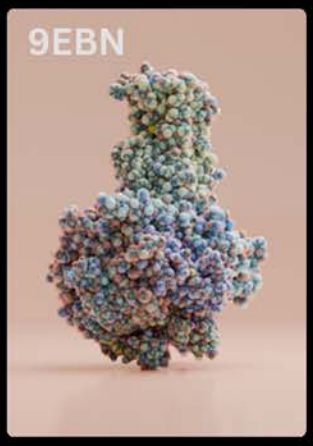

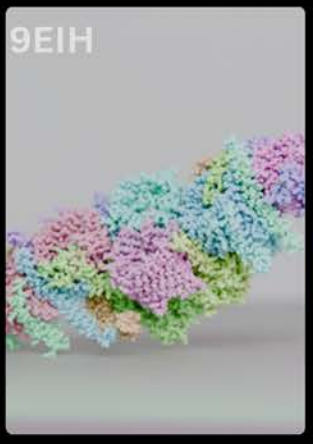

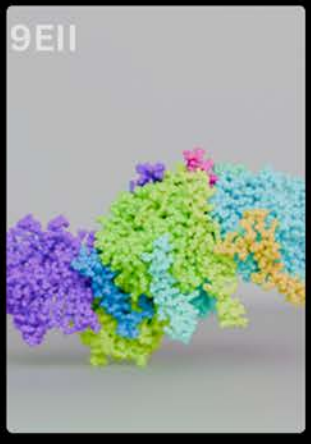

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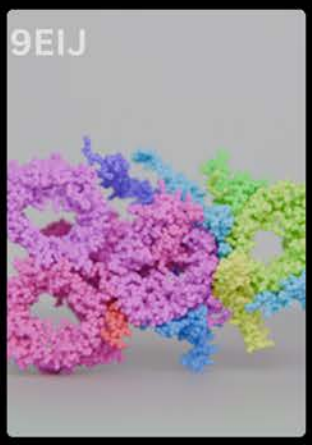

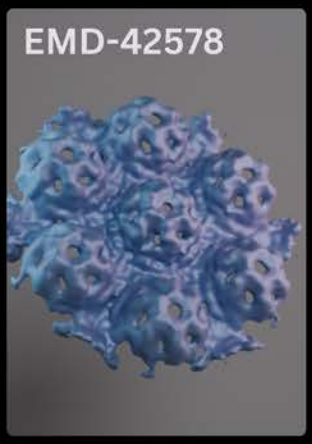

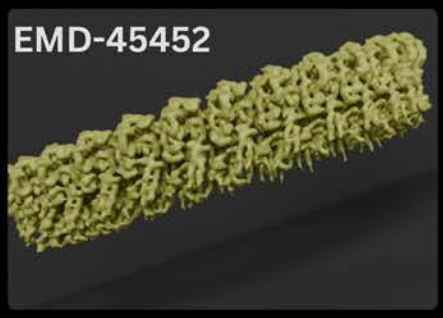

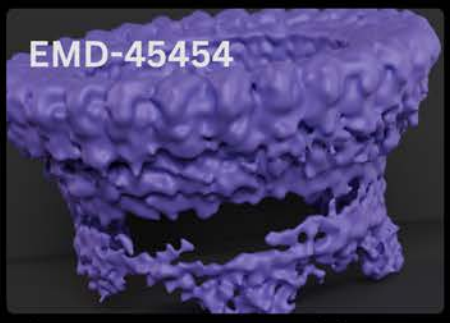

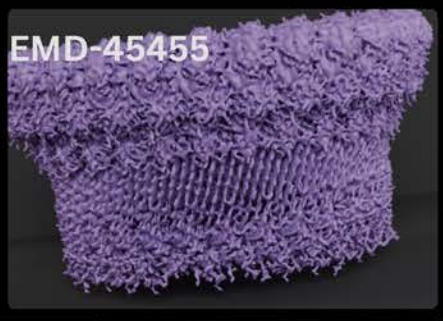

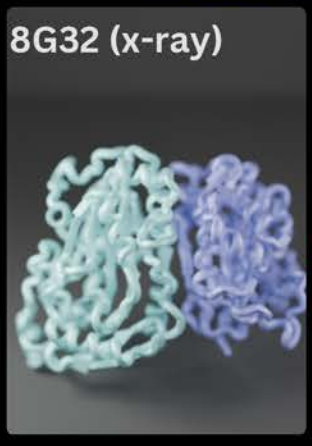

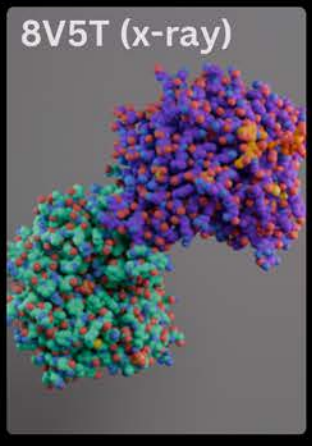

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